TOWARDS A SUSTAINABLE QUALITY MANAGEMENT SYSTEM IN HOSPITALS

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KU LEUVEN

**DOCTORAL SCHOOL
BIOMEDICAL SCIENCES**

TOWARDS A SUSTAINABLE QUALITY MANAGEMENT SYSTEM IN HOSPITALS

A MIXED-METHOD APPROACH TO DEVELOP A CONCEPTUAL MODEL

Fien Claessens

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"Systems awareness and systems design are important for health

professionals. However, it are the ethical dimensions of individuals that are

essential to a system's success. Ultimately, the secret of quality is love."

Avedis Donabedian

Dit doctoraat wordt opgedragen aan Sien Billen, familie van Fien.

Sien overleed op 15 oktober 2019 op 28-jarige leeftijd na een gemiste diagnose.

Zij was Fiens intrinsieke motivatie om in te zetten op de kwaliteit van zorg in de Vlaamse ziekenhuizen.

SUMMARY

Providing high-quality services is a healthcare system's fundamental goal and the role of hospitals in delivering these services is paramount. In hospitals, organisation-wide quality management systems constitute an important method for improving patient outcomes. Nevertheless, previous research and practice examples showed that many quality strategies fail to become sustainably incorporated in professionals' routines. Ensuring sustainability of quality management systems is critical. However, state-of-the-art theoretical and practical models towards sustainability in quality management is lacking and concepts in this area are unclear. This PhD study aimed to close these gaps by developing a conceptual model towards sustainable quality management systems in hospitals.

Our research discovered that the definition of healthcare quality in the 21st century is a multidimensional one of core values, technical domains, catalysts and surrounding domains of person- and kin-centred care. These dimensions are part of front-office and back-office initiatives, which are integrated in practice by care pathways, care programs, protocols and procedures that guide all stakeholders towards healthcare quality. In hospitals, multidimensional quality experiences of patients, kin, professionals in the hospital and primary care setting can be measured by a mirror instrument focusing on both "Healthcare quality for patients and kin" and "Healthcare quality for professionals". This instrument, i.e. the FlaQuM-Quickscan, is co-developed with its end-users and validated in this PhD study. A multistakeholder and multicentre sample discovered that both stakeholder groups "Patient and kin" and "Professionals" do experience healthcare quality domains differently in practice and revealed significant between-hospital variation in quality experiences. Based on these experience measurements, priorities in quality domains can be set, which turned out to be multidimensional in our study sample. Overall, the multidimensional quality definition should be the common thread in quality management systems and continuously monitoring of stakeholders' quality experiences can serve as a catalyst for quality in hospitals.

Conceptual clarity on "sustainability of quality management systems" was brought by proposing a comprehensive, univocal definition of its prerequisites, essential components and consequences. Sustainability is a multi-factorial concept focusing on the continuous improvement of four factors: (1) the goals, (2) resources, (3) the quality management system itself and (4) the individuals. For hospitals, practical drivers for a sustainable quality management system are incorporated in a holistic co-creation roadmap developed by integrating national and international expert opinions and a literature review. The roadmap features six primary drivers, related to 19 building blocks and made actionable with 104 evidence-based action fields, which can be used as a guide towards sustainability. To measure the maturity of the co-creation roadmap implementation in hospitals two maturity tools, i.e. (1) a maturity

matrix with 52 sub-components and (2) a co-creation scan with 19 statements, were co-developed with its end-users and validated in this PhD study. The maturity tools offer insights into both, i.e. the 'as-is' position of the quality management system, and the knowledge needed to guide further development towards sustainability, i.e. the desired 'to-be' position. By doing so, the maturity tools enable hospitals to identify management priorities in their quality management system and continuously monitor growth in maturity over time.

A four-year mixed-method action case study showed a real-life practice example of the co-created quality management system in Sint-Trudo hospital. Results revealed that patients, kin, professionals in the hospital and primary care setting can be successfully involved in quality management and that committed leadership at all hierarchical levels is essential to enhance organisational engagement to co-creation and to ensure resources.

Within this PhD study, a conceptual model towards sustainable quality management in hospitals was developed by integrating mixed-methods results. This conceptual model is supported by multiple validated instruments and tools. This mixed-methods study involved all stakeholders: 26 focus groups were conducted with patients and kin (n=35), primary care professionals (n=22) and content experts (n=79); 56 semi-structured interviews were conducted with international experts in healthcare quality (n=12), healthcare quality managers from 20 hospitals as national experts (n=23) and professionals employed in the Sint-Trudo hospital (n=21); analyses of articles (n=107) were conducted, i.e. in the concept analysis (n=31), in the development of the co-creation roadmap (n=59) and in the development of the maturity tools (n=17); the FlaQuM-Quickscan was validated based on data from patients and kin (n=5,891), professionals (n=7,724) and primary care professionals (n=550); and, finally, the maturity tools were developed based on a Delphi round with healthcare quality managers (n=19) and validated based on data from professionals (n=119).

The final conceptual model consists of prerequisites and essential drivers for developing a sustainable quality management system in co-creation with key healthcare stakeholders, i.e. patients, kin and professionals in the hospital and primary care setting, on the one hand, and the consequences of a sustainable quality management system that need to be monitored, on the other hand. The prerequisites, essential drivers and consequences are described as being sequential with four factors, i.e. (1) the goals, (2) resources, (3) the quality management system itself and (4) the individuals, interacting dynamically and evolving continuously over time.

The developed model, instruments and tools, which are currently being implemented in 25 Flemish hospitals, are specific to the healthcare sector and are widely applicable in hospitals that aim to further develop a sustainable quality management system. Despite the fact that the FlaQuM models, instruments and tools developed and validated in this PhD study have received the ISQua External Evaluation Association (ISQuaEEA) recognition, their implementation in a longitudinal, multi-centre study can reveal new insights in which the impact on patient and professional outcomes is measured continuously.

BEKNOPTE SAMENVATTING

Het leveren van hoge zorgkwaliteit is het fundamentele doel van een gezondheidszorgsysteem, en de rol van ziekenhuizen is hierbij van het grootste belang. In ziekenhuizen vormen organisatiebrede kwaliteitsmanagementsystemen een belangrijke methode om patiëntresultaten te verbeteren. Eerder onderzoek en praktijkvoorbeelden toonden echter aan dat veel kwaliteitsstrategieën er niet in slagen om duurzaam opgenomen te worden in de routines van professionals. Het is van cruciaal belang dat kwaliteitsmanagementsystemen duurzaam zijn. Het ontbreekt echter aan theoretische en praktische modellen voor duurzaamheid in kwaliteitsmanagement en concepten alsook kennis op dit gebied zijn onduidelijk. Dit doctoraatsonderzoek had als doel deze hiaten te dichten door een conceptueel model te ontwikkelen voor duurzaam kwaliteitsmanagement in ziekenhuizen.

Ons onderzoek ontdekte dat de definitie van kwaliteit van zorg in de 21st eeuw multidimensionaal is en bestaat uit kernwaarden, technische domeinen, katalysatoren en overkoepelende domeinen van persoons- en naastegerichte zorg. Deze dimensies maken deel uit van frontoffice- en backoffice-initiatieven, die in de praktijk worden geïntegreerd door zorgpaden, zorgprogramma's, protocollen en procedures die alle belanghebbenden begeleiden naar zorgkwaliteit. In ziekenhuizen kunnen multidimensionale kwaliteitservaringen van patiënten, naasten en professionals in het ziekenhuis en de eerstelijnszorg worden gemeten door een spiegelinstrument dat zich richt op zowel "Kwaliteit van zorg voor patiënten en naasten" als "Kwaliteit van zorg voor professionals". Dit instrument, de FlaQuM-Quickscan, werd samen met de eindgebruikers ontwikkeld en gevalideerd in dit doctoraatsonderzoek. Een multistakeholder en multicentrische steekproef ontdekte dat beide stakeholdergroepen *"Patiënten en naasten"* en *"Professionals"* de kwaliteitsdomeinen verschillend ervaren in de praktijk en toonde significante variatie in kwaliteitservaringen tussen ziekenhuizen. Op basis van deze multidimensionale kwaliteitservaringen kunnen prioriteiten worden gesteld in de kwaliteitsdomeinen, die multidimensionaal bleken te zijn in onze steekproef. Over het geheel genomen zou de multidimensionale kwaliteitsdefinitie de rode draad moeten zijn in kwaliteitsmanagementsystemen en kan het continu monitoren van de ervaringen van belanghebbenden dienen als katalysator voor kwaliteit in ziekenhuizen.

Conceptuele duidelijkheid over "duurzaamheid van kwaliteitsmanagementsystemen" werd gecreëerd door een allesomvattende, eenduidige definitie van de voorwaarden, essentiële componenten en gevolgen ervan voor te stellen. Duurzaamheid is een multifactorieel concept dat zich richt op de voortdurende verbetering van vier factoren: (1) de doelen, (2) de middelen, (3) het kwaliteitsmanagementsysteem zelf en (4) de individuen. Voor ziekenhuizen zijn praktische *drivers* voor een duurzaam kwaliteitsmanagementsysteem geïncludeerd in een holistisch *co-creation roadmap*

dewelke is ontwikkeld door nationale en internationale expertadviezen en een literatuuronderzoek te integreren. De *roadmap* bevat zes *primary drivers*, gerelateerd aan 19 bouwstenen en uitvoerbaar gemaakt met 104 op evidentie gebaseerde actievelden, die gebruikt kunnen worden als leidraad voor duurzaamheid. Om de maturiteit van de implementatie van de *roadmap* in ziekenhuizen te meten, werden twee maturiteitstools, namelijk (1) een maturiteitsmatrix met 52 subcomponenten en (2) een co-creatie sneltest met 19 stellingen, ontwikkeld en gevalideerd. De maturiteitstools bieden inzicht in zowel de 'as-is' positie van de maturiteit van het FlaQuM kwaliteitsmanagementsysteem, als in de kennis die nodig is om verdere ontwikkeling ervan richting duurzaamheid te sturen, d.w.z. de gewenste 'to-be' positie. Door dit te doen, stellen de maturiteitstools ziekenhuizen in staat om managementprioriteiten in hun kwaliteitsmanagementsysteem te identificeren en de groei in maturiteit doorheen de tijd voortdurend te bewaken.

Een vier jaar durende *mixed-method action case study* toonde een praktijkvoorbeeld van de co-creatie van het kwaliteitsmanagementsysteem in het Sint Trudo Ziekenhuis. De resultaten toonde aan dat patiënten, familieleden of naasten, ziekenhuis- en eerstelijnszorgprofessionals succesvol betrokken kunnen worden bij kwaliteitsmanagement en dat toegewijd leiderschap op alle hiërarchische niveaus essentieel is om de betrokkenheid van de organisatie bij co-creatie te vergroten en middelen te garanderen.

Binnen dit doctoraatsonderzoek werd door het integreren van de *mixed-methods* resultaten een conceptueel model naar duurzaam kwaliteitsmanagement in ziekenhuizen ontwikkeld dat ondersteund wordt door meerdere gevalideerde instrumenten en tools. In deze *mixed-methods* studie werden alle belanghebbenden betrokken: 26 focusgroepen werden uitgevoerd met patiënten en naasten (n=35), eerstelijnszorgprofessionals (n=22) en inhoudelijke experts (n=79); 56 semigestructureerde interviews werden uitgevoerd met internationale kwaliteitsexperten (n=12), kwaliteitsmanagers van 20 ziekenhuizen als nationale experten (n=23) en professionals werkzaam in het Sint-Trudo ziekenhuis (n=21); een analyse van artikels (n=107) werd uitgevoerd, nl. in de conceptanalyse (n=31), in de ontwikkeling van de *co-creation roadmap* (n=59) en in de ontwikkeling van de maturiteitstools (n=17); de FlaQuM-Quickscan is gevalideerd op basis van gegevens van patiënten en naasten (n=5,891), professionals (n=7,724) en eerstelijnszorgprofessionals (n=550) en tenslotte werden de maturiteitstools ontwikkeld op basis van een Delphi-ronde met zorgkwaliteitsmanagers (n=19) en gevalideerd op basis van gegevens van professionals (n=119).

Het finale conceptuele model bestaat enerzijds uit randvoorwaarden en essentiële *drivers* om een duurzaam kwaliteitsmanagementsysteem in co-creatie met de belangrijkste belanghebbenden in de gezondheidszorg, d.w.z. patiënten, naasten en professionals in het ziekenhuis en de eerstelijnszorg, te ontwikkelen en anderzijds uit de gevolgen van een duurzaam kwaliteitsmanagementsysteem die opgevolgd dienen te worden. De voorwaarden, essentiële *drivers* en gevolgen worden beschreven als opeenvolgend, waarbij vier factoren, namelijk (1) de doelen, (2) de middelen, (3) het kwaliteitsmanagementsysteem zelf en (4) de individuen, dynamisch op elkaar inwerken en voortdurend evolueren in de tijd.

De ontwikkelde modellen en instrumenten, die momenteel geïmplementeerd worden in 25 Vlaamse ziekenhuizen, zijn specifiek voor de zorgsector en zijn breed toepasbaar in ziekenhuizen die een duurzaam kwaliteitsmanagementsysteem verder willen ontwikkelen. Ondanks dat de in dit doctoraatsonderzoek ontwikkelde en gevalideerde FlaQuM-instrumenten, -tools en -modellen de *ISQua External Evaluation Association (ISQuaEEA)* erkenning hebben gekregen, dient de implementatie ervan in een longitudinaal, multicenter onderzoek nieuwe inzichten op te leveren waarbij de impact op de uitkomsten voor patiënten en professionals continu gemeten wordt.

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LIST OF ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
ANOVA	Analysis of Variance
CEM	Clinician Experience Measure
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
COREQ	Consolidated criteria for reporting qualitative studies
CVI	Content Validity Index
EHMA	European Health Management Association
FlaQuM	Flanders Quality Model
FTE	Full-time equivalent
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HQM(s)	Healthcare Quality Manager(s)
IAR	Insider Action Research
ICM-CFA	Independent Clusters Model Confirmatory Factor Analysis
IHI	Institute for Healthcare Improvement
IOM	Institute of Medicine
ISO	International Organisation for Standardization
ISQua	International Society for Quality in Health Care
I-CVI	Item Content Validity Index
JCI	Joint Commission International
LIHP	Leuven Institute for Healthcare Policy
MLR	Robust Maximum Likelihood
MM	Maturity Model
NHS	National Health Service
OECD	Organization for Economic Co-operation and Development
P4P	Pay-for-Performance
PAR	Participatory Action Research
PCP(s)	Primary care professional(s)
PDSA	Plan, Do, Study, Act
PR	Participatory Researcher
PREM	Patient Reported Experience Measure
QI	Quality Improvement

QM	Quality Management
QMS	Quality management systems
QoC	Quality of Care
QUAGOL	Qualitative Analysis Guide of Leuven
RITA	Rapid Identification of Themes from Audio recordings
RMSEA	Root Mean Square Error of Approximation
RO	Research objectives
S-CVI	Scale Content Validity Index
SRMR	Standardized Root Mean Squared Residual
TLI	Tucker–Lewis index
VIKZ	Vlaams Instituut voor Kwaliteit van Zorg
VPP	Vlaams Patiëntenplatform
WHO	World Health Organization

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Chapter 1

General introduction and research objectives

Op mijn allereerste dag als doctoraatsstudent, 3 juni 2019, stond op onze scheurkalender geschreven:

'Ik heb het nog nooit gedaan, dus ik denk dat ik het kan'

On my first day as a PhD student, 3 June 2019, our tear-off calendar reads as follows:

"I have never tried that before, so I think I should definitely be able to do that"

(Quote Pippi Langkous)

The crucial imperative of healthcare quality

Providing high-quality services is a healthcare system's fundamental goal, and the role of hospitals in delivering these services is paramount. Hospitals are complex service organisations, governed by nonlinear behaviours of their professionals, the patients, kin and patients' illnesses. Assuring healthcare quality management within these hospitals is not only a matter of ethical responsibility but also a matter of national and global importance. Globally, we have seen a proliferation in the interest and implementation of quality improvement strategies in hospitals [1,2]. Despite these efforts to improve healthcare quality, slow progress in improvement has been made [3,4]. Quality and safety problems persist. Unsafe care in hospitals still causes significant morbidity and mortality worldwide [5,6] and 10 to 20% of patients experience an adverse event, of which 50 to 70% is avoidable [7–9]. As only 60% of care is based on evidence or guidelines [10], substantial practice variation seems to be a persistent healthcare quality issue [11]. There is a growing awareness of the importance of maintaining effective quality strategies which inevitably introduces cost-effectiveness into the quality management dialogue in hospitals [2]. Once hospitals have taken the first steps to improve quality, it is important but challenging to sustain gained quality results and ultimately achieve quality management as an integral part of the organisation [12]. A firm foundation of safe, high-quality care, together with all that is necessary to sustain it, is the imperative for policy-makers today at national and international levels [2]. If we can change how we think about healthcare improvement and draw on new thinking paradigms, such as the push for person-centred care, need-driven and value-based healthcare, perhaps we can move beyond today's frozen systems performance [10]. "First do no harm" remains a sacred obligation for all in healthcare and success requires constancy of purpose for improvement [6].

Healthcare quality: an evolution of definitions

To measure, to improve or to assure healthcare quality, it is important to have a clear and focused understanding of what we mean by healthcare quality. To define healthcare quality, academics have developed definitions and conceptual frameworks over the years [12,13]. Starting with Donabedian's early process-centred definition in 1980 focusing on '*care that is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts*' [14], followed by the outcome-centred definition of the Institute of Medicine (IOM) in 1990 focusing on '*the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge*' [15]. A decade later, in 2001, IOM elaborated this definition with six renowned aims for improvement: *patient-centredness, timeliness, efficiency, effectiveness, safety and equity* [16]. These quality definitions played a key role in the way quality was understood in healthcare and had a

tremendous, worldwide impact on the healthcare policy, healthcare system transformation, healthcare organisations' quality management, education and research to this day [17].

During this large-scale quality movement in healthcare, priority-setting was mainly on trends of IOM's quality dimensions [18,19], which seemed to progress and stagnate over time [4,20]. As these definitions focused mainly on the thin line between healthcare quality and overall health system performance, internationally recognised (research) institutes in quality and safety expanded their quality frameworks, driven by experiences in real-life practice settings and by feedback of healthcare professionals, organisations and policy-makers who emphasized that quality improvement requires more than the six aforementioned quality aims. For example, the World Health Organization (WHO) officially published in 2007 the change from 'patient-centred care' to 'people-centred care' in their definition of healthcare quality [21]. This shift in terminology reflects a broader recognition of the holistic nature of healthcare, taking into account patients as whole persons with various needs, values and preferences, beyond their disease, illness or condition [22]. Other, more recent, expansions are the one including healthcare professionals as important key players in the healthcare system. For example, the Institute for Healthcare Improvement (IHI) aims for improvement evolved from Triple Aim to Quadruple Aim by adding 'care for the caregiver' [23], and since the COVID-19 pandemic from Quadruple to Quintuple Aim by gaining momentum for 'health equity', which was already part of IOM's definition [24,25]. These expansions were made actionable via new frameworks, such as Improving Joy in work [26] and the Psychology of Change [27]. Over the past decades, the definition of quality has undergone an important evolution not only in a theoretical but also in an operational way [28].

Recently, the widely accepted frameworks have been reviewed on its relevance and revised based on healthcare quality experiences of the last years [29]. As a result, a new multidimensional quality model is proposed by Lachman, Batalden and Vanhaecht (2021) [28,29] that incorporates existing domains, such as person-centredness by including patients and professionals, and emerging domains which reflect the changing worldview of healthcare, such as ecology [30] and transparency [31] (Figure 1.1). Moreover, this model extends the umbrella domain of person-centredness by including kinship that surrounds every other domain. The person- and kin-centred vision refers to all people involved in healthcare processes, from patients and their kin to hospitals management and professionals. The extension can be linked to the maturing concepts of co-production and partnership in care [32–34].
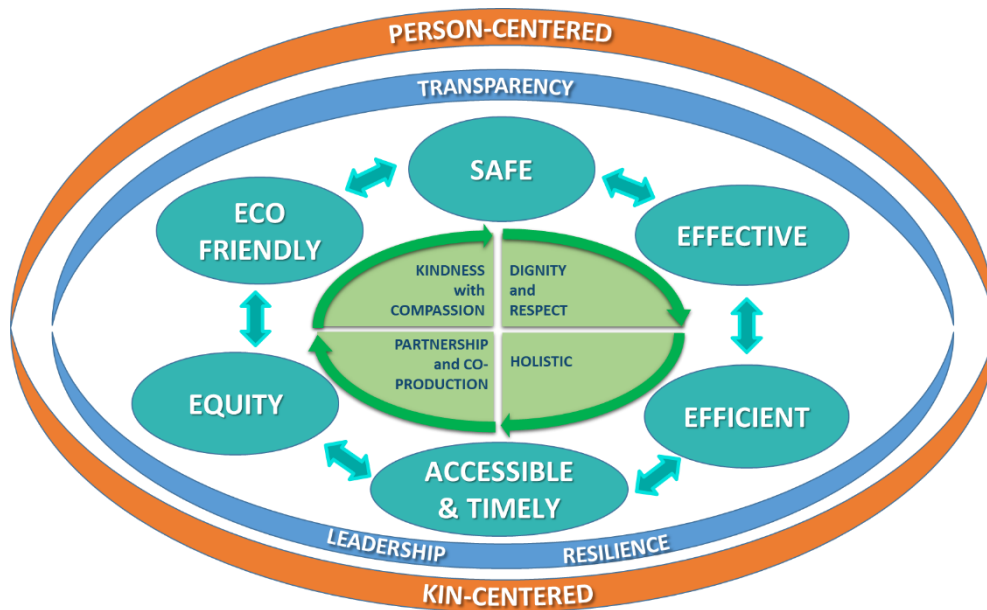
Figure 1.1 Lachman, Batalden and Vanhaecht's multidimensional quality model [29]. Reproduced with permission.

In addition to technical domains, domains related to emotional and relational aspects of healthcare are introduced at the core of the multidimensional model [28]. These domains are named the 'core values', referring to the recent trend towards a value-driven approach in quality management [35]. These core values reflect an atmosphere of kindness with compassion [36], dignity and respect [37,38], partnership and co-production [39] and holistic care [40]. Previous research highlighted the core values as desired quality outcomes [41,42] and subsequently they are increasingly studied in many regions of the world, pointing the global interest [43]. An emerging literature shows links between the defined core values, patient outcomes [44,45] and provider outcomes [45,46]. Moreover, catalysts, such as leadership and resilience which are underscored by fundamental research [47,48], are introduced in this multidimensional quality model to implement technical quality domains and core values in practice. These catalysts are critical for strengthening quality management and the integration of care [49,50].

Healthcare quality definitions were shaped almost exclusively from the vision of health professionals and service researchers. However, perspectives of patients and their kin has been increasingly recognised as highly relevant to comprehensively define healthcare quality [2,51]. Moreover, since a lack of knowledge sharing between hospitals and primary care is observed [52,53], efforts to define and prioritise quality domains should include primary care professionals [54–56]. Current absence of patients', kin's and primary care's perspective led to a poor understanding of healthcare quality in practice settings and a theoretical gap in the definition of healthcare quality based on a multistakeholder perspective. Besides the importance of a comprehensive and holistic understanding of key quality attributes from a multistakeholder perspective, a knowledge gap is observed as current

healthcare quality experiences from these stakeholders are unknown and a practice gap on how to use their experiences for quality management purposes. Understanding patients', kin's and professionals' experiential knowledge in-depth is a valuable resource for hospitals to define quality-related priorities and to focus future quality management. Previous research suggested differences in healthcare quality experiences between stakeholders groups and hospitals but more research on this variation is needed. Interpreting differences in stakeholders' experiences of healthcare quality can serve as an accelerator for future quality strategies and is critical to ensure sustainable success of these strategies.

Quality management systems: an evolution of systems

A variety of theoretical frameworks have been put forward to develop quality management systems (QMS) that induce change at different hospital levels: at the individual, team and organisational level. The evolution of quality management in hospitals has been a continuous one, starting with the early works in industry design concerning the 'Statistical Quality Control' (1924) the 'Deming Wheel of Plan-Do-Study-Act' (1950), 'Jurans Trilogy' of quality design, control and improvement (1950), 'Total Quality Control' (1958) and 'Zero Defects' (1979) described by founding fathers Walter Shewhart, Edwards Deming, Joseph Juran, Armand Feigenbaum and Philip Crosby, respectively [28,57]. Quality was still highly linked to efficiency and profit [28]. These strategies influenced the origination of Total Quality Management (1980s-1990s), Continuous Quality Improvement (1990s-2000s), towards Patient-Centered Care (2000s-Present) and Lean Six Sigma (2010s-Present) [57,58]. Following these strategies, certification and accreditation bodies, such as the International Organisation for Standardization (ISO) and the Joint Commission International (JCI), emerged to develop standards for healthcare quality and management and to externally assess organisations to these pre-specified standards. Research has shown that certified and accredited hospitals showed better adherence to quality management standards than non-certified hospitals [59]. Despite this improved adherence, no firm conclusions about the effectiveness of external review of compliance with standards in improving hospital behaviour, healthcare professional behaviour or patient outcomes could be drawn [60]. Conversely, hospitals' internal, organisation-wide QMS has proven to be an effective strategy to improve structural characteristics [61], an innovative culture [61], processes [62] and patient outcomes [63,64]. Moreover, a European study involving frontline staff and clinical leaders found positive associations between hospitals' QMS implementation, teamwork and safety climate [65]. Such new evidence introduced the importance of a patient safety culture in hospitals [66] complemented by an effective learning system to harness, refine, and deploy all of the knowledge flowing within and between organisations [67].

Nevertheless, quality management in hospitals today is not what it was twenty or even ten years ago. As technology, the attention for climate change, patient expectations and healthcare policies continue to evolve and the shortage in healthcare professionals and their burn-out rates continue to increase, QMS in hospitals need to adapt to meet these changing needs and challenges [68]. This continually evolving healthcare system, the compliance of hospitals to numerous standards that requires exorbitant administrative work from healthcare professionals as well as the repetitive audits and assessments have been leading to an alleged 'quality fatigue' and resistance to change among professionals [69,70]. Emerging literature shows that a highly demanding work environment is negatively associated with healthcare professionals' health [71] and with quality and patient safety satisfaction [72]. As described by Braithwaite et al. (2018), caution goes to the proponents of today's most popular quality strategies: *'it's time to stop thickening the rule book and to reorganise the organisation chart'* [10]. Where quality strategies could once be applied separately to hospital departments or nursing wards, it is now apparent that it should be subject to a more overarching, organisation-wide, non-disease-specific QMS using a bottom-up approach to promote shared values and behaviours organisation-wide. Different from the 'Company-Wide Quality Control' introduced by Ishikawa (1981), current organisation-wide quality strategies focus on understanding how key stakeholders, i.e. patients, kin, professionals in the hospital and primary care setting, can play an active role in the QMS [1]. The early interventions to co-produce quality management were promoted by Batalden et al. (2021) [73,74] and has been emphasizing how we can improve the value of the contribution that healthcare services make to health [29]. The sole notion of 'creating value' acquires a new perspective that echoes in the recent paradigm of value-based management by focusing on what matters to patients, kin and healthcare professionals [75,76] and by enhancing their entrepreneurship [77,78]. By doing so, the ethical dimension of individuals and their preferences, needs and values becomes essential to a QMS's success [28]. Despite the first positive outcomes of co-creation [79–81], theoretical and empirical knowledge in this area is nascent and the field is still far from being mature [82]. Operational frameworks on how to co-manage quality in healthcare are currently lacking and empirical data collection on the multiple faceted co-produced quality activities is promoted. These insights would support other hospitals to co-create their QMS.

Unravelling the black box of sustainable quality management systems

In parallel with the establishment of co-creation principles, sustainability has been vaunted as a "North star" for quality management in healthcare organisations. International and national policy-makers, managers, healthcare professionals and researchers have at least one thing in common: they share a universal need to better understand sustainability of a QMS in the hope that it contributes to the optimisation of healthcare delivery [83]. Implementation of QMS is meaningless without including

long-term sustainability efforts. The consequences of evaporation of achieved success in improved quality are not just financial and a waste of time, but may also result in suboptimal care, cause frustration, and diminish the support for future quality strategies. Therefore, it is important to incorporate quality sustainably into the daily workflow of professionals, so that they do not perceive it as 'extra' above daily practices [84]. For hospitals, it is a strategic imperative to embed, to have 'stickability', to maintain quality strategies and their contribution to performance [85,86]. The debate on how to accelerate and sustain quality improvement is more relevant than ever.

Sustainability is a relatively new term in healthcare quality management research and has become an issue of growing interest. Today, evidence in the area of sustaining QMS is still lacking for several reasons [87,88]. First, there is no universal definition, conceptual consistency nor operational clarity for sustainability [88–91]. The concept remains ambiguous in the discipline of healthcare quality, resulting in a struggle to articulate the role of sustainability in the quality movement. In literature, only generalised descriptions are found [87,89,92]. Different definitions of sustainability have been proposed [93–95], which can be seen in its simplest form as "normalization", "holding the gains," and "evolving as required". However, as highlighted by Braithwaite et al. (2020) [94], it is important to have a clear and focused understanding of what we mean when we discuss 'sustainability' in QMS. Second, most implementation studies do not report the success factors or essential activities for obtaining sustainability [92,96]. Few studies explored influencing activities, which are mainly related to infrastructures [89–91,97], human elements [89,90,97,98], organisational and environmental support [89,90,97] and improvement initiatives [89–91,97,98]. Third, to the best of our knowledge, sustainability is until now only investigated as a minor part of the implementation process, such as concerning the sustainability of evidence-based practices or improvement interventions, and not as a main pillar for an organisation-wide QMS [88]. These reasons show that there is still a conceptual gap between hospitals' wish for sustainability and how this sustainability can be achieved. A state-of-the-art theoretical and practical definition of sustainability in quality management would support hospitals choose the 'right' quality strategies best suited to their context, in order to grow towards optimisation of healthcare delivery.

Quality management in Flanders, Belgium

Belgium is a European country with a federal state and a three language communities, the northern region, Flanders, speaks primarily Dutch, the southern region, Wallonia, speaks primarily French and a German-speaking community in the east of the country. As in all European countries, the Belgian state plays a role in hospitals' quality management [2]. The federal government is responsible for financing care services in hospitals and outlining the standards of acute-care hospitals. The regional

governments are responsible for checking the compliance with (federal) standards and imposing generic standards and disease specific standards, such as standards for geriatric care in acute-care hospitals. In Flanders, a region with more than 6.5 million inhabitants and around 70 acute-care and specialised hospitals, a governmental coalition agreement was established in 2009. In this agreement between the government and hospital associations a 'Quality-of-Care Triad' was defined and hospitals were encouraged to build their QMS mainly around this triad. The latter consists of a voluntary organisation-wide external accreditation by an international external agency, mandatory governmental inspections and voluntary public reporting of quality indicators. The mandatory governmental inspections consist of an announced systemic inspection of which accredited hospitals are exempt, as well as a yearly unannounced examination of patient trajectories. As described in a recent study, Flemish hospitals have been increasingly implementing the Flemish 'Quality-of-Care Triad', especially from 2016 onwards, with 87% of Flemish hospitals having obtained an accreditation label by either the JCI or the Dutch Qualicor Europe; and all hospitals voluntarily publicly reporting a selected set of quality indicators [99–101].

Since the introduction of the 'Quality-of-Care Triad', small improvements in all-cause 30-day mortality and prolonged length-of-stay between 2008 and 2018 were uncovered, while readmission rates increased over time [102]. Based on the publicly reported patient experiences [100], a significant improvement in patients scoring the hospital 9 or 10 (56% to 61%) and patients definitely recommending the hospital (67% to 70%) between 2014 and 2019 was observed [101]. Despite these improvements, hospitals' increasing commitment to quality resulted in a heterogeneity in perceptions and attitudes towards quality initiatives among healthcare stakeholders [99,103]. On the topic of external international accreditation, overall attitudes were predominantly neutral (36.2%), while 34.5% expressed positive and 29.3% negative views towards accreditation [99]. A narrative review examining the impact of the 'Quality-of-care Triad' on patient processes and outcomes, revealed primarily no overall effect [104], except accreditation was discovered to positively influence processes of care [104]. Another international study observed a positive impact of accreditation on patient outcomes in the survey week [105]. A recent cost-analysis showed that a first accreditation cycle amounted to 879.45 euro (interquartile range: 794.81) per bed and 3.8 full-time equivalent (FTE) per hospital were recruited for coordination and implementation, for a second accreditation cycle this was 222.88 euro (interquartile range: 244.04) and 1.50 FTE respectively [106]. As no resources were provided by the government to participate in this accreditation trajectory, hospitals had to provide their own funding. Currently, questions are rising about the durable support of current accreditation systems. Quantified preferences of policy-makers, hospital managers, clinicians and patients revealed that a future quality model should focus on a multicomponent approach with external quality control,

improvement actions on hospital network level and public transparency [107]. National and international hospital associations currently face the challenge to develop this sustainable quality model. As previously observed in Denmark [108], several Flemish hospitals announced to leave organisation-wide accreditation. Consequently, the Flemish minister of Department of Welfare, Public Health and Family stated in 2021 that no governmental inspections on hospitals' QMS would be conducted before December 2023. In practice, each hospital is given the opportunity to design their own QMS but they still have to comply with the generic standards and disease specific standards controlled by Flemish government and other laws on healthcare, quality and patient safety in Flanders, Belgium and Europe. Today, there is a practice gap in Flanders as hospitals need guidelines to develop this QMS sustainably and in co-creation with patients, kin and professionals, as recommended in emerging international quality paradigms.

On federal level, specific funding concerning certain quality indicators through the implementation of a Pay-for-Performance (P4P) program was introduced in 2018. After a decade of fixed bonus budgets for "quality and safety contracts", hospitals are rewarded depending on their score on a selected set of quality indicators, such as measuring patient experiences, that is revised yearly. Since the introduction of the P4P program, quality performance scores increased yearly for 55% of hospitals and decreased yearly for 5% of hospitals [107]. The transition from fixed bonus budgets for quality efforts to a new incentive payment in a P4P program has led to more hospitals being financially impacted, although the effect is marginal given the small P4P budget [107]. Despite that the impact on outcomes in Flemish hospitals being currently unknown, previous research showed that P4P programs were not consistently positively associated with improved health outcomes [109,110]. Additionally, the federal government introduced in 2019 a 'Healthcare professionals Quality Act' that has been in force since July 2022. This law, which will be operationalised in the coming years, concerns the requirement of a visa to practice, the conditions regarding the framework, structure and organisation of the practice, the maintenance of patient records, the obligation of care continuity, the communication of practitioners with the community and diagnostic and therapeutic freedom for practitioners [111].

Sint-Trudo hospital, an acute-care hospital in Flanders

Sint-Trudo hospital is a 310-bed acute-care hospital in Flanders with over 1,000 employees and about 140 physicians. However, after the obtainment of the JCI-label, the Chief Executive Officer (CEO) of the hospital wondered why the QMS was not sustainably embedded into the daily workflow of professionals. In the hospital, change fatigue was expressed by healthcare professionals, related to rapid and continuous change implementation. This fatigue, in combination with the feeling that quality improvement was 'imposed' on them, increased the distance between quality initiatives and the daily

routines of healthcare professionals. This distance meant that healthcare providers no longer fully understood the usefulness and value of certain strategies and subsequently did not further support the adherence to pre-specified standards defined by accreditation bodies and not based on evidence. The hospital clearly needed a new, evidence-based form of quality management to re-engage professionals in quality.

After the CEO had contacted the research team of the Leuven Institute for Healthcare Policy (KU Leuven) with the aforementioned question in autumn 2018, a Research Chair, i.e. an investment of an organisation in high-quality scientific research, was established to conduct research on the development of a sustainable QMS in an acute-care, regional hospital. A significant practice gap exists regarding what, how and when different steps are taken in real-life practice settings to develop a co-created QMS aimed at sustainably and continuously engaging all stakeholders [94]. In hospitals, the unique insights in these development steps are often not described. Describing co-creation as a real-word phenomenon is a crucial academic and managerial issue. Therefore, a clear rationale exists to further evolve the empirical knowledge base on how to co-develop a QMS with patients, kin and professionals. The Sint-Trudo Research Chair promotes this PhD project that started in 2019, in which we aimed to close the described theoretical, knowledge, conceptual and practice gaps.

Objectives of this PhD study

The aim of this research is to develop a conceptual model towards sustainable quality management in hospitals. This main research objective is translated into the following specific research objectives (RO):

1. To identify key attributes of healthcare quality in the 21st century.
2. To understand healthcare quality experiences from a multistakeholder perspective:
    a. To develop and validate an instrument to measure healthcare quality experiences multidimensionally from a multistakeholder perspective;
    b. To examine between-stakeholder group variation and between-hospital variation in healthcare quality experiences to set quality priorities for hospital management and policymakers.
3. To define 'sustainability' in quality management systems of healthcare organisations.
4. To develop a roadmap that guides hospitals towards a sustainable, mature quality management system:
    a. To develop a roadmap to implement healthcare quality sustainably into hospitals;
    b. To measure the maturity of the implementation of the co-creation roadmap in hospitals.
5. To describe a case study of the co-created QMS in Sint-Trudo hospital.

The relations between the main research objective, the specific research objectives, the publications and the outline of this thesis are presented in Table 1.1.

Table 1.1 Outline of the PhD dissertation.

Main research objective: To develop a conceptual model towards sustainable quality management in hospitals	
SPECIFIC RESEARCH OBJECTIVES (RO)	**CHAPTERS**
/	**Chapter 1:** General introduction and research objectives
RO1. To identify key attributes of healthcare quality in the 21st century.	**Chapter 2:** Patients' and kin's perspectives on healthcare quality compared to Lachman's multidimensional quality model: Focus group interviews (published in Patient Education and Counseling)
	Chapter 3: The "House of Trust": A framework for quality healthcare and leadership (under review)
RO2. To understand healthcare quality experiences from a multistakeholder perspective: RO2a) To develop and validate an instrument to measure healthcare quality experiences multidimensionally from a multistakeholder perspective;	**Chapter 4:** Measuring in-hospital quality multidimensionally by integrating patients', kin's and healthcare professionals' perspectives: Development and validation of the FlaQuM-Quickscan (published in BMC Health Services Research)
RO2b) To examine between-stakeholder group variation and between-hospital variation in healthcare quality experiences to set quality priorities for hospital management and policymakers.	**Chapter 5:** Understanding variation in healthcare quality experiences of three stakeholders: Patients and kin, healthcare professionals and hospitals (published in NEJM Catalyst)
	Chapter 6: The FlaQuM-Quickscan: A starting point to include primary care professionals' perspectives in the evaluation of hospital quality priorities (published in Journal of Healthcare Quality Research)

RO3. To define 'sustainability' in quality management systems of hospitals.	**Chapter 7:** A concept analysis of sustainability of quality management systems in healthcare organisations (under review)
RO4. To develop a roadmap that guides hospitals towards a sustainable, mature quality management system: RO4a) To develop a roadmap to implement healthcare quality sustainably in hospitals;	**Chapter 8:** Cornerstones of a sustainable national quality policy: A qualitative study based on international expert opinions (published in The International Journal of Health Planning and Management)
	Chapter 9: Sustainable quality management in hospitals: the experiences of healthcare quality managers (published in Health Services Management Research)
	Chapter 10: A co-creation roadmap towards sustainable quality of care: A multi-method study (published in PLOS ONE)
RO4b) To measure the maturity of the implementation of the co-creation roadmap in hospitals.	**Chapter 11:** A multi-phase, multi-centre development and validation of two maturity tools assessing the implementation of the FlaQuM co-creation roadmap (accepted in International Journal for Quality in Health Care)
RO5. To describe a case study of the co-created quality management system in Sint-Trudo hospital.	**Chapter 12:** How to co-create a quality management system: a mixed-method action case study in a regional hospital (under review)
	Chapter 13: General discussion

Related PhD studies

Along with the PhD study described above, two other PhD studies has been promoted by the Research Chair Zorgnet-Icuro, i.e. the Flemish hospital umbrella organisation, 'Future of hospital quality'. In the first PhD study, Jonas Brouwers focused on the financial impact of quality improvement initiatives and the policy concerning quality of care and patient safety [107]. In the second PhD study, Astrid Van Wilder focused on a retrospective observational study of temporal trends and variability in patient outcomes within the Belgian hospital landscape [112]. One published manuscript is a joint one between the PhD study of Jonas Brouwers and the current PhD study [113]. The three PhD studies together will provide a scientific basis for a new Flanders Quality Model (FlaQuM) towards sustainable quality of care in hospitals. In May 2023, a new PhD study was initiated under the lead of Alexander Wytinck, who will focus on the financial implications of quality management and specifically the cost of poor quality.

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Chapter 2

Patients' and kin's perspectives on healthcare quality compared to Lachman's multidimensional quality model:
Focus group interviews

Patients' and kin's perspectives on healthcare quality compared to Lachman's multidimensional quality model: Focus group interviews

Abstract

Objectives: To identify key attributes of healthcare quality relevant to patients and kin and to compare them to Lachman's multidimensional quality model.

Methods: Four focus groups with patients and kin were conducted using a semi-structured interview guide and a purposive sampling method. Classical content analysis and constant comparison method were used to focus data analysis on individual and group level.

Results: Communication with patients, kin and professionals emerged as a new dimension from interview transcripts. Other identified key attributes largely corresponded with Lachman's multidimensional quality model. They were mainly classified in dimensions: 'Partnership and Co-Production', 'Dignity and Respect' and 'Effectiveness'. Technical quality dimensions were linked to organisational aspects of care in terms of staffing levels and time. The dimension 'Eco-friendly' was not addressed by patients or kin.

Practice Implications: The key attributes can serve as a holistic framework for healthcare organisations to design their quality management system. An instrument can be developed to measure key attributes.

Conclusion: The results enhance the comprehension of healthcare quality and contribute to its academic understanding by validating Lachman's multidimensional quality model from patients' and kin's perspective. The model robustness is increased by including communication as a quality dimension surrounding technical domains and core values.

Introduction

In the last decades, academics have attempted to develop definitions and conceptual models to describe healthcare quality [1,2]. Since 2001, the Institute of Medicine (IOM) has played a key role in a large-scale quality movement in healthcare by introducing a quality framework with six dimensions: patient-centredness, timeliness, efficiency, effectiveness, safety and equity [3]. Recently, IOM's widely accepted framework has been reviewed on its relevance and revised based on healthcare quality experiences of the last 20 years [4,5]. As a result, a new multidimensional quality model is proposed by Lachman that incorporates new domains which reflect the changing worldview of healthcare, such as ecology and transparency [4]. Moreover, this model extends the domain of person-centredness by including kinship that surrounds every other domain. The extension can be linked to the maturing concepts of co-production and partnership [6–8]. Emphasis on person- and kin-centred care makes them actively involved in the management of both their health and the healthcare system [9]. Co-creating value with patients and kin is essential to develop future healthcare quality strategies.

During the large-scale quality movement in healthcare, the focus of improvement was mainly on trends of technical quality dimensions [10,11]. Based on these trends, quality seems to progress over time [5,12,13]. However, results may be different if a holistic approach on quality was used [1]. Therefore, in order to design a future quality management system to improve and sustain results, it is fundamental to assess quality by including a comprehensive view of all healthcare stakeholders [14,15]. Few studies explored what constitutes healthcare quality from different perspectives. Healthcare professionals are more inclined to describe it technically with a focus on processes [16,17], in contrast to patients putting emphasis on supportive [18], human [16,19], environmental [20,21] and functional elements [17,21].

Although considerable research has been devoted to exploring quality from professionals' and patients' perspectives, less attention has been paid to the perspective of kin [22–26]. The absence of key quality attributes from kin's perspective has led to a poor understanding of healthcare quality. Understanding both patients' and kin's experiential knowledge in-depth is a valuable resource for hospitals to focus further quality improvement on and assess progress [27,28]. In conclusion, before applying the new revised multidimensional quality model in practice, a comprehensive and holistic understanding of key quality attributes from patients' and kin's perspective is critical to ensure success [27,29].

The objectives of this paper are two-fold. First, to further enhance the comprehension of healthcare quality by identifying key attributes relevant to patients and kin. Second, to assess whether the findings contribute to the academic understanding of healthcare quality by comparing the key attributes to those of Lachman's multidimensional quality model [4].

Methods

Design

A qualitative design with the focus group technique was used to explore key healthcare quality attributes [30]. Focus group interviews have the advantage of group dynamics for accessing rich information to explore different viewpoints in depth [31,32]. Theoretical insights were inductively derived from focus group interviews with patients and kin and were then deductively compared to Lachman's multidimensional quality model.

Setting

This study took place in three hospitals in Flanders (Belgium), which are implementing a new Flanders Quality Model (FlaQuM). UZ Leuven is a university hospital with 1.949 licensed beds, 51.645 hospitalisations and 113.637 one-day admissions in 2020. Sint-Trudo Ziekenhuis and Regionaal Ziekenhuis Heilig Hart Tienen are general hospitals with 310 licensed beds, 13.819 hospitalisations and 16.949 one-day admissions and with 303 licensed beds, 10.308 hospitalisations and 23.995 one-day admissions in 2020, respectively.

Participant selection and recruitment

Dutch speaking participants of at least 18 years old were selected. Patients were eligible when they received care in the study hospital in the past two years. Kin should have visited or accompanied a patient in the hospital in the past two years. 'Kin' refers to the wider social construct around the people involved in receiving and providing care [4]. The hospitals made a call for participants on their website, via social media and patient associations. Interested patients and kin could apply for a focus group participation by completing a short survey with sociodemographic questions and number of contacts with different kind of hospital services within the last two years. This short survey was used to obtain in each focus group a heterogeneous sample capturing a wide spectrum of experiential expertise on overall hospital quality. As such, participants were recruited by purposive and maximum variation sampling [32] without having previous knowledge about Lachman's multidimensional quality model. All those who had completed the form were contacted by phone. During this phone call, the research

goal and focus of the group interview were explained. In addition, their expectations, experiences and overall attitude to function in a focus group were assessed.

Data collection

Four focus group interviews, of which two were in the hospital with the most licensed beds, took place in meeting rooms of the hospitals between September and October 2021. Each group consisted of 5 - 13 participants, which represents the ideal size of focus groups [32,33]. The mean duration of group interviews was two hours. Three experienced moderators (EMC, AJ and LJ), who are healthcare quality managers in the hospitals involved, led the focus group interviews by using a script. Two moderators are postdoctoral fellows at Leuven University (EMC, AJ) and one is a senior expert in change and consultancy research (LJ). The script helped to increase the reliability of the results by ensuring that each focus group interview was conducted in a similar way [34]. A semi-structured guide, as part of the script, was developed based on the research question and subsequently tested on relevance and clarity within the hospital quality departments [34]. Participants were blinded for both the script details and Lachman's multidimensional quality model to avoid biased opinions of participants [32]. After a short introduction of purpose and method of the focus group interview, the following question was raised: 'Which are the attributes that positively or negatively affect your experience about healthcare quality in a hospital setting?'. Participants were given some time to think about this question and independently noted keywords on three green and three red cards. Green cards were for positively influencing attributes, red cards were for negative ones. The moderator placed the keywords on a blackboard and used the interview guide's open-ended questions to stimulate in-depth group discussion. Within the open discussion, minimal structure was provided by the moderator. During each focus group the same research team member (FC) was present as observer and took notes. Focus groups were audio-recorded and transcribed verbatim. During weekly peer debriefing meetings, the quantity and quality of data from each group was discussed and evaluated. There was consensus that within-group and across-group data saturation about key healthcare quality attributes was reached after four focus groups as no new information seemed to emerge [35].

Data analysis

A combination of the classical content analysis described by Morgan [36] and the constant comparison analysis of Glaser and Strauss [37] was used to analyse the data. Both methods guided us to code new and emergent attributes inductively from interview transcripts and to compare quality attributes deductively to the multidimensional quality model. Morgan's classical content analyses focuses on how frequently codes are used. Glaser and Strauss's constant comparison analysis systematically reduces data to codes and develops themes from these codes to build a theory. These methods

allowed us to focus analysis on the data of individual participants and as a group as stated by Kidd and Parshall [38]. The advantage of this flexible approach is that attributes are analysed based on individual perspectives and group dynamics. The actual coding process consisted of two steps. In the first step, the individually focus of analysis is based on participant's keywords on green and red cards. In total 178 cards, 91 green and 87 red ones, were collected and classified in pre-existing categories of Lachman's multidimensional quality model. After the first classification, transcripts were reread by coders (FC, EMC and KV) to further categorise cards (Figure 2.1). Remaining cards were categorised through discussion in team. All categorised cards were independently validated by all coders. In the second step, the focus of analysis is on group dynamics in verbatim transcripts in order to gain an in-depth understanding of key attributes relevant to patients and kin. To ensure open coding, the NVivo 12 software program was used to identify themes, to derive codes from transcripts and to group these into conceptual categories. At each step of the constant comparison analysis, the research team met to increase the abstraction level and to discuss preliminary results. The study adhered to the consolidated criteria for reporting qualitative research guidelines (Supplemental Material 1) [39].

Methodological quality

To enhance the study quality, context and researcher triangulation was used [40]. Participants from three hospital settings were included. Before the focus group started, moderators and observers introduced themselves, explained the interview goal and described the research project. No suggestions or examples of Lachman's quality dimensions were given in order to obtain as many different views as possible. The observer (FC) took notes of participants' facial expressions, the strength of feeling with which descriptions were made and other observations that were impossible to capture in the audio-recording [34]. A member check was performed by submitting a focus group summary to each participant for feedback and approval [32]. Observational notes, the summary, verbatim transcripts and member check were used as a starting point for data analysis. A senior expert in healthcare quality (KV) and an expert in qualitative research (EMC) were involved in all steps of data collection and analysis. The research team consisted of ten experienced researchers, each with a different academic and clinical background: seven health services researchers (two men and five women, with nursing, medical or allied health professional background, five of them with PhD degree and experience in healthcare quality research and two are experts in person-centred care) and three junior researchers (two women and one man; a nurse, a pharmacist and a physician, all PhD Candidates) with clinical experience. Everyone had previous experience with qualitative research. Regular critical self-reflection and in-team discussions about key attributes helped to foster an open attitude and to interpret participants' views [37].

Ethical considerations

Ethics committees of involved institutions provided approval between June and July 2021. Informed consent was obtained from all participants prior to data collection. Participants were provided with detailed information about the study and were informed that focus groups would be audio recorded, that their anonymity would be assured and that they could withdraw from the study at any time without further explanation.

Results

In total, 23 patients and 12 kin participated in the focus groups of which the demographic characteristics are described in Table 2.1.

Table 2.1 Demographic characteristics of focus group participants (n=35).

Characteristics	N
Gender	
Male	4
Female	31
Age (years)	
18-30	1
31-50	9
51-65	19
66-79	6
80+	-
Stage in the care process	
Diagnosis	3
Treatment	11
Follow-up	21
Experience with the organisation (years)	
New since this year	2
1 – 5	6
6 – 10	2
>10	25

1. *Classification of key quality attributes*

In total 178 cards, 91 green and 87 red ones, were collected during the focus groups (Figure 2.1). Based on definitions of Lachman's multidimensional quality model, 81 (45.5%) cards were classified in the pre-existing dimensions. After reading verbatim transcripts, 27 cards (15.2%) or 108 cards (60.7%) in total were classified. Peer review discussions with healthcare quality experts (EMC and KV) led to the

addition of a new dimension 'Communication' and to the classification of 66 cards (37.1%) or 174 cards (97.8%) in total. The four cards (2.2%) that could not be classified were general descriptions not discussed in-depth during focus groups.
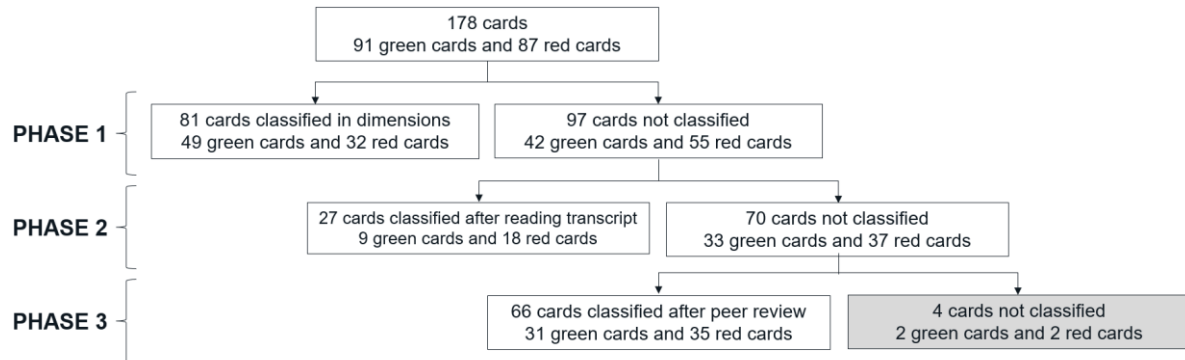
Figure 2.1 Overview of the classification of green (positively influencing attributes) and red cards (negatively influencing attributes).

An overview of the classification of cards within Lachman's multidimensional quality model is illustrated in Figure 2.2. Cards were mainly classified in dimensions 'Partnership and Co-Production' (13.5%), 'Dignity and Respect' (12.4%) and 'Effective' (11.8%). The dimension 'Eco-friendly' was not mentioned as a key attribute by participants. Ten cards (5.6%) were classified in the new dimension 'Communication'.
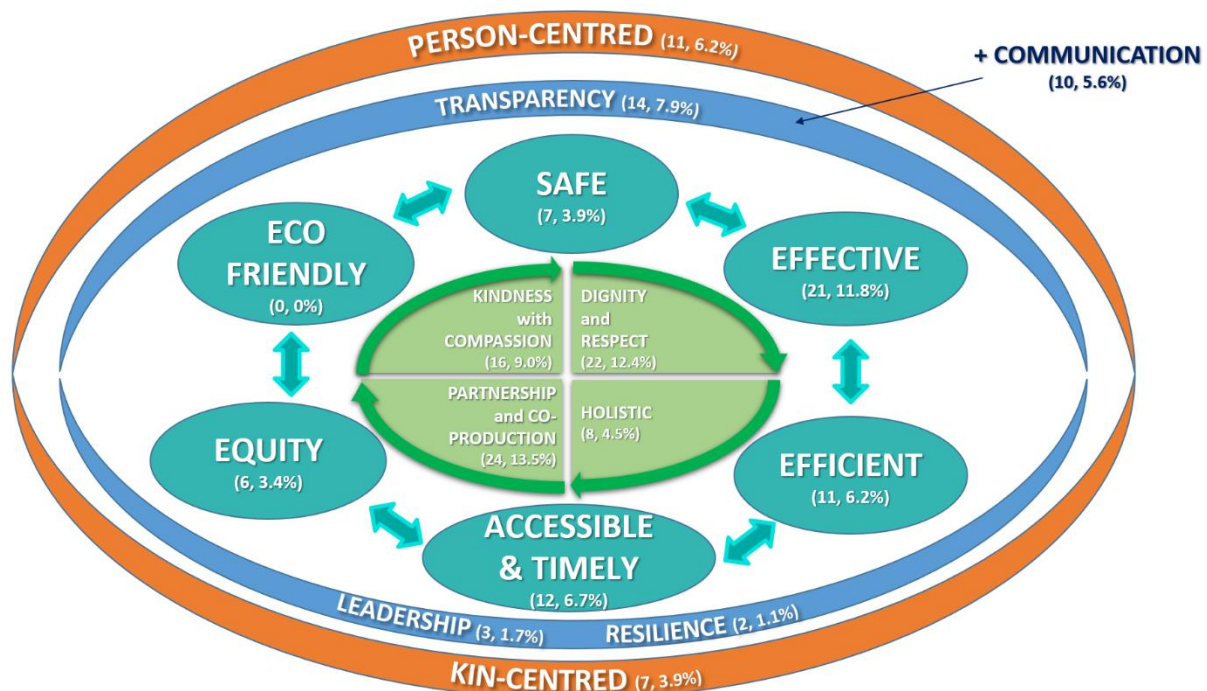
Figure 2.2 Overview of the classification of key attributes in Lachman's multidimensional quality model [4] (N, %).

2. In-depth description of key quality attributes

Person- and kin-centred care and core values were discussed in-depth during all focus groups (Table 2.2). Technical dimensions were often described as related to organisational aspects of care and subsequently not always discussed separately. Participant quotations are selected and presented to ensure transparency of results (Table 2.3).

Table 2.2 Key attributes discussed in-depth during focus groups.

	Focus group 1	**Focus group 2**	**Focus group 3**	**Focus group 4**
Person-centred care	X	X	X	X
Kin-centred care	X	X	X	X
Transparency	X	X		X
Communication	X	X	X	X
Leadership	X	X	X	
Resilience			X	X
Safe			X	X
Effective		X	X	X
Efficient	X	X	X	X
Accessible and timely	X	X	X	X
Equity	X			X
Eco-friendly				
Dignity and respect	X	X	X	X
Holistic	X	X	X	
Partnership and co-production	X	X	X	X
Kindness with compassion	X	X	X	X

X: Discussed dimension

Table 2.3 Key healthcare quality attributes with supporting quotes.

Attributes	Quotes
Person- and kin-centred care	
	"Everyone who works in a hospital, whether in the administration or cooking department, must be patient-oriented." (Patient, focus group 1) *"It is like being ill in no man's land, because no one knows who they are. They start on two different departments and actually nobody knows who they are, how they got here and that they also have a family with children." (Kin, focus group 3)*
Transparency	
	"Follow-up is important so that they can keep an eye on the healing process. But give me an appointment at a time when the physician says it must be healed and in order and then you go home with a good feeling, because I have been treated well, the aftercare is good and I know what to expect." (Patient, focus group 4)
Communication	
	"At a certain point, I said to one of the physicians: 'Could you repeat that in our language, please?'. I think that as a doctor you have to see if they don't understand what you are saying." (Kin, focus group 2).
Leadership	
	"In business, there is the term 'ownership'. You need someone who says: 'I will make sure it's done from A to Z'. In one department, I had that feeling very strongly. The head nurse guided me from the beginning to the end." (Patient, focus group 1)
Resilience	
	"I don't know to what extent the doctors and nurses need it, but they can have a bad day too and where can they go with it?" (Kin, focus group 3)
Technical domains (Safe, Effective, Efficient, Accessible and timely, Equity) related to organisational aspects	
	"At night, the nurse must scan your bracelet before giving medication and take your arm out from under the blanket. That is important. But in practice, they often leave the medication on the bedside table without scanning." (Patient, focus group 3). *"I think spending too little time with a patient and being in a hurry is a consequence of staff shortages. Professionals do have good intentions, but processes that should be done cannot be done because the workload is too high. (…) Those little things that they said they were going to do and that do not happen, can build up frustration and make you think: 'They are not listening to me'. While there are the best intentions to do it, they have not been able*

to write it down or something urgent has come up in another patient room. That can make your experience of care quality positively or negatively." (Patient, focus group 2)

"It is also about efficiency, a lot of examinations overlap and a lot of time can be saved here. On the one hand time for me as a patient to rest and on the other hand for the doctors and caregivers. As care providers, they should know what examinations have already been done at other departments." (Patient, focus group 2)

"I think there are two types of accessibility. On the one hand there is the physical accessibility, for example not being able to go through doors or elevators that are too narrow with the wheelchair. On the other hand, there is also the administrative part, like the website that is accessible to everyone." (Kin, focus group 4)

"I find that sometimes healthcare professionals are a bit stubborn, to me it came across as 'I studied for it and I will know', but that is not always true in practice, sometimes people experience it differently than what they learned in their education." (Patient, focus group 1).

Core values (Dignity and respect, Holistic, Partnership and co-production, Kindness with compassion)

"One important word is 'respect'. Taking away the patient's dinner without supporting them to eat or not believing my mum being in pain, is having no respect." (Kin, focus group 1)

"I would broaden the offering to more interdisciplinary care, that there is collaboration with more different kind of disciplines, not just the medical but everything around it. More holistic care." (Patient, focus group 4).

"It is important that I have the feeling that when I am with my physician, that we are a team that is going down that road, that I have the feeling of trust, that I know what he is doing and that it is not 'he or she says we will do this'. Really having the feeling that we are a team that is on the way to solving the problem together." (Patient, focus group 2)

"I sometimes have my doubts about that empathy, people do act empathic but they are not. A professional called us and promised a number of things that make you think: 'That is kind, they take us seriously' and then the story ends. Empathy has to be real and genuine." (Kin, focus group 2)

2.1 Person- and kin-centred care

Participants identified both person- and kin-centred care as an indispensable attribute in every care step or process. Person-centred care was described as approaching patients as a unique individual and keep them from feeling like a number. Participants emphasised the importance of being more than just a medical disease. Most of them pointed out the need to adapt standardised medical care to their specific situation. Others highlighted to incorporate their voice in every organisational decision. Patients and kin considered it very important that their values, cultural beliefs and personal preferences are respected by all professionals.

Moreover, participants argued the need to involve kin in care processes in different ways. They underlined that involvement can already consist of small acts, which are, of great value to them. First, by transparent communication to kin about diagnoses, treatments and follow-ups. Second, by listening to kin's perspectives on the feasibility of home care for the patient. Third, by training kin in care skills and management to ensure smooth discharge from hospital care to home care.

2.2 Transparency

Participants appreciated professionals who are straightforward and sincere, speak clearly and adopt an open attitude. They mentioned besides the importance of practical information such as accuracy of websites or efficient wayfinding throughout the hospital, also the importance of knowledge provision about care processes, assumptions of rehabilitation and expectations of patients' self-management.

2.3 Communication

During focus group discussions, patients and kin emphasised the ability of health professionals to communicate honestly and comprehensibly with patients, kin and colleagues. The content of professionals' communication with both themselves and between colleagues influenced their experience of other quality domains. Participants expressed the need for communication in a clear, understandable way without an abundance of medical terms dominating the conversation. Furthermore, patients and kin value a communication approach with attention to partnership, with kindness and respect, which subsequently increases the quality of interpersonal relationships with professionals.

2.4 Leadership

To experience the best possible healthcare quality, patients and kin recognised the importance of professionals taking responsibility for continuity of patients' care processes. In order to provide effective and efficient care, they emphasised the need for professionals who know the details of their

patient records on the one hand and are updated about organisational guidelines on the other hand. Some participants appreciated a care trajectory supervisor who took charge of patient's care processes and put the patient as person at the centre. By doing so, they represent patients across departments, keep an overview of care activities, facilitate holistic care and accurately answer patients' and kin's questions. This leader gives patients and kin confidence that all care processes are under control.

2.5 Resilience

Participants expressed the need for a safe place or confidant to support professionals when they do not feel well or to train them in order to become stress resistant. They reported that signs of stress should be avoided in professionals' attitude because it will affect patients' and kin's experience of the relationship with professionals and lower their experience of healthcare quality.

2.6 Technical domains related to organisational aspects

The technical dimensions of Lachman's multidimensional model are 'Safe', 'Effective', 'Efficient', 'Accessible and timely', 'Equity' and 'Eco-friendly'. 'Eco-friendly' was not mentioned by patients and kin. Moreover, patients and kin considered organisational aspects of care as an indispensable key healthcare quality attribute. Organisational aspects were mostly described as ensuring sufficient staff levels to organise work routines in such a way that the best results on technical domains could be obtained. More precisely, sufficient staff levels are related to less stress, lower workload and more time to care for patients and kin, which subsequently increases the safety and efficiency of care from participants' perspectives. At the same time, participants argued for continued care by the same professionals so that crucial information about their health would not be lost.

Other participants described the organisational aspects as accessibility by a supportive and person-centred infrastructure, availability via administrative support, mail and telephone and the reduction of waiting times. In addition, participants argued to avoid duplications of medical examinations, so increased time is left for patients to recover or for professionals to connect with them. Lastly, an equal approach between patients, professionals and other healthcare organisations was expressed as an important healthcare quality attribute by participants. Professionals should not adopt an authoritarian stance but rather engage a human-to-human dialogue.

2.7 Core values

Patients and kin considered the attitude of professionals during the first contact as very important. This attitude determined whether they had or could build confidence in the professional-patient relationship. Trust is needed so they can open up to professionals, feel personally connected and finally experience the care as high-quality.

Dignity and respect are described in different ways. First, participants valued that everyone is person-centred and communicates in a respectful manner. Second, privacy is perceived as important, such as discretion during nursing care or while informing patients and kin. Third, patients must be taken seriously without prejudice on the basis of their medical history. Lastly, professionals should keep promises and agreements they made with patients and kin.

Both patients and kin attributed holistic care as important because it focuses on approaching persons as individuals with medical, psychological, emotional and social needs. They underlined the need for interdisciplinary teamwork to integrate patients' and kin's needs in one care trajectory. To enable holistic care, the implementation of a care trajectory supervisor or coach can be supportive.

Partnership and co-production were described by participants with concepts such as participation, listening and teamwork. Participation gives patients and kin the opportunity to express their preferences and needs. Professionals should adopt an open-minded attitude and make their preferences an active conversation topic, e.g. 'What do you think or want in this care process?'. For a successful conversation, it is important that professionals take sufficient time to listen carefully to patients' and kin's opinion. These are the basic ingredients for teamwork in co-production with patients, kin and other professionals, both internal and external. Patients put emphasis on being at the centre of this cooperation without competing interests.

Participants appreciated friendly, polite and genuinely empathic professionals throughout the entire organisation, from clinicians to non-clinicians. They described the need for warm and welcoming professionals who are open to questions, constantly supportive and involve both patients and kin.

Discussion

This study explored a deeper understanding of key healthcare quality attributes from patients' and kin's perspective. A theory-based interpretation of their experiential knowledge resulted in the validation of Lachman's multidimensional quality model, which was mainly built on expertise of healthcare researchers and professional knowledge [4]. The identified attributes largely correspond with the dimensions of Lachman's model and are complementary to professionals' perspectives as illustrated by Johari's Window [29]. Participant's descriptions of attributes revealed, explicitly and implicitly, the interaction and relation with other attributes as visualised in Lachman's original model. Despite the consistent focus on improving technical quality aspects in healthcare during the last decade, the emphasis in our results was on interpersonal, relational and behavioural attributes. These findings are supported by previous evidence about patients' and kin's quality perspectives [22,24,25].

Moreover, in today's healthcare quality management there is a need for a transition from a system focused approach of healthcare quality to a person-centred one. Through a patients' and kin's view, this might start by expanding traditional quality measures, such as structure and process ones, with measuring what matters to patients, kin and healthcare professionals [9,15,19].

Generally accepted, future quality measures should be defined in co-production with all healthcare stakeholders to gain sustainable outcomes [6,9]. This draws on the 'people matter'-mindset shift that is related to well-known quality dimensions of person- and kin-centred care and their active participation in healthcare [18,27]. Our findings stated that the involvement of kin can improve healthcare quality, even after hospital discharge. Similarly to results of previous research, it was shown that lack of communication with kin can cause ineffective and unsafe care [23] and a trustful relationship between kin and professional can increase feelings of confidence [25,28].

Furthermore, communication emerged in our analysis as a powerful quality attribute that is related to patients' and kin's perception of other dimensions. Given that patients and kin were strong advocates of successful communication on macro, meso and micro level, it should be considered as an additional quality dimension to be included into healthcare quality models and definitions that might be developed [18,26,29]. Communication is a unique contribution to Lachman's model in accordance with perspectives of healthcare professionals on quality attributes [16]. Therefore, core communication competencies of professionals can be further developed through education programs in both medical school and healthcare organisations. In addition, Jun and colleagues described that teaching professionals' to be friendly, understandable and co-productive, might improve patients' and kin's experience of interpersonal, relational and behavioural attributes [17,18]. In conclusion, communication is important for providers, patients and kin, so that they can open up to each other and build trustful relationships.

Although 'Effectiveness', one of the technical domains, was the third most classified attribute on green and red cards, participants described technical aspects during our focus group mainly as organisational aspects of care. Jun stated that patients are typically not capable of assessing the technical healthcare quality [17]. Sufficient staff levels would facilitate an ongoing interaction or continuous dialogue between patients, kin and healthcare professionals [9] and foster consistent care [16,18]. Moreover, supportive organisational quality structures, such as introducing quality improvement meeting groups, could foster collective thinking and the sharing of preferences. By doing so, competing demands between all stakeholders are made transparent. In accordance with previous research [18,20,21], infrastructure, accessibility, an equal approach and avoiding duplications, emerged from our focus groups as descriptions of technical dimensions. Although environmental conditions are known as

quality attributes [20,21], Lachman's new domain reflecting the changing worldview, 'Eco-friendly', was not expressed by patients and kin in our results. Healthcare organisations can raise awareness of this domain among patients, kin and professionals by making their ecological strategies transparent and how these will reduce the carbon waste generated by healthcare. By doing so, this new quality dimension can grow as a major focus of our healthcare system [41].

Our study has strengths and limitations. The number of focus groups for exploring quality attributes is in line with the recommendation of two to five focus groups in pragmatic guidelines [33]. Member check was conducted and incorporated in data analysis process to increase credibility and validity [31]. This quality control is further enhanced by using context and researcher triangulation [32]. A combination of data analysis methods allowed to focus on individual and group level. There is consensus that data saturation was reached. However, no information about cultural backgrounds and socio-economic demographics of participants was surveyed. Additionally, we observed a possible sampling bias because the majority of our participants were women aged 51 years or older. It remains unclear how these demographics influenced our results.

Practice implications

The key attributes can serve as a reference framework to assess quality progress in healthcare organisations, to enhance the perceived quality and to implement future quality initiatives. The framework will facilitate organisations to design or reflect about their multidimensional quality approach. Furthermore, organisations need an additional focus on transparency and communication of quality results on macro, meso and micro level. To understand the transferability of results, future research should focus on perspectives of other healthcare stakeholders. Focus groups can be repeated with adolescent patients and kin and with disadvantaged population groups based on ethnicity, sexuality, religion, refugee or disability to explore the relation between healthcare quality, environmental sustainability [42,43] and equity [44,45] respectively. Moreover, healthcare quality attributes may vary according to geographical location, hospital size or other healthcare systems in European countries. Further research will focus on the development of an instrument to measure identified attributes in healthcare organisations. Variation of scores on key attributes within and between healthcare organisations can be used to set national or local priorities.

Conclusion

The identified key attributes of healthcare quality from patients' and kin's perspective largely correspond with those of Lachman's multidimensional quality model. 'Communication' emerged as a new important quality dimension in our study results. 'Eco-friendly', one of Lachman's technical domains, was not described by patients and kin. The results enhance the comprehension of healthcare quality and contribute to its academic understanding by validating Lachman's multidimensional model from patients' and kin's perspective. The robustness of this model would be increased by including 'Communication' as a quality dimension surrounding technical domains and core values.

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Supplemental Material 1: Consolidated criteria for reporting qualitative studies

Supplementary Table 2.1 Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in HC*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/descriptions	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	6
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	9
3. Occupation	What was their occupation at the time of the study?	9
4. Gender	Was the researcher male or female?	9
5. Experience and training	What experience or training did the researcher have?	9
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	6
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	6
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	6,9
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	5
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	6
12. Sample size	How many participants were in the study?	6, 9
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A

Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	5-6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	7
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	6,9-10
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6-7
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	N/A
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	7
20. Field notes	Were field notes made during and/or after the interview or focus group?	8
21. Duration	What was the duration of the inter views or focus group?	6
22. Data saturation	Was data saturation discussed?	7
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	8
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	8-9
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	7-8
27. Software	What software, if applicable, was used to manage the data?	8
28. Participant checking	Did participants provide feedback on the findings?	8
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	12-14
30. Data and findings consistent	Was there consistency between the data presented and the findings?	14-18
31. Clarity of major themes	Were major themes clearly presented in the findings?	14-18
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	14-18

The "House of Trust": A framework for quality healthcare and leadership

The "House of Trust": A framework for quality healthcare and leadership

Abstract

In healthcare, improvement leaders have been inspired by the frameworks from industry which have been adapted into control systems and certifications to improve quality of care for people. To address the challenge to regain trust in healthcare design and delivery, we propose a conceptual framework, i.e. the "House of Trust". This House brings together the Juran Trilogy, the maturing concept of co-production in quality management and the multidimensional definition of quality, which describes core values as an integral part of the system to deliver person- and kin-centred care. In the "House of Trust" patients, kin and healthcare providers feel at home, with a sense of belonging. If we want to build a care organisation that inspires and radiates confidence to all stakeholders, highlighting the basic interactions between front-office and back-office is needed. An organisation with both well-organized back- and front-offices can enable patients, kin and care providers the trust each of them needs and deserves. Whether a quality system develops itself into a House of Trust, does not depend on obtaining a government inspection and regulation or an external accreditation. It will only succeed if we continuously question ourselves about the technical dimensions of quality and our core values during the moment of truth.

Introduction

Patients and healthcare providers have high expectations on all aspects of care. To meet these expectations people must trust the healthcare service. Jain noted that even before the COVID-19 pandemic trust in healthcare was on the decline [1]. The misinformation that accompanied the pandemic has eroded trust further. As a result, trust in healthcare design and delivery has been challenged. Meeting expectations of healthcare recipients and providers will require a new approach to healthcare leadership to regain trust. One may argue that the literature and research on leadership does not require another angle or framework. However, the declining levels of trust implies that current models of quality and leadership are not adequate to meet this new challenge.

The need for a new approach

A recent paper by Bates et al. on the continuing high levels of harm in healthcare demonstrates that the leadership models of the past have simply not been as effective as they need to be [2]. In response to this finding Berwick commented that safety has to be a core focus of leadership [3]. The methodologies taken to improve quality and safety have been based on the theories of Deming, Juran, Feigenbaum, Crosby and others who developed quality improvement methodologies in other industries. The introduction of these improvement methodologies in healthcare has been accompanied by the introduction of control systems such as accreditation, regulation and certification [4]. While there has been progress in improving quality, the spread of good practice has not been at the scale it needs to be. New challenges include human resources management, the energy crisis, inflation and climate change. To achieve the changes at scale will require a different approach. Citizens and healthcare providers require more trust in each other and in the organisations they visit or in which they work and co-produce the change that is required [5].

In this paper, we will offer a concept that brings together the different processes in healthcare and that places people at the centre to co-produce trust and quality in care, where leadership is a shared endeavour.

The role of trust

In a study based on 360-degrees feedback reports of 87,000 leaders, Zenger and Folkman concluded that three elements can create or re-establish trust i.e., positive relationships, consistency and good judgement or expertise [6]. This applies to leaders and to their complex organisations, e.g. hospitals, where the front-office of care and back-office of support meet at the "hinge" point. At the hinge point care pathways, care programs, protocols and procedures guide all stakeholders towards high quality care and excellence. Lee et al. suggested a framework to improve trust in healthcare [7]. The

framework includes concepts of leadership, measurement of trust, transparency, use of data to demonstrate trust, co-producing care with people and ensuring patients are actively engaged in care. To restore trust, healthcare requires a recalibration of how we view the different components of the system, how we communicate with people in the system and how we learn to improve continually. In this paper we offer an innovative framework that brings together the totality of care from care design to care delivery.

The concept of a House of Trust

To address these challenges, we propose that a House of Trust, is built to deliver quality care. In the House of Trust people (patients), their kin and healthcare providers will have a sense of belonging. The House will facilitate the implementation and further development of the multidimensional model on quality [5]. A recent study proposed a co-creation model to facilitate sustainable quality. This co-creation model considers the internal and external context of an organisation, co-create solutions and continuously focuses on five primary pillar [8]. The pillars include the Juran Trilogy of quality design and planning, quality control, and quality improvement [9], with the addition of quality leadership and quality culture. A House of Trust integrates the multidimensional vision and co-creation models.

1. The front-office, back-office and the "moment of truth"

Real care and service delivery takes place at the hinge point of the front-office and back-office of a care organisation [10]. It is a co-production mechanism between the service user and the service provider [11].

- In the back-office, processes, protocols and care pathways are designed, but they come to life in the front-office. Healthcare staff trained in the theoretical models that include the latest evidence to bring their knowledge and skills to an optimal level. It is similar to the kitchen of a restaurant, where food is prepared in a seamless manner. The diner does not really know how the meal is prepared and perhaps does not need to know, as there is trust that the process is hygienic, and the food will be safe to consume.

- The front-office in healthcare is where the unique meetings between the care receivers and providers happen, a real human interaction. This unique interaction takes place between a person as a patient, their loved one or kin and the individual caregiver as a person; or within the team itself, in their clinical microsystem. This is a unique moment, the moment of truth, which cannot be reversed if it is suboptimal [12–15]. The moment of truth requires effective bi-directional communication and education in a dynamic, authentic and at times equal partnership. The

moment of truth includes the design of the setting, the completeness of the knowledge-gathering, and the adaptation of the persons, resources and settings to the needs of both involved in the unique relationship [16].

To build a care organisation that inspires and radiates confidence to all stakeholders, we must highlight the interactions between the front-office and back-office. We contend that an organisation with well-organized back and front offices can enable trust and quality for patients, kin and care providers.

2. Building a House of Trust to enable authentic moments of truth

There are five stages to building a House of Trust to enable the moment of truth (Figure 3.1).

2.1 The core of the House (green squares in the middle of the house in Figure 3.1):
Care quality takes place in the front-office during the moment of truth. Therefore, the starting point of the multidimensional vision model is to prioritize the four core values of dignity and respect, a holistic vision, partnership and co-production and attention to compassion with kindness [5]. These values apply not only to the unique interaction between people in their roles as care providers, patient or kin, but also between people as care providers themselves or with their managers [13]. The core values are located in the heart of the House of Trust, where interaction, positive resonance, humour and acts of kindness (e.g. Mangomoments) can take place and people meet in-person or virtually [14–16].

2.2 The foundations (grey rectangle in Figure 3.1):

This interaction can only be smooth, warm and of high quality if the care processes, programs, protocols and procedures are well developed and managed [17]. The clinical pathways and procedures are the floorboards of the House and should be developed on a solid foundation, rather than on loose sand. The foundations of a House of Trust are based on the technical dimensions of the multidimensional quality model and are the real hinge point between the front-office and back-office of the organisation.

2.3 The support posts (turquoise squares in Figure 3.1):
The domains of quality are the support posts for the House of Trust. Safety and efficiency serve as the outer bearing posts of the House as an unsafe or inefficient organisation cannot provide quality or trust [18]. The other support posts are inclusive equity and diversity, effectiveness, timeliness and ecological sustainability [5]. The six supporting post form the backbone of a healthcare organisation and are the technical dimensions of quality. These structures must be in good order, and without them, real care cannot take place.

2.4 The support pillars (blue rectangles in Figure 3.1):

Four support pillars are located in the front-office and are also connected to the back-office. These pillars are transparency, communication, resilience and leadership. We need to communicate transparently, both about the unique interaction on an individual level and about our business processes which operate in the background. Transparent public reporting as well as internal openness and communication with our own stakeholders ensures that there is trust in the organisation. A continued focus on clinical leadership and resilience is important to ensure that the philosophy of care is aligned across all processes. The pandemic highlighted that authentic clinical leadership, exemplary behaviour and knowledge is important, as well as ensuring health providers' physical and psychological wellbeing and resilience [19]. Resilience of the individual person as a patient, their kin, and the people providing care and managing the organisation is essential. This, in turn, will have an impact on the attractiveness of the organisation as an employer, retention of staff and creation of trust.

2.5 The roof (orange triangle in Figure 3.1):

The roof is supported by the other structures and refers to continuous attention to person-centred and kin-centred care in all that the organisation does. Person-centeredness is about the human experience and relationships of both the people known as patients and the people known as healthcare providers, i.e., all the stakeholders in this eco-system [20]. A House of Trust can be built step by step when all structures below the roof are of high quality, and people trust each other and trust the organisation. The roof can be the visiting card of the organisation, which can be seen from afar to invite people to seek or provide care.
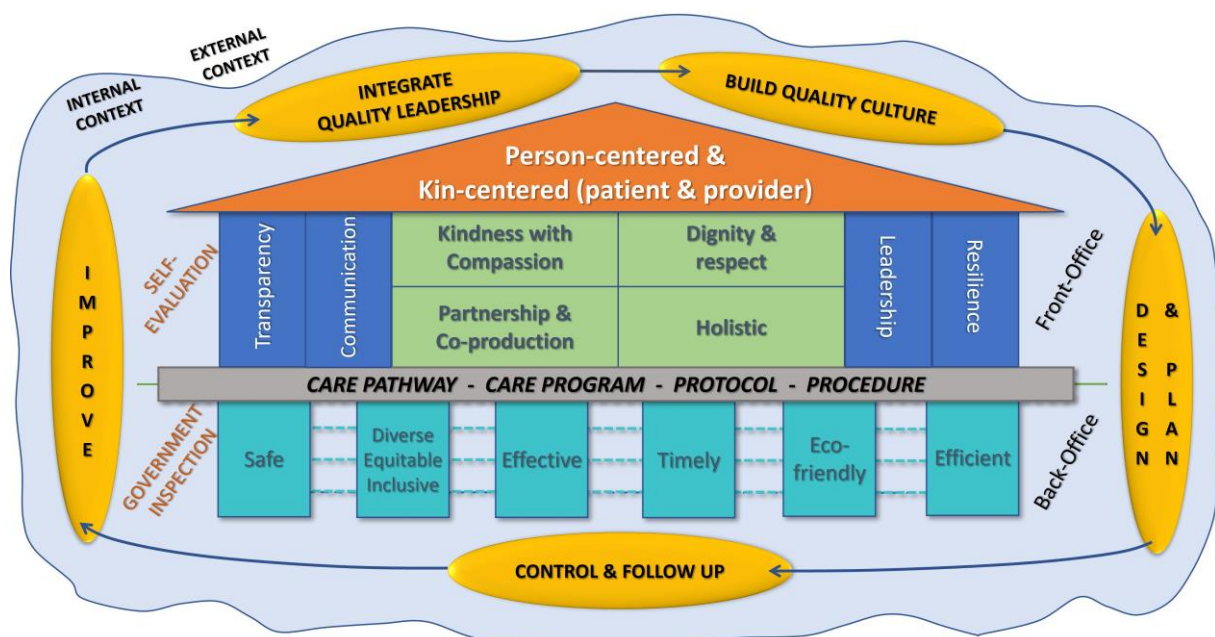
Figure 3.1 A House of Trust.

3.   Principles in building a House of Trust (yellow ovals in Figure 3.1).

Several principles must be applied when building a House of Trust. Just as a real house is built brick by brick, connected to each other, with architects, surveyors and builders, so a House of Trust is built step by step, project by project and with a clear vision and mission [5, 8, 13]. By doing so, we can integrate implementation research with improvement methodology [5]. When building the House we have to consider the internal context of an organisation, for example its financial status or governance challenges, and the external context, such as legislation or the impact of a pandemic.

It is crucial to involve all the stakeholders as partners in a true co-creation process from the very beginning. Each bring their own unique knowledge to the task of co-production [11]. This is why the planning and design module is situated in both the front- and back-offices of the organisation. The operation of the front- and back-offices must be properly monitored and controlled. However, employees, patients and their relatives should experience as little inconvenience as possible as a result of the control and monitoring. The use of existing data sources will be crucial and must be implemented in the back-office as much as possible, including the development of automated control systems.

Scientific evidence is important to underpin quality. If the enhanced Juran Trilogy of Quality works well, then clinicians, management and the board will be able to use their quality leadership to build a quality culture [9]. When the quality culture is just and there is an innovative learning health network, it will be possible to continually take a critical look at the current design and quality level of the House, with the necessary psychological safety [21]. Teams must be closely involved in every improvement initiative and the voice of the patient and their kin must count. The change and implementation strategy is an essential driver of sustainable improvement.

Governmental inspection or regulation may be required, even if the core, the supporting foundations and the pillars of the House are in good order and the systems and processes imposed by the government regulators are followed. However continuous self-evaluation by patients, kin and professionals will be key in keeping the front-office at a high level during the moment of truth and will challenge all to continuously enhance it.

Conclusions

The House of Trust embodies the three cornerstones of trust described by Zenger and Folkman [6], i.e., positive relationships, expertise and consistency, and addresses the challenges posed by Jain [1] and Lee [7]. Mate highlighted the need to rebuild trust in healthcare and recommended that one has to empower people to develop a culture of Trust [22]. The core of the House of Trust, with its four central values of care and supporting pillars of transparency, communication, leadership and resilience can deliver this urgent requirement and provides a new approach that incorporates the lessons of the past 20 years of improvement endeavours. It is key for the development of positive relationships that empowers people, i.e., patients and providers to co-produce trust together. Without these values relationships will not be trustworthy, or human-centred and quality and safety will not be achieved.

The evolution of an organisation into a House of Trust, will only succeed if we continuously question the technical dimensions of quality and our core values during the moment of truth. The architectural design and the co-construction of a House of Trust are more likely if those involved are personally involved in the design, co-production, and continual review to improve its operation and assess its benefits. This includes transparency, communication, leadership and resilience and the application of the co-creation model itself. Only then will the personal orientation, for people i.e., patients, their kin and the healthcare workforce, truly radiate trust. This will result in people, the care receivers and providers, remaining loyal with positive energy, engagement and commitment day after day.

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Measuring in-hospital quality multidimensionally by integrating patients', kin's and healthcare professionals' perspectives:

Development and validation of the FlaQuM-Quickscan

Measuring in-hospital quality multidimensionally by integrating patients', kin's and healthcare professionals' perspectives: Development and validation of the FlaQuM-Quickscan

Abstract

Background: Measuring quality is essential to drive improvement initiatives in hospitals. An instrument that measures healthcare quality multidimensionally and integrates patients', kin's and professionals' perspective is lacking. We aimed to develop and validate an instrument to measure healthcare quality multidimensionally from a multistakeholder perspective.

Methods: A multi-method approach started by establishing content and face validity, followed by a multi-centre study in 17 Flemish (Belgian) hospitals to assess construct validity through confirmatory factor analysis, criterion validity through determining Pearson's correlations and reliability through Cronbach's alpha measurement. The instrument FlaQuM-Quickscan measures 'Healthcare quality for patients and kin' (part 1) and 'Healthcare quality for professionals' (part 2). This bipartite instrument mirrors 15 quality items and 3 general items (the overall quality score, recommendation score and intention-to-stay score). A process evaluation was organised to identify effective strategies in instrument distribution by conducting semi-structured interviews with quality managers.

Results: By involving experts in the development of quality items and through pilot testing by a multi-stakeholder group, the content and face validity of instrument items was ensured. In total, 13,615 respondents (5,891 Patients/kin and 7,724 Professionals) completed the FlaQuM-Quickscan. Confirmatory factor analyses showed good to very good fit and correlations supported the associations between the quality items and general items for both instrument parts. Cronbach's alphas supported the internal consistency. The process evaluation revealed that supportive technical structures and approaching respondents individually were effective strategies to distribute the instrument.

Conclusion: The FlaQuM-Quickscan is a valid instrument to measure healthcare quality experiences multidimensionally from an integrated multistakeholder perspective. This new instrument offers unique and detailed data to design sustainable quality management systems in hospitals. Based on these data, hospital management and policymakers can set quality priorities for patients', kin's and professionals' care. Future research should investigate the transferability to other healthcare systems and examine between-stakeholders and between-hospitals variation.

Introduction

In the past 20 years, healthcare quality initiatives were mainly related to six quality domains as defined by the Institute of Medicine (IOM): patient-centredness, timeliness, efficiency, effectiveness, safety and equity [1]. Recently, Lachman and colleagues reflected on the relevance of IOM's quality domains and suggested a multidimensional quality model that includes new domains. The revised domains reflect the changing worldview of quality management [2,3], such as ecology [4] and transparency [5]. Lachman's new quality model extends the domain of person-centredness by recognising the patient's kin and healthcare professionals as persons with fundamental needs embodied in every other quality domain. Kin involvement is increasingly being seen as an individual component of quality initiatives that can lead to improved patient outcomes [6–8]. Emphasis is placed on including their experiences as an important knowledge source for quality purposes [9]. Moreover, research has shown that quality of care (QoC) and patient safety are related to professionals' characteristics, such as a negative association with burnout [10,11], and that their working environment should be monitored [12]. The incorporation of care for professionals has been reinforced by the transition from the Triple Aim to the Quintuple Aim for improving healthcare, with an emphasis on healthcare equity [13]. To conclude, integrating experiential knowledge of patients, kin and professionals about QoC for patients and kin as well as for professionals is recognised as important considering the trend towards value-based, co-produced quality management systems.

In order to effectively co-produce an organisation-wide quality management system, it is essential to approach QoC multidimensionally and integrate it from a multistakeholder perspective [14–16]. Many instruments have been developed to measure experiences of QoC [12,17–26] and quantifying them has become widespread [27]. Nevertheless, existing instruments have focused on a particular stage of a patients' hospital journey from admission [17] to hospital discharge [18], on a specific disease, e.g. in cardiology care [19], on certain quality domains, e.g. such as communication and coordination of care [20] or on including only patients [21,22], kin [23] or professionals [12,24–26]. An instrument that captures organisation-wide experiences would provide a comprehensive healthcare quality assessment whose results can catalyse meso- and macro-level quality management, such as prioritising quality improvement efforts based on multistakeholder experiences. Such an instrument, that encompasses all quality domains [2] and integrates patients', kin's and professionals' perspectives on these domains, is currently lacking. The absence of experiences from other quality domains, such as Lachman's core values and catalysts, which has been highlighted as desired quality outcomes in previous research [28–32], leads currently to a non-comprehensive view on QoC in hospitals. In addition, blind spots from other stakeholders' experiences prevent hospitals from creating a quality management system that creates value for all. Measuring QoC multidimensionally from a

multistakeholder perspective is fundamental for hospitals to gain a deeper understanding of experiences. Though, no studies have so far constructed a bipartite, organisation-wide instrument measuring both healthcare quality for 'patients and kin' and how the organisation cares for its 'professionals' in a methodologically sound way that involved patients, kin and professionals. Results of such a validated instrument will facilitate co-production of a sustainable, organisation-wide quality management system in which all stakeholders' values are central.

In conclusion, we need a valid instrument encompassing quality multidimensionally in terms of care for patients, kin and for professionals and integrating multistakeholder perspectives, i.e. with patients, kin and professionals as key stakeholders in quality management. To address this research gap, we aimed to develop and validate an instrument to measure experiences of healthcare quality multidimensionally from a multistakeholder perspective.

Methods

1. Design

A multi-method approach was used to develop and validate a rigorous instrument [33]. Development started by establishing content and face validity, followed by testing construct and criterion validity as well as reliability using a cross-sectional survey design in 17 Flemish (Belgian) hospitals (Figure 4.1). Data were collected between May 2021 and June 2022 via an online survey, the Flanders Quality Model (FlaQuM)-Quickscan. A parallel process evaluation was organised to identify effective strategies in instrument distribution by conducting semi-structured interviews with healthcare quality managers [34].

INSTRUMENT DEVELOPMENT AND PSYCHOMETRIC PROPERTIES

Content validity
1) Conducted four focus groups with patients and kin (n=35) to validate the quality domains in Lachman's multidimensional quality model.
2) Involved quality and patient participation experts (n=3) to design instrument items (first instrument version).
3) Involved an expert advisory panel (n=10) to provide input on the completeness, relevance, structure and usability of items (second instrument version).

Face validity
Pilot test of the instrument by a multistakeholder group (n=41), including patients (n=5), their kin (n=5) and professionals (n=31), to score instrument items and give feedback on appropriateness of instrument items, wording clarity, overall instrument design and navigation (third instrument version).

Multi-centre testing
Disseminated the electronic instrument FlaQuM-Quickscan in a multi-centre study of 17 hospitals to patients, kin and professionals.

Construct validity
1) Assessed the tetra-dimensional structure of the FlaQuM-Quickscan (4 factors: person- and kin-centred care, catalysts, technical domains and core values) defined a priori by Lachman's multidimensional quality model through confirmatory factor analysis.
2) Assessed the measurement invariance across type of respondents and their characteristics (gender and age) through independent clusters confirmatory factor analysis.

Criterion validity
Assessed the degree of Pearson's correlation between the 15 items and three general items (overall quality score, recommendation score and intention-to-stay score), for both instrument parts.

Reliability
Assessed the internal consistency by determining the Cronbach's alpha.

Figure 4.1 Instrument development and assessment of psychometric properties.

2. Instrument development and psychometric properties

2.1 Content validity

Content validity, also known as theoretical analysis, referred to the adequacy with which a measure assesses the domain of interest, i.e. that the items capture the relevant experience of the target population being examined [33]. First, our research group conducted four focus groups with patients and kin (n=35 in total, $n_{patients}$=23 and n_{kin}=12) to gain a deeper understanding of key attributes of QoC relevant to them [35]. 'Kin' refers to the wider social construct around the people involved in receiving and providing care [2]. Kin is also known as caregivers, as used in other international publications [36,37]. Caregiver refers to someone who takes care of a person who is young, old, ill, or disabled, i.e.

having an illness, injury, or condition that makes it difficult for them to do some things that other people do, either as a family member or friend, or as a job [38]. As the word 'kin' is used in Lachman's original multidimensional quality model [2], this term is also used in this manuscript to decrease the risk of confusion between the instrument and Lachman's model [2]. Focus group results were mainly related to the quality domains 'Partnership and co-production', 'Dignity and respect' and 'Effectiveness'. Technical quality domains were linked to organisational aspects of care in terms of staffing levels and time. A theory-based, inductive interpretation of patients' and kin's experiential knowledge during these focus groups resulted in the validation of Lachman's multidimensional quality model. This model, that was developed by QoC experts using deductive reasoning based on expertise of healthcare researchers and professionals' knowledge over the past 20 years, served as a conceptual framework for the development of the instrument [2]. Second, to design instrument items, three quality and patient participation experts (two are postdoctoral fellows, one with specific expertise in patient participation and empowerment and one with additional experience as member of a patient association in a Flemish hospital, and one is staff member specialised in patient participation in a Flemish hospital), were involved to consider content relevance of instrument items and to ensure operational 'fit' with the theoretical meaning of quality domains. An expert advisory panel (n=10), consisting of the instrument's target population (patients, kin and different types of professionals) provided input on the completeness, relevance, structure and usability of items. Based on their feedback, instrument items were revised.

2.2 Face validity

Face validity, which is defined as the appropriateness of instrument items to the intended construct [33], was obtained through a pilot test by a multistakeholder group (n=41), including patients (n=5), their kin (n=5) and professionals (n=31). The latter were hospital board members (n=4), executives (n=11), healthcare quality managers (n=4), physicians (n=6), nurses (n=5) and medical secretary (n=1). In addition to scoring instrument items, they were asked to give feedback about appropriateness of instrument items, wording clarity, overall instrument design and navigation. The pilot test results were used to develop an updated version of the instrument.

2.3 Description and scoring of the instrument

The instrument, hereinafter referred to as FlaQuM-Quickscan, is designed to mirror patients', kin's and professionals' experiences of QoC through two parts that measure identical quality domains from different care perspectives (Supplemental Material 1). The first part aims to explore perspectives on 'Healthcare quality for patients and kin', the second part on 'Healthcare quality for professionals', i.e. how the hospital cares for their professionals. Patients, kin and professionals were asked to complete

both instrument parts. Each part includes 15 items, measuring exactly the same domains, i.e those of the multidimensional quality model [2], three general items, two of which (the overall quality score and recommendation score) are based on international [39] and Belgian questionnaires [40] and one (the intention-to-stay score) was included because of the importance of this topic in the healthcare landscape and the current shortage of professionals, and sociodemographic questions. The 15 items reflecting quality domains were divided into four subscales: person- and kin-centred care (2 items), catalysts (3 items), technical domains (6 items) and core values (4 items). Each item was rated on a 11-point Likert-type scale reflecting the respondent's level of disagreement or agreement with the item statement [score from "0" (strongly disagree) to "10" (strongly agree)]. The three general items started with the overall quality assessment of received care (in part 1) and the overall quality assessment of the hospital as employer (in part 2) [score from "0" (worst possible quality) to "10" (best possible quality)]. The second general item concerned the willingness to recommend the hospital to family and friends for receiving care (in part 1) or to work as an employee (in part 2) [score from "0" (definitely no) to "10" (definitely yes)]. The last general item reflected on respondents' intention-to-stay in the next year to receive care (in part 1) or to work as employee (in part 2) [score from "0" (definitely no) to "10" (definitely yes)]. Demographic items included respondent groups (patients, kin or different professional groups), gender and age. The instrument language was Dutch.

2.4 Multi-centre testing: setting and participants

This study took place in a convenience sample of 17 hospitals in Flanders (Belgium), which are implementing a new Flanders Quality Model (FlaQuM). FlaQuM focuses on developing a sustainable quality management system and encompasses 3 pillars: 1) "thinking" based on a quality vision model [2]; 2) "doing" by focusing on the implementation of a co-creation roadmap [14] and 3) "learning and innovating" from social capital in inter-hospital collaboratives [41]. The FlaQuM-Quickscan is part of pillar 1. Patients and their kin who had a consultation, treatment or admission in one of the included hospitals were invited to complete the FlaQuM-Quickscan. Dutch-speaking participants (patients, kin and professionals) of at least 18 years old were invited to complete the FlaQuM-Quickscan online. A FlaQuM Coordinator, i.e. the local healthcare quality manager, for each hospital was responsible for distributing the survey link for their hospital. The link to the electronic survey was provided by the University of Leuven and all the response data flowed to the university database. Each hospital invited patients, kin, or its professional staff to complete the survey, whether by way of e-mail, website, or a limited, local hospital portal. Only fully completed instruments (part 1 and part 2) were included in this study. In line with recommendations, a minimum sample size of 300 patients and kin and 300 professionals was considered acceptable for testing the FlaQuM-Quickscan validation [42].

2.5 Descriptive statistics

Descriptive analyses of sociodemographic data delineated frequencies across type of respondents and their characteristics (gender and age). Descriptive analyses for each of the 15 items reflecting quality domains and for the three general items included average, percentage distribution of scores on the 11-point Likert scale and percentage of scores between 0-5, between 6-7 and between 8-10. The Kolmogorov-Smirnov test, a test to assess whether two samples have the same statistical distribution, was used to compare percentage distributions of scores on the 11-point Likert scale between patients/kin and professionals. The t-test, a test to assess differences between two independent groups, was used to compare averages of the 15 items and three general items scored by patients/kin and professionals. The level of significance was set to $p < 0.05$. The descriptive analyses were generated using the SAS software, Version 9.4 of the SAS System for Windows.

2.6 Construct validity

First, confirmatory factor analysis (CFA) was performed to evaluate the tetra-dimensional structure of the FlaQuM-Quickscan (person- and kin-centred care, catalysts, technical domains and core values) defined a priori by the multidimensional quality model [2]. We assessed whether the hypothesised subscales of part 1 and 2 are conceptualized as such by patients, kin and professionals. Second, independent clusters (ICM)-CFA was used to assess measurement invariance across type of respondents and their characteristics. By doing so, the model fit across groups of respondents could be evaluated. To start, model fit was assessed in each group by conducting single-group CFA to investigate whether the established dimensionality of the instrument fit the two stakeholder groups separately: patients/kin and professionals [43]. Next, multiple group ICM-CFA was conducted to assess various types of invariance [44]. Configural invariance relates to showing the same pattern of associations between items and factors and the same number of factors. Factor loadings and thresholds are free across groups. Evidence of scalar invariance is a requirement for drawing meaningful comparisons across groups [44]. All items were continuous for all described steps. For multiple-group ICM-CFA, weighted least squares estimation with delta parameterization was used. In multiple-group analyses, factor variances and latent means were fixed to be 1 and 0, respectively, for identification purposes [45]. Model fit evaluation was based on internationally recognised cut-off criteria [46] and Chen's [47] allowed changes in fit indices when studying invariance for the Comparative Fit Index (CFI) (ranges between 0 and 1; reasonable if >.90 and very good if >.95), the Tucker–Lewis index (TLI) [48] (ranges between 0 and 1; reasonable if >.90 and very good if >.95), and the Root Mean Square Error of Approximation (RMSEA) [49] (ranges between 0 and 1; good fit if <.1). Mplus version 7.1 was used to estimate factor analytic models [45].

2.7 Criterion validity

Criterion validity, defined as the degree of a relationship between a given test score and performance on another measure [33], was assessed by determining the degree of Pearson's correlation between the 15-item instrument and the three general items (overall quality score, recommendation score and intention-to-stay score) for each instrument part. Coefficients exceeding *r = 0.3* were considered as meaningful [50]. As no other instrument was available to measure patients', kin's and professionals' experiences of QoC as defined by Lachman's multidimensional model, scores on general items were treated as a substitute for a gold standard with which the instrument items were correlated. The general items have been found to relate well to quality domains [51,52]. The overall quality score and recommendation score are also used for public reporting of patient experiences via the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) in the United States [39] and in Belgium [40]. The intention-to-stay score received international attention because of the increasing shortage of healthcare professionals [53] and is used in Belgium as a smoke signal for policymakers and managers [54].

2.8 Reliability

To obtain reliability for the FlaQuM-Quickscan, the internal consistency was measured using the Cronbach's alpha for both instrument parts, the subscales and for both stakeholder groups (patients/kin and professionals), with a coefficient ≥.7 considered to be good [33].

3. Process evaluation

The process evaluation aimed to identify effective strategies to communicate the FlaQuM-Quickscan, to distribute it hospital-wide and to motivate patients, kin and professionals to complete. This evaluation started in three pilot hospitals by taking observation notes from all activities related to its aim. Qualitative, thematic analysis of notes led to lessons learned for other hospitals. Based on these lessons, a topic list and interview guide were developed to conduct semi-structured interviews with healthcare quality managers of the 17 included hospitals. This manager leads the overall coordination of instrument distribution in their hospital. All interviews were audio recorded. The rapid identification of themes from audio recordings (RITA) was used as a first data analysis step [55]. RITA allows for expeditious identification of themes in qualitative data while minimizing the loss of information. Next, thematic analysis was used to inductively analyse the data and to gradually develop and refine insights into effective strategies [56]. Research team (all authors) discussions enabled interpretation of the data and identification of strategies. The data analysis was performed in MS Excel.

4. Ethical considerations

Ethical approval was obtained from all local ethics committees of participating hospitals. All respondents (focus groups, FlaQuM-Quickscan and process evaluation) provided informed consent. All methods were carried out in accordance with the Declaration of Helsinki guidelines and regulations.

Results

1. Development and validation

1.1 Developed instrument 'FlaQuM-Quickscan'

By involving experts in the development of quality items and through pilot testing by a multi-stakeholder group, the content and face validity of the instrument and instrument items was ensured. During the development steps, the number of items remained the same, but the wording in item statements was adjusted based on feedback. The FlaQuM-Quickscan contains two parts (part 1 'Healthcare quality for patients and kin' and part 2 'Healthcare quality for professionals'). Each part includes 15 quality items and three general items.

1.2 Multi-centre testing: sample

In total, 13,615 respondents ($N_{Patients/kin}$ = 5,891 and $N_{Professionals}$ = 7,724) completed the FlaQuM-Quickscan. The respondents' characteristics are shown in Table 4.1. Among patients and kin, 56.4% were female and 32.9% were aged 51-65. Among professionals, 40.8% were nurses, 75.3% were female, and 48.2% were aged 31-50.

Table 4.1 Characteristics of respondents.

	Patients and kin Total (N = 5,891)	Professionals Total (N = 7,724)
Type of respondent, *N (%)*		
Patients/kin		
Patients	4,720 (80.1%)	/
Kin	1,171 (19.9%)	/
Professionals		
Management and boards	/	145 (1.9%)
Middle management (Staff members and supervisors)	/	898 (11.6%)
Physicians / Dentists	/	882 (11.4%)
Nurses / Midwives / Nursing assistants	/	3,152 (40.8%)
Other professionals with direct patient contact	/	1,531 (19.8%)
Supporting professionals without direct patient contact	/	1,036 (13.4%)
Professional group unknown	/	80 (1.0%)
Gender, *N (%)*		
Female	3,322 (56.4%)	5,818 (75.3%)
Male	2,458 (41.7%)	1,820 (23.6%)
Other	11 (0.2%)	50 (0.6%)
Unknown	100 (1.7%)	36 (0.5%)
Age (years), *N (%)*		
18-30	533 (9.1%)	1,453 (18.8%)
31-50	1,578 (26.8%)	3,723 (48.2%)
51-65	1,938 (32.9%)	2,449 (31.7%)
66-79	1,516 (25.7%)	55 (0.7%)
80+	268 (4.6%)	8 (0.1%)
Unknown	58 (1.0%)	36 (0.5%)

1.3 Descriptive results

Descriptive results of 15 items of the multidimensional quality model and the three general items are analysed for part 1 'Healthcare quality for patients and kin' and part 2 'Healthcare quality for professionals' (Supplemental Material 2). For part 1, averages of items varied between 7.7 ('Kin-centred care' and 'Eco-friendly') and 8.7 ('Equity' and 'Kindness with compassion') and between 5.9 ('Eco-friendly') and 8.3 ('Equity') scored by patients/kin and professionals, respectively. The item with the lowest average was the same as the one with the highest percentage of scores between 0-5 ('Eco-

friendly' scored by patients/kin and professionals) and vice versa for the highest percentage of scores between 8-10. For part 2, averages of items varied between 7.6 ('Kin-centred care', 'Resilience', 'Partnership and co-production') and 8.3 ('Kindness with compassion') and between 5.8 ('Resilience', 'Efficient', 'Accessible and timely' and 'Partnership and co-production') and 8.0 ('Equity') scored by patients/kin and professionals, respectively. The items with the lowest average were the same as the ones with the highest percentage of scores between 0-5 ('Partnership and co-production' scored by patients and kin, 'Accessible and timely' and 'Partnership and co-production' scored by professionals) and vice versa for the highest percentage of scores between 8-10. For all items, percentage distributions of scores for each item and averages on items scored by patients and kin were significantly different from those scored by professionals, except for the general item 'Intention-to-stay' in instrument part 2.

1.4 Construct validity

The hypothesised dimensionality of part 1 'Healthcare quality for patients and kin' and part 2 'Healthcare quality for professionals' were evaluated separately (Table 4.2). The hypothesised subscales of both instrument parts were conceptualized as such by patients, kin and professionals. Moreover, the ICM-CFA and the multiple group ICM-CFA showed good to very good fit for the data for the respondent groups in both instrument parts (Supplemental Material 3). The FlaQuM-Quickscan allowed for cross-group comparison between patients, their kin and professionals.

Table 4.2 Confirmatory Factor Analyses.

	χ^2	p	df	CFI	TLI	RMSEA (90% CI)
Part 1 'Healthcare quality for patients and kin'						
CFA (with 4 factors): Patients/kin	3558.069	<0.001	84	0.961	0.951	0.084 (0.081 - 0.086)
CFA (with 4 factors): Professionals	4245.651	<0.001	84	0.950	0.938	0.080 (0.078 - 0.082)
Part 2 'Healthcare quality for professionals'						
CFA (with 4 factors): Patients/kin	3667.058	<0.001	84	0.969	0.962	0.085 (0.083 - 0.087)
CFA (with 4 factors): Professionals	5486.786	<0.001	84	0.946	0.932	0.091 (0.089 – 0.093)

Notes: CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation, CFA = Confirmatory Factor Analysis.

1.5 Criterion validity

All correlation coefficients exceeded the 0.3 criterion. For part 1, associations of items-to-overall-quality-score ranged from 0.545 to 0.802 and from 0.373 to 0.713 responded by patients/kin and professionals respectively (Table 4.3). Associations of items-to-recommendation-score ranged from 0.494 to 0.790 and from 0.326 to 0.671 responded by patients/kin and professionals respectively. Associations of items-to-intention-to-stay-score ranged from 0.468 to 0.759 and from 0.309 to 0.608 responded by patients/kin and professionals respectively. The association of the item 'Eco-friendly' and the three general items of both parts, responded by patients/kin as well as professionals, is assessed as the lowest, except for the item 'Equity' responded by professionals in part 2. The association of the item 'Dignity and respect' and each general item of both parts and responded by patients/kin and professionals is considered the highest. For part 2, associations of items-to-overall-quality-score ranged from 0.697 to 0.812 and from 0.438 to 0.822 responded by patients/kin and professionals respectively. Associations of items-to-recommendation-score ranged from 0.654 to 0.777 (scored by patients/kin) and from 0.434 to 0.781 (scored by professionals). Associations of items-to-intention-to-stay-score ranged from 0.633 to 0.729 (scored by patients/kin) and from 0.417 to 0.637 (scored by professionals).

Table 4.3 Item-to-general-items correlations.

	Overall quality score	Recommendation score	Intention-to-stay score
Part 1 'Healthcare quality for patients and kin'			
Respondents: patients/kin			
Person-centred	0.762	0.729	0.704
Kin-centred	0.689	0.660	0.629
Transparency	0.715	0.689	0.658
Leadership	0.771	0.742	0.714
Resilience	0.769	0.743	0.715
Safe	0.727	0.695	0.675
Effective	0.769	0.745	0.719
Efficient	0.723	0.683	0.658
Accessible and timely	0.727	0.694	0.669
Equity	0.643	0.637	0.618
Eco-friendly	0.545	0.494	0.468
Dignity and respect	0.802	0.790	0.759
Holistic	0.776	0.755	0.724
Partnership and co-production	0.778	0.745	0.714
Kindness with compassion	0.778	0.773	0.747

	Overall quality score	Recommendation score	Intention-to-stay score
Respondents: professionals			
Person-centred	0.674	0.618	0.541
Kin-centred	0.639	0.572	0.502
Transparency	0.614	0.541	0.485
Leadership	0.631	0.567	0.506
Resilience	0.648	0.585	0.515
Safe	0.667	0.621	0.570
Effective	0.627	0.574	0.532
Efficient	0.581	0.523	0.479
Accessible and timely	0.577	0.511	0.462
Equity	0.490	0.481	0.439
Eco-friendly	0.373	0.326	0.309
Dignity and respect	0.713	0.671	0.608
Holistic	0.690	0.639	0.571
Partnership and co-production	0.663	0.602	0.539
Kindness with compassion	0.677	0.622	0.558
Part 2 'Healthcare quality for professionals'			
Respondents: patients/kin			
Person-centred	0.784	0.752	0.715
Kin-centred	0.776	0.739	0.706
Transparency	0.778	0.749	0.716
Leadership	0.774	0.753	0.704
Resilience	0.793	0.751	0.724
Safe	0.781	0.739	0.701
Effective	0.760	0.738	0.681
Efficient	0.776	0.739	0.700
Accessible and timely	0.757	0.732	0.677
Equity	0.698	0.675	0.633
Eco-friendly	0.697	0.654	0.633
Dignity and respect	0.812	0.777	0.729
Holistic	0.792	0.751	0.723
Partnership and co-production	0.791	0.751	0.718
Kindness with compassion	0.758	0.740	0.672
Respondents: professionals			
Person-centred	0.794	0.751	0.609
Kin-centred	0.724	0.683	0.563
Transparency	0.691	0.653	0.532
Leadership	0.669	0.653	0.536
Resilience	0.760	0.716	0.574
Safe	0.701	0.667	0.539
Effective	0.658	0.638	0.529

	Overall quality score	Recommendation score	Intention-to-stay score
Efficient	0.673	0.628	0.495
Accessible and timely	0.694	0.651	0.510
Equity	0.438	0.442	0.417
Eco-friendly	0.467	0.434	0.350
Dignity and respect	0.822	0.781	0.637
Holistic	0.803	0.766	0.619
Partnership and co-production	0.756	0.718	0.557
Kindness with compassion	0.584	0.579	0.496

1.6 Reliability

For part 1, the Cronbach's alphas were 0.967 and 0.957 scored by patients/kin and professionals, respectively. The Cronbach's alphas for the subscales were ranging from 0.828 to 0.937 (Table 4.4). For part 2, the Cronbach's alphas were 0.981 and 0.947 scored by patients/kin and professionals, respectively. The Cronbach's alphas for the subscales were ranging from 0.857 to 0.945.

Table 4.4 Internal consistency.

Subscales	Patients'/kin's Cronbach's alphas	Professionals' Cronbach's alphas
Part 1 'Healthcare quality for patients and kin'		
Person- and kin-centred care	0.847	0.885
Catalysts	0.905	0.841
Technical domains	0.908	0.828
Core values	0.937	0.913
Part 2 'Healthcare quality for professionals'		
Person- and kin-centred care	0.930	0.892
Catalysts	0.937	0.861
Technical domains	0.945	0.857
Core values	0.945	0.897

2. Process evaluation

In three pilot hospitals, presentations at committees, leaflets, paper posters and screensavers in waiting rooms were used to communicate about the FlaQuM-Quickscan. Healthcare quality managers, job students and volunteers were actively distributing the FlaQuM-Quickscan with a QR-code and tablets on which respondents could immediately complete it. In these hospitals, an individualised approach to explain FlaQuM-Quickscan objectives, to describe the added value of both instrument parts and to support in the online navigation was observed to be most effective. Based on the analysis of the researchers' observation notes, a clear introduction and instructions on how to complete this

mirror instrument emerged as essential. In part 1 of the FlaQuM-Quickscan, professionals without experience as a patient in that hospital were asked to imagine what it would be like to be a patient there. In part 2 of the FlaQuM-Quickscan, patients and kin that were not employed in that hospital, were asked to score the items based on what they could feel, hear and experience during their hospital contact. These lessons learned were presented to healthcare quality managers of included hospitals before the FlaQuM-Quickscan distribution was launched in their hospital. Interviews with 17 healthcare quality managers revealed that all hospitals explained FlaQuM-Quickscan objectives and added value on meetings with employees and used a personalised poster in the hospital's language, leaflet or screensaver to communicate to all healthcare stakeholders, including patients and kin.

Six hospitals published an article in their hospital magazine and three hospitals launched an introduction video. For distribution, social media or internal webpages were used by three hospitals towards patients and kin and by nine hospitals towards professionals. Moreover, all hospitals used e-mail addresses of professionals to contact them and one hospital used text messages to reach patients. Additionally, to motivate patients, kin and professionals, all hospitals used an individualised approach with a job student or volunteer motivating respondents hospital-wide to complete the FlaQuM-Quickscan. In eleven hospitals they used tablets for immediate instrument completion. Moreover, hospitals received weekly feedback about the number of respondents for each type of respondent, which motivated them to focus on reaching lower response groups.

Discussion

This study described a multi-step approach to develop and validate an instrument that measures experiences of QoC multidimensionally [2] from an integrated multistakeholder perspective, i.e. patients, kin and professionals. The goal of this mirror instrument is to measure patients', kin's and professionals' experiences of quality in terms of care for patients and their kin (instrument part 1) and for professionals (instrument part 2). The FlaQuM-Quickscan is the first to provide a comprehensive, non-disease-specific assessment of QoC for both patients/kin and professionals. A mirror instrument has been used extensively in health services research to study different perspectives, e.g. to mirror experiences of different stakeholder groups, such as patients and professionals [17,57,58], or to mirror experiences of one stakeholder group focusing on different care perspectives [43]. The uniqueness of the FlaQuM-Quickscan is that all stakeholders complete both instrument parts, which implicates that patients and kin have to imagine how the hospital cares for professionals and vice versa. Mirroring experiences is substantially supported by theoretical models [2,59] describing that experiential knowledge of patients and kin may differ from the gaps experienced and preferences held by

professionals and vice versa. Integrating different perspectives gives the opportunity to analyse discrepancies and to foster an in-depth discussion to gain a deeper understanding on QoC [59]. The complementarity of quantitative and qualitative results to define QoC priorities, reinforce an integrated, well-informed approach towards quality management.

The validation of the FlaQuM-Quickscan started by conducting focus groups [35] and involving an expert advisory panel to establish content validity, followed by obtaining face validity through a pilot-test in a multistakeholder group. Subsequent validation steps focused on a series of factor analytic models assessing multidimensionality and measurement invariance. The hypotheses to divide each instrument part in four subscales, as a priori defined in Lachman's model, were confirmed in our multicentre study. This dimensionality fitted our stakeholder groups of patients/kin and professionals separately. Multiple group analyses showed a well-fitting model for both groups and allowed comparison across various types of respondents and their characteristics (gender and age). We assumed that respondents can only score on domains experienced by themselves, but based on validity tests we can conclude that items of each instrument part separately had the same meaning for each type of respondent. The criterion validity tests revealed that the majority of items demonstrated strong correlations with overall quality assessment of respondents, thus appearing to measure QoC and nothing else. Consistent with other research [60], the core value 'Dignity and respect' showed the highest correlation with the overall quality assessment in both instrument parts and for both stakeholder groups (patients/kin and professionals). Therefore, despite the generally accepted measurement of technical quality aspects, from a patients', kin's and professionals' view the emphasis has to be on interpersonal, relational, interprofessional and behavioural aspects in quality management [12,26,31,32]. The Cronbach's alpha coefficients revealed good internal consistency for both instrument parts. These values are excellent in comparison with earlier studies that demonstrated lower range rates for instruments measuring healthcare quality experiences of patients [19,22], kin [23] and professionals [12,24,26]. In conclusion, this validated instrument can facilitate co-production of a sustainable, multidimensional quality management system in which all stakeholders' values are central.

Our process evaluation emphasised the need for an individualised approach in communicating and distributing the FlaQuM-Quickscan and in motivating stakeholders to share their QoC experiences. Although the domain 'Eco-friendly' is a maturing quality attribute receiving growing research attention [4], it correlates the lowest of all quality domains in our study. In the current paradigm of youth awareness for environmental conditions and climate targets, the domain may be correlated differently by younger respondents in our sample. Moreover, despite including health equity in the Quintuple Aim [13], the domain has the second lowest association with overall quality assessment. This may be due

to the inclusion of only Dutch-speaking respondents in our sample. The FlaQuM-Quickscan can be expanded to include information on cultural backgrounds and socio-economic demographics of respondents.

FlaQuM-Quickscan results at meso- or micro-level can be used by hospitals to build a shared quality vision and to define related aims (FlaQuM pillar 1). In practice, the discrepancies between the experiences of patients, kin and professionals as well as the differences between results of FlaQuM-Quickscan part 1 'Healthcare quality for patients and kin' and FlaQuM-Quickscan part 2 'Healthcare quality for professionals' can be used for this vision development. The brief tool can be used to develop a monitoring and transparent feedback system, as guided in the co-creation roadmaps towards sustainable QoC (FlaQuM pillar 2) [14]. As shown in our study, monitoring quality multidimensionally implies a focus on technical experiences and soft skills. Education programmes are increasingly focusing on soft skills such as leadership and teamwork as important factors contributing to quality improvement [25,61]. Hospital human resources departments can use FlaQuM-Quickscan results to improve patient, kin and employer experience [13]. Moreover, the FlaQuM-Quickscan could be expanded to include items concerning care pathways, protocols or procedures as well as the quality of communication between patient and provider. In addition to in-hospital QoC management, benchmark reports can be shared to learn during inter-hospital learning collaboratives (FlaQuM pillar 3). In conclusion, the FlaQuM-Quickscan will be useful to researchers, healthcare managers, hospitals' executives and policymakers. In future research, variation in experiences within and between stakeholder groups and hospitals can be examined to identify quality priorities at management, Executive and Board levels and to co-produce future quality initiatives. Additionally, associations of experiences and respondents' demographic variables will be researched. When data from repeated measurements become available, longitudinal invariance and impact of quality initiatives on FlaQuM-Quickscan scores must be studied to explore the sensitivity of the instrument.

Strengths and limitations

A major strength of this study is the evidence-based, stepwise development of this new instrument in a multi-centre setting of 17 hospitals and a parallel process evaluation. The sample of patients, kin and professionals consisted of a female/male ratio that is similar to other healthcare studies [18,62]. Inclusion criteria were only restricted by age, which might lead to a generalisability of results in hospital settings. Quality is addressed multidimensionally in each instrument part, which are validated separately and can be used to mirror results of both parts and of both perspectives. Subscales or individual quality domains can be used on their own. Because the validation of this multidimensional instrument is complex, with analyses per respondent group and per FlaQuM-Quickscan part, and

because previous studies used different types of analyses based on the characteristics of their developed instrument, this study did not make a statement on the comparison of our validation results with those of other instruments. The approach of the FlaQuM-Quickscan is efficient (not time-consuming), feasible and therefore useful for formal quality improvement methods that put patients', kin's and professionals' experiences central. Although this instrument has been developed in Flanders, the method of the FlaQuM-Quickscan could be applied in all healthcare settings in an international perspective. Potential limitations of this study are the cross-sectional design and the self-administrating instrument completion. Further testing of psychometric properties, such as content validity index and convergent validity, is preferable. Evaluation of the FlaQuM-Quickscan in other languages, different countries and in the wider context of healthcare systems, such as in primary care settings, will be the focus of future research. Additionally, within the methods of this study we were not able to match patients, kin and professionals around individual patient cases. Future studies should focus on matched analysis and on understanding differences between experiences of the different stakeholders.

Conclusion

Based on a multi-method approach to establish content and face validity followed by the assessment of construct validity, criterion validity as well as the reliability, the FlaQuM-Quickscan is considered as valid to measure and mirror experiences of QoC multidimensionally from a multistakeholder perspective, i.e. patients, kin and professionals. The FlaQuM-Quickscan measures 'Healthcare quality for patients and kin' (part 1) and 'Healthcare quality for professionals' (part 2). Each instrument part contains 15 quality items, reflecting quality domains, and 3 general items. The power of this new instrument is its ability to mirror experiences from patients, kin and professionals, providing unique and detailed data to design a sustainable quality management system in hospitals. Continuous monitoring of stakeholders' experiences can serve as a catalyst for quality improvement. Future research will assess the transferability to other healthcare systems, examine between-stakeholder group and between-hospitals variation and support to set national quality priorities.

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Supplemental Material

Supplemental Material 1: FlaQuM-Quickscan survey

Supplemental Material 2: Descriptive results

Supplemental Material 3: Good-of-fit indices

Supplemental Material 1: FlaQuM-Quickscan survey

The FlaQuM-Quickscan contains two parts. Patients, kin, and professionals were asked to complete both instrument parts. The first part explores perspectives on *Healthcare quality for patients and kin*, i.e., how professionals care for patients and their kin, while the second part focuses on *Healthcare quality for professionals*, i.e., how the organisation cares for their professionals.

Each item is rated on a 11-point Likert-type scale.

Responses to the first 15 instrument items on quality domains of healthcare will reflect the respondent's level of disagreement or agreement with the item statement, scored from *0* (strongly disagree) to *10* (strongly agree).

The first general item includes the overall quality assessment of received care (in part 1) and the overall quality assessment of the hospital as employer (in part 2), and is scored from *0* (worst possible quality) to *10* (best possible quality). The second general item concerns the willingness to recommend the hospital to family and friends for receiving care (in part 1) or to work as an employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes). The third general item reflects on a respondent's intention-to-stay in the next year to receive care (in part 1) or to work as employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes).

Part 1: Healthcare quality for patients and kin

Instrument items	Quality domains
This organisation takes into account the wishes, needs and requirements of patients.	Person-centred
This organisation pays close attention to family, caregivers and/or other kin.	Kin-centred
Patients and kin are informed about the quality of care in this organisation.	Transparency
All staff consistently demonstrate their commitment to the organisation and set a good example so that patients and their kin feel comfortable and safe.	Leadership
This organisation takes into account what a patient and their kin can cope with (e.g. stress or new information).	Resilience
The care provided to patients and kin in this organisation is safe and actions are taken to prevent or resolve unsafe situations.	Safe
The staff in this organisation know their jobs and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on patients where possible.	Efficient
Care services are always accessible and offered without postponement or unnecessary delay.	Accessible and timely
All patients and kin are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
This organisation has a policy to reduce its ecological footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats patients and their kin with dignity and respect.	Dignity and respect
This organisation considers the individual behind the patient and their kin: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation patients and their kin are involved in decisions, listened to and their knowledge and experience are taken into account.	Partnership and co-production
In this organisation people are friendly and kind to patients and their loved ones.	Kindness with compassion
Which score would you give the overall quality of care, provided to patients and their kin, in this organisation?	Overall quality score
Would you recommend this organisation to your friends and family?	Recommendation score
If you need care in the coming year, would you choose this care organisation?	Intention-to-stay score

Part 2: Healthcare quality for professionals

Statements	Domain
This organisation takes into account the wishes, needs and requirements of staff.	Person-centred care
This organisation takes into account familial circumstances of staff.	Kin-centred care
Staff are informed about the quality of care in this organisation.	Transparency
Staff always show their commitment and set a good example that makes other staff feel trusted and safe.	Leadership
In this organisation, what staff can cope with (e.g. stress or new information), is taken into account.	Resilience
This organisation does everything within their power to keep a safe working environment for its staff and ensures that they dare to call each other to account for unsafe situations.	Safe
This organisation ensures that staff know their job and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on staff where possible.	Efficient
This organisation ensures an adequate staffing level that works together optimally to provide care that is accessible, timely and without unnecessary delays.	Accessible and timely
All staff are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
Staff is motivated to reduce their environmental footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats staff with dignity and respect.	Dignity and respect
This organisation considers the individual behind the staff: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation, staff is actively involved in decisions, changes or improvement projects; they are listened to and their knowledge and experience is taken into account.	Partnership and co-production
In this organisation staff are friendly and kind to each other.	Kindness with compassion
Which score would you give this organisation as an employer?	Overall quality score
Would you recommend this organisation as an employer to your friends and family?	Recommendation score
Would you continue to work in this organisation in the coming year?	Intention-to-stay score

Supplemental Material 2: Descriptive results

Supplementary Figure 4.1 Distribution of scores for part 1 'Healthcare quality for patients and kin' on the 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by patients/kin (dark blue line) and professionals (burgundy line). Next to the distribution of each item, the percentage of scores between 0-5 (square) and between 8-10 are shown (diamond). K-S test P = the p-value of the Kolmogorov-Smirnov test to assess differences in percentage distributions of scores between patients/kin and professionals. T-test p = the p-value of the t-test to assess differences in averages of items scored by patients/kin and by professionals.

Part 1. Healthcare quality for patients and kin

Domain	Respondent	%0-5	%6-7	%8-10
Person-centred	Patients/kin	7.3%	16.2%	76.5%
	Professionals	13.9%	41.6%	44.6%
Kin-centred	Patients/kin	14.3%	21.3%	64.4%
	Professionals	19.1%	44.5%	36.4%
Transparency	Patients/kin	12.8%	20.6%	66.7%
	Professionals	22.0%	44.7%	33.2%
Leadership	Patients/kin	7.3%	16.4%	76.3%
	Professionals	15.9%	42.3%	41.8%
Resilience	Patients/kin	9.8%	20.1%	70.1%
	Professionals	17.5%	45.8%	36.7%
Safe	Patients/kin	6.5%	15.3%	78.2%
	Professionals	11.0%	34.8%	54.2%
Effective	Patients/kin	4.6%	11.4%	84.0%
	Professionals	8.5%	32.6%	58.9%
Efficient	Patients/kin	10.2%	20.2%	69.6%
	Professionals	25.1%	45.3%	29.6%
Accessible and timely	Patients/kin	10.0%	20.2%	69.7%
	Professionals	24.5%	43.2%	32.3%
Equity	Patients/kin	5.5%	10.0%	84.6%
	Professionals	5.9%	17.2%	76.9%
Eco-friendly	Patients/kin	14.5%	23.0%	62.5%
	Professionals	36.6%	35.2%	28.1%
Dignity and respect	Patients/kin	5.6%	11.7%	82.7%
	Professionals	7.5%	32.3%	60.2%
Holistic care	Patients/kin	8.1%	16.0%	75.9%
	Professionals	11.4%	40.9%	47.7%
Partnership and co-production	Patients/kin	9.9%	17.9%	72.3%
	Professionals	14.1%	42.1%	43.8%
Kindness with compassion	Patients/kin	4.7%	10.1%	85.1%
	Professionals	7.0%	30.0%	63.0%
Overall quality score	Patients/kin	4.8%	13.8%	81.4%
	Professionals	7.2%	43.2%	49.6%
Recommendation score	Patients/kin	6.1%	10.4%	83.5%
	Professionals	9.4%	30.2%	60.3%
Intention-to-stay score	Patients/kin	6.5%	10.1%	83.4%
	Professionals	11.0%	25.9%	63.0%

Supplementary Figure 4.2 The percentage of scores between 0-5 (red), between 6-7 (light orange) and between 8-10 (dark green) are shown for part 1 'Healthcare quality for patients and kin' on the 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by patients/kin (top bar for each quality domain) and professionals (bottom bar for each quality domain).
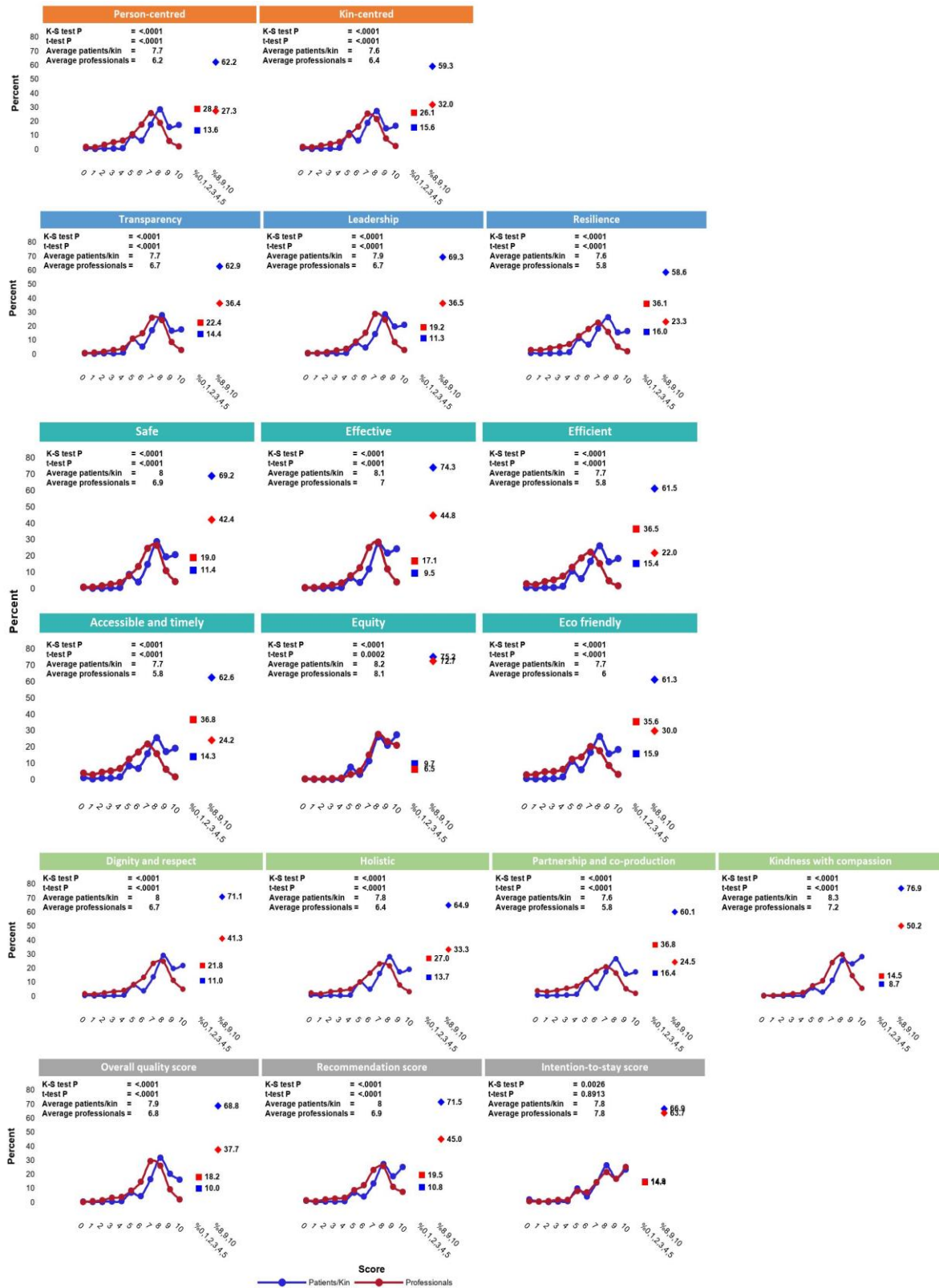
Supplementary Figure 4.3 Distribution of scores for part 2 'Healthcare quality for professionals' on the 15 items of the multidimensional quality model (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by patients/kin (dark blue line) and professionals (burgundy line). Next to the distribution of each item, the percentage of scores between 0-5 (square) and between 8-10 are shown (diamond). K-S test P = the p-value of the Kolmogorov-Smirnov test to assess differences in percentage distributions of scores between patients/kin and professionals. T-test p = the p-value of the t-test to assess differences in averages of items scored by patients/kin and by professionals.

Part 2. Healthcare quality for professionals
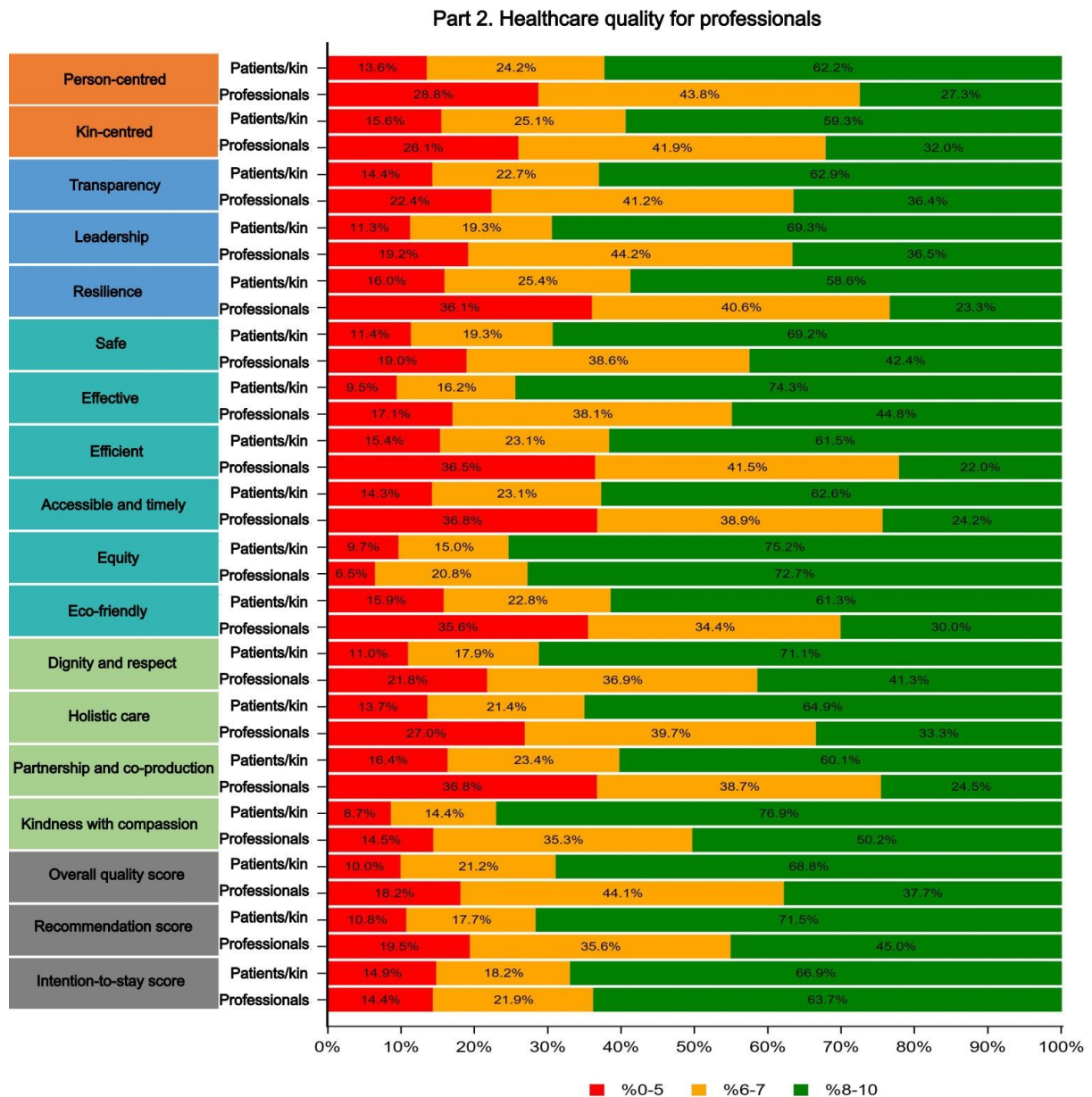
Supplementary Figure 4.4 The percentage of scores between 0-5 (red), between 6-7 (light orange) and between 8-10 (dark green) are shown for part 2 'Healthcare quality for professionals' on the 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by patients/kin (top bar for each quality domain) and professionals (bottom bar for each quality domain).

Supplemental Material 3: Good-of-fit indices

Supplementary Table 4.1 Goodness-of-fit indices associated with factor analyses for part 1 'Healthcare quality for patients and kin'.

	γ²	p	df	CFI	TLI	RMSEA (90% CI)
Respondents: Patients and kin						
Type of respondents						
ICM-CFA with 4 factors: Patients	2901.370	<0.001	84	0.959	0.948	0.085 (0.082 - 0.087)
ICM-CFA with 4 factors: Kin	858.220	<0.001	84	0.960	0.950	0.089 (0.084 - 0.095)
Multiple group ICM-CFA with 4 factors: Configural invariance	3759.589	<0.001	168	0.959	0.949	0.086 (0.083 − 0.088)
Multiple group ICM-CFA with 4 factors: Scalar invariance	3892.085	<0.001	190	0.958	0.953	0.082 (0.080 - 0.084)
Gender						
ICM-CFA with 4 factors: Female	2336.923	<0.001	84	0.956	0.945	0.090 (0.087 - 0.093)
ICM-CFA with 4 factors: Male	1470.582	<0.001	84	0.961	0.951	0.081 (.0078 - 0.085)
Multiple group ICM-CFA with 4 factors: Configural invariance	3807.756	<0.001	168	0.958	0.948	0.086 (0.084 - 0.089)
Multiple group ICM-CFA with 4 factors: Scalar invariance	3868.201	<0.001	190	0.958	0.953	0.082 (0.079 - 0.084)
Age						
ICM-CFA with 4 factors: 18-30	596.666	<0.001	84	0.934	0.917	0.105 (0.097 - 0.113)
ICM-CFA with 4 factors: 31-50	1301.346	<0.001	84	0.949	0.936	0.096 (0.092 - 0.101)
ICM-CFA with 4 factors: 51-65	1244.419	<0.001	84	0.963	0.954	0.085 (0.081 - 0.089)
ICM-CFA with 4 factors: 66-79	907.702	<0.001	84	0.962	0.953	0.081 (0.076 - 0.086)
ICM-CFA with 4 factors: 80+	326.004	<0.001	84	0.924	0.905	0.105 (0.093 - 0.117)
Multiple group ICM-CFA with 4 factors: Configural invariance	4376.136	<0.001	420	0.955	0.944	0.090 (0.088 - 0.093)
Multiple group ICM-CFA with 4 factors: Scalar invariance	4796.028	<0.001	508	0.951	0.950	0.085 (0.083 - 0.088)

	χ^2	p	df	CFI	TLI	RMSEA (90% CI)
Respondents: Professionals						
Type of respondents						
ICM-CFA with 4 factors: Middle management (Staff members and supervisors)	554.788	<0.001	84	0.940	0.926	0.079 (0.073 - 0.086)
ICM-CFA with 4 factors: Physicians / Dentists	544.594	<0.001	84	0.944	0.931	0.079 (0.073 - 0.085)
ICM-CFA with 4 factors: Nurses / Midwives / Nursing assistants	1815.336	<0.001	84	0.948	0.935	0.081 (0.078 - 0.085)
ICM-CFA with 4 factors: Other professionals with direct patient contact	1188.801	<0.001	84	0.936	0.920	0.092 (0.088 - 0.097)
ICM-CFA with 4 factors: Supporting professionals without direct patient contact	665.688	<0.001	84	0.957	0.947	0.082 (0.076 - 0.088)
ICM-CFA with 4 factors: Management and executives	183.163	<0.001	84	0.910	0.888	0.092 (0.073 - 0.110)
Multiple group ICM-CFA with 4 factors: Configural invariance	4952.371	<0.001	504	0.946	0.932	0.083 (0.081 - 0.086)
Multiple group ICM-CFA with 4 factors: Scalar invariance	5899.051	<0.001	614	0.935	0.934	0.082 (0.080 - 0.084)
Gender						
ICM-CFA with 4 factors: Female	3427.769	<0.001	84	0.946	0.933	0.083 (0.081 - 0.086)
ICM-CFA with 4 factors: Male	869.511	<0.001	84	0.958	0.948	0.072 (0.068 - 0.076)
Multiple group ICM-CFA with 4 factors: Configural invariance	4297.280	<0.001	168	0.949	0.936	0.081 (0.079 - 0.083)
Multiple group ICM-CFA with 4 factors: Scalar invariance	4388.301	<0.001	190	0.948	0.943	0.077 (0.075 - 0.079)
Age						
ICM-CFA with 4 factors: 18-30	883.282	<0.001	84	0.939	0.923	0.082 (0.077 - 0.087)
ICM-CFA with 4 factors: 31-50	2314.210	<0.001	84	0.943	0.929	0.085 (0.082 - 0.088)
ICM-CFA with 4 factors: 51-65	1232.295	<0.001	84	0.961	0.951	0.075 (0.071 - 0.079)
Multiple group ICM-CFA with 4 factors: Configural invariance	4429.786	<0.001	252	0.949	0.936	0.081 (0.079 - 0.083)
Multiple group ICM-CFA with 4 factors: Scalar invariance	4689.450	<0.001	296	0.946	0.943	0.077 (0.075 - 0.079)

Notes: CFI = comparative fit index, ICM-CFA = independent cluster model confirmatory factor

analysis; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index

Supplementary Table 4.2 Goodness-of-fit indices associated with factor analyses for part 2 'Healthcare quality for professionals'.

	χ^2	p	df	CFI	TLI	RMSEA (90% CI)
Respondents: Patients and kin						
Type of respondents						
ICM-CFA with 4 factors: Patients	3067.178	<0.001	84	0.968	0.960	0.087 (0.085 - 0.090)
ICM-CFA with 4 factors: Kin	829.525	<0.001	84	0.966	0.958	0.087 (0.082 - 0.093)
Multiple group ICM-CFA with 4 factors: Configural invariance	3896.703	<0.001	168	0.967	0.959	0.087 (0.085 - 0.090)
Multiple group ICM-CFA with 4 factors: Scalar invariance	3946.495	<0.001	190	0.967	0.964	0.082 (0.080 - 0.085)
Gender						
ICM-CFA with 4 factors: Female	2372.106	<0.001	84	0.965	0.956	0.091 (0.088 - 0.094)
ICM-CFA with 4 factors: Male	1483.919	<0.001	84	0.972	0.965	0.082 (0.078 - 0.086)
Multiple group ICM-CFA with 4 factors: Configural invariance	3856.025	<0.001	168	0.968	0.960	0.087 (0.085 - 0.089)
Multiple group ICM-CFA with 4 factors: Scalar invariance	3901.119	<0.001	190	0.968	0.964	0.082 (0.080 - 0.084)
Age						
ICM-CFA with 4 factors: 18-30	536.583	<0.001	84	0.952	0.940	0.099 (0.091 - 0.107)
ICM-CFA with 4 factors: 31-50	1415.310	<0.001	84	0.957	0.946	0.101 (0.096 - 0.105)
ICM-CFA with 4 factors: 51-65	1343.880	<0.001	84	0.967	0.959	0.088 (0.084 - 0.093)
ICM-CFA with 4 factors: 66-79	1003.045	<0.001	84	0.971	0.963	0.085 (0.081 - 0.090)
ICM-CFA with 4 factors: 80+	367.212	<0.001	84	0.943	0.929	0.114 (0.102 - 0.126)
Multiple group ICM-CFA with 4 factors: Configural invariance	4666.029	<0.001	420	0.963	0.954	0.093 (0.091 - 0.096)
Multiple group ICM-CFA with 4 factors: Scalar invariance	4932.223	<0.001	508	0.962	0.960	0.087 (0.084 - 0.089)

	χ^2	p	df	CFI	TLI	RMSEA (90% CI)
Respondents: Professionals						
Type of respondents						
ICM-CFA with 4 factors: Middle management (Staff members and supervisors)	566.354	<0.001	84	0.950	0.937	0.080 (0.074 - 0.086)
ICM-CFA with 4 factors: Physicians / Dentists	666.959	<0.001	84	0.944	0.930	0.089 (0.083 - 0.095)
ICM-CFA with 4 factors: Nurses / Midwives / Nursing assistants	2759.553	<0.001	84	0.936	0.920	0.101 (0.098 - 0.104)
ICM-CFA with 4 factors: Other professionals with direct patient contact	1202.165	<0.001	84	0.943	0.928	0.093 (0.088 − 0.098)
ICM-CFA with 4 factors: Supporting professionals without direct patient contact	816.174	<0.001	84	0.946	0.932	0.092 (0.086 − 0.098)
ICM-CFA with 4 factors: Management and executives	177.876	<0.001	84	0.908	0.885	0.089 (0.071 - 0.107)
Multiple group ICM-CFA with 4 factors: Configural invariance	6189.082	<0.001	504	0.941	0.926	0.094 (0.092 − 0.096)
Multiple group ICM-CFA with 4 factors: Scalar invariance	7367.407	<0.001	614	0.929	0.928	0.093 (0.091 − 0.095)
Gender						
ICM-CFA with 4 factors: Female	4328.971	<0.001	84	0.943	0.929	0.094 (0.092 - 0.096)
ICM-CFA with 4 factors: Male	1153.371	<0.001	84	0.953	0.941	0.084 (0.080 - 0.088)
Multiple group ICM-CFA with 4 factors: Configural invariance	5482.343	<0.001	168	0.945	0.931	0.092 (0.090 − 0.094)
Multiple group ICM-CFA with 4 factors: Scalar invariance	5672.258	<0.001	190	0.943	0.937	0.088 (0.086 − 0.090)
Age						
ICM-CFA with 4 factors: 18-30	1101.248	<0.001	84	0.940	0.925	0.092 (0.087 - 0.097)
ICM-CFA with 4 factors: 31-50	2962.542	<0.001	84	0.940	0.925	.096 (.093 - .099)
ICM-CFA with 4 factors: 51-65	1699.954	<0.001	84	0.951	0.938	0.089 (0.085 - 0.093)
Multiple group ICM-CFA with 4 factors: Configural invariance	5763.745	<0.001	252	0.944	0.929	0.093 (0.091 − 0.095)
Multiple group ICM-CFA with 4 factors: Scalar invariance	6022.453	<0.001	296	0.941	0.938	0.088 (0.086 − 0.090)

Notes: CFI = comparative fit index, ICM-CFA = independent cluster model confirmatory factor analysis; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index

Understanding variation in healthcare quality experiences of three stakeholders: Patients and kin, healthcare professionals and hospitals

Understanding variation in healthcare quality experiences of three stakeholders: Patients and kin, healthcare professionals and hospitals

Abstract

Background: As quality of care increasingly becomes a strategic topic for hospitals, understanding variation between stakeholders' experiences is essential. A framework can be used by managers, researchers, and policy makers to account for these variations and set priorities to ensure an environment of trust among all stakeholders — including patients and kin. To measure perceptions of quality from a multidimensional view, four objectives were established. The first was to explore whether patients and kin (collectively), and professionals experience quality as a multidimensional concept. The second was to examine the between-stakeholder variation across healthcare quality experiences of patients/kin and professionals. The third was to examine between-hospital variation in healthcare quality experiences among the 19 hospitals studied. The fourth was to set quality priorities for hospital management and policy makers based on multistakeholder and multicentre data.

Methods: To collect information, researchers used the Flanders Quality Model (FlaQuM)-Quickscan tool, which is a two-part instrument that measures quality from a multidimensional view. It includes a series of statements on healthcare quality for patients and kin (part 1) and a corresponding series of statements on healthcare quality for professionals (part 2), each consisting of 15 quality domains and three global ratings; all respondents were required to address both parts 1 and 2. To explore whether quality is experienced as a multidimensional concept, intraindividual variation was examined by analysing stakeholders' differences between minimum and maximum scores on the instrument domains. Between-stakeholder variation was examined by evaluating differences in mean scores of the two stakeholder groups on the quality domains using unpaired t-tests. Between-hospital variation was examined by evaluating differences in hospitals' mean scores on the quality domains using one-way analysis of variance (ANOVA).

Results: In total, 14,977 respondents (6,590 patients/kin and 8,387 professionals) completed the FlaQuM-Quickscan during the study period between May 2021 and June 2022. Respondents used a Likert scale, where 0 is full disagreement with the statement and 10 is full agreement. Analyses revealed important intraindividual variation in experiences of respondents across quality domains. Researchers also observed that patients/kin scored all domains (in parts 1 and 2) significantly higher than professionals, except for the Equity domain in part 2. Significant between-hospital variation in

the mean scores was observed for all domains. Of note, by combining the correlation of the overall quality scores with the quality domains, the difference in mean scores on domains, and the variation between hospitals' mean scores, priorities can be identified.

Conclusion: Overall, researchers found that patients/kin and professionals do experience quality as a multidimensional concept. The multidimensional priorities identified based on the FlaQuM-Quickscan results indicate the need for future multifaceted quality strategies at the meso and macro levels that can have an impact at the patient care level. Hospital management and policy makers need to support the integration between executive/management-level and frontline-level initiatives.

Introduction

As we approach the third decade of patient safety and quality initiatives, reports have indicated that progress is not as one would expect [1,2]. Despite having increased knowledge on how to improve care delivery and patient safety, a major challenge has been figuring out how to implement — at scale — what works in a reliable and effective way. As a result, expected improvements of quality initiatives have not always been achieved. Healthcare organisations now face increasing pressure to change their quality of care (QoC) strategies [3–5] and to increase their value and cost-effectiveness [6]. Despite recommendations as early as 1966 to include interpersonal measures — essentially person-centeredness and patient-provider experiences — in evaluating the methods for assessing the quality of medical care [7], QoC strategies have focused mainly on technical measures such as safety, effectiveness, efficiency, timeliness, and eco-friendliness as the *gold standard* [8,9]. Other experts proposed striking the balance between technical and interpersonal quality measures to establish whole system quality [10–13]. A new model, referred to as the Lachman multidimensional quality model, expands on the Institute of Medicine's definition of quality and supports the need for this quest for balance [10]. The new model consists of the six aforementioned technical dimensions, but also includes four core values and indicators on person- and kin-centred care. These are enabled by the leadership, resilience, and transparency principles [10,14]. Organisations need to redefine their QoC strategies based on a multidimensional, holistic quality approach to develop cost-effective, co-created quality management systems [10,15].

From a value-based healthcare perspective, the buy-in of patients, kin, and professionals represents an essential source of information and insight to support managerial knowledge and methods [16,17]. The integration of the quality experiences of different stakeholders will guide the transformation of QoC strategies to fit the needs of the stakeholders [18,19]. However, integration remains challenging and elusive for hospitals. Although expertise regarding the experience of patients and kin has gained attention recently [20–22] and positive associations with outcomes have been found [23], measuring multidimensional experiences is not yet an integral part of quality management. Moreover, despite a greater understanding of the positive impact of a healthy work environment for professionals on patient outcomes [24] and on the professional's well-being [25], job satisfaction [26], and retention [27], how the organisation cares for its professionals is not yet systematically monitored in a consistent manner [28] and the development of versatile, validated tools remains limited [29]. There is an obvious requirement for hospitals and national policy makers to consider new quality strategies from a multidimensional approach, based on a multistakeholder perspective [3,27].

Therefore, we developed an instrument, Flanders Quality Model (FlaQuM)-Quickscan, which measures QoC multidimensionally from a multistakeholder perspective. The use of FlaQuM-Quickscan in hospitals can be a catalyst to define QoC priorities at the meso and macro levels, i.e., at the organisational and national levels [23]. Most aspects of Belgium's healthcare system are funded and controlled by federal authorities, which are responsible for matters including the national compulsory health insurance, setting the hospital budget, regulating health products and activities, regulating healthcare professionals, and patients' rights. The three federated regions, of which Flanders is one, undertake the main responsibility for primary care organisations, care for older people, mental healthcare, rehabilitation, and health promotion and disease prevention. Since 2020, collaboration between general and specialized functions and university hospitals has been reinforced by the legal requirement that every hospital must be in a locoregional hospital network, with task allocation within the network [30].

As quality increasingly becomes a strategic topic for managers and policy makers, it is essential to understand variation in individuals' experiences of healthcare quality and to learn from it [17]. Previous research suggested differences in QoC experiences between quality domains, stakeholder groups [12,31–34], and hospitals [35–38]. Today, it remains unclear which domains should be prioritized on the road toward multidimensional quality management systems. Therefore, the objectives of this study were fourfold: (1) To explore whether patients/kin and professionals experience quality as a multidimensional concept; (2) To examine between-stakeholder variation across healthcare quality experiences of patients/kin and professionals; (3) To examine between-hospital variation in healthcare quality experiences and (4) To set quality priorities for hospital management and policy makers based on multistakeholder and multicentre data.

Based on this multistakeholder and multicentre study, the results of FlaQuM-Quickscan demonstrated that the patients and kin and the professionals experience quality as a multidimensional concept and revealed significant between-stakeholder variation and significant between-hospital variation in healthcare quality experiences. The identified quality priorities at the meso and macro levels are multidimensional and include technical dimensions, both person- and kin-centred care, core values, and catalysts. Future multifaceted quality improvement strategies need to focus on these multidimensional priorities. To set priorities at the hospital level, we recommend that hospital management uses the correlation of the overall quality scores with quality domains and the mean scores of domains. To set priorities at a greater macro policy level, we recommend that policy makers use the correlation of the overall quality scores with quality domains and the between-hospital variation

Methods

Design, setting and participants

We employed a cross-sectional survey design across a convenience sample of 19 Flemish hospitals, located in the Dutch-speaking part of Belgium, that are members of the Flanders Quality Model Consortium, a collaboration of 23 Flemish hospitals. Dutch-speaking participants 18 years of age and older were invited to complete the FlaQuM-Quickscan survey. The invited participants were either patients who had had a consultation, treatment, or admission in one of the included hospitals; their kin; or professionals employed in these 19 hospitals. The FlaQuM-Quickscan tool was available between May 3, 2021, and June 30, 2022. The sample consisted of 16 acute-care hospitals, two rehabilitation centres, and one psychiatric hospital. There was no specific trigger or engagement process. A FlaQuM coordinator for each hospital was responsible for disseminating the survey link for their hospital, whether by way of email, a website, or a limited, local hospital portal. The link to the electronic survey was provided by the University of Leuven, and all the response data flowed to the university database. Each hospital received a weekly update on their number of responses by patients and kin and by professionals. The FlaQuM coordinator in most hospitals was the local quality manager and was informed by the FlaQuM team.

FlaQuM focuses on developing a sustainable quality management system and encompasses three pillars:

1. Thinking based on a quality vision model [10];
2. Doing by focusing on the implementation of a cocreation road map [39];
3. Learning from innovation and social capital in interhospital collaboratives [40].

Instrument FlaQuM-Quickscan

The FlaQuM-Quickscan tool is a survey instrument to assess experiences of healthcare quality of patients, kin, and professionals (Supplemental Material 1). It contains two parts. Patients, kin, and professionals were asked to complete both instrument parts; a response was required/forced for each statement. The first part, Healthcare quality for patients and kin, explores perspectives on how professionals care for patients and their kin, whereas the second part, Healthcare quality for professionals, focuses on how the organisation cares for their professionals. Each part contains 18 total items, including 15 statements measuring the domains of the multidimensional quality model known as Lachman's model [10] and three global ratings with respect to the organisation, and three

sociodemographic questions. Lachman's model encompasses four subscales: person and kin-centred care (two items), catalysts (three items), technical domains (six items), and core values (four items) [10]. Each domain item is rated on an 11-point Likert-type scale reflecting the respondent's level of disagreement or agreement with the item statement, with scores from 0 (strongly disagree) to 10 (strongly agree). The ratings are similar for the global statements; the first global rating includes the overall quality assessment of received care (in part 1) and the overall quality assessment of the organisation as employer (in part 2), scored from 0 (worst possible quality) to 10 (best possible quality). The second global rating concerns the willingness to recommend the organisation to family and friends for receiving care (in part 1) or to work as an employee (in part 2), scored from 0 (definitely no) to 10 (definitely yes). The final global rating reflects a respondent's intention to stay at that hospital in the next year to receive care (in part 1) or to work as an employee (in part 2), scored from 0 (definitely no) to 10 (definitely yes). The demographic items identify respondent group (patient/kin or professional), gender, and age.

Respondents were informed of how the surveys would be used. The introduction of the survey stated that the survey protocol had been approved by the ethical committee of their hospital and that the data would be used only for quality management purposes and research goals. The sociodemographic questions were also reviewed by the ethical committees of the hospitals. Based on their suggestion, we created an informed-consent letter, which was added to the introduction, before the start of the survey. This letter explained how the FlaQuM team would handle the data analysis. The hospitals had no access to the source data. Furthermore, it was explained that the data of the electronic survey were going directly to the database of the research team, which could be accessed by only two researchers.

Statistical analyses

Given that a response to each statement was required, only fully completed surveys (all 36 statements from the combined part 1 and part 2) were included in this study. Descriptive analyses of sociodemographic data identified respondents' characteristics (gender and age). We focused on two stakeholder groups, patients/kin and professionals, in accordance with the characteristics of FlaQuM-Quickscan, which is designed to reflect healthcare quality for patients and kin and healthcare quality for professionals. In the first research question, intraindividual variability was examined for both FlaQuM-Quickscan parts by assessing, for each respondent in both stakeholder groups, differences between minimum and maximum scores on items. The cut-off value for the minimum difference between respondents' minimum and maximum scores was set at 3 points. Significance in difference was studied by the one-sample t-test. Our null hypothesis is that there is no difference between the minimum and maximum scores on dimensions, meaning that respondents do not distinguish

experiences between dimensions and perceive quality as a unidimensional construct. Nevertheless, in Lachman's model, quality is described as a multidimensional construct.

Second, between-stakeholder variation was examined by using box plots, including an interquartile range, median, and mean. Differences in mean scores for healthcare quality domains between patients/kin and professionals were assessed for significance by an unpaired t-test. Outliers were excluded in the presentation of results in the figures. Third, between-hospital variation was examined by plotting the hospitals' mean scores for all quality domains, scored by both stakeholder groups (patients/kin and professionals). Differences in hospitals' mean scores for quality domains were studied by one-way analysis of variance (ANOVA). Significance was determined at an alpha level of $P < 0.05$. Fourth, setting priorities in healthcare quality was based on the combination of the Pearson's correlations between the 15 quality domains and the overall quality score, stakeholders' mean scores on quality domains, and the variation between hospitals' mean scores on quality domains. The analyses were generated using the SAS software, version 9.4, of the SAS system for Windows.

Results

Characteristics of respondents

Throughout the study period, from May 3, 2021, to June 30, 2022, the FlaQuM coordinator at each hospital would submit orders for the survey link for several weeks for their hospital's patients, kin, and healthcare professionals; the orders were fulfilled by the University of Leuven, which opened and closed the links. In total, 14,977 respondents ($N_{patients/kin}$ = 6,590 and $N_{professionals}$ = 8,387) completed the FlaQuM-Quickscan survey. Respondents' characteristics are shown in Table 5.1. Among patients and kin, 56.4% were female and 32.5% were 51–65 years old. Among professionals, 75.1% were female and 48.1% were 31–50 years old. These percentages generally align with the demographics of the Flanders region.

Table 5.1 Characteristics of respondents and hospitals.

Characteristics of respondents	Patients and kin (N=6,590)	Professionals (N=8,387)
Gender, *N (%)*		
Female	3,718 (56.4%)	6,302 (75.1%)
Male	2,745 (41.7%)	1,975 (23.6%)
Other	15 (0.2%)	61 (0.7%)
Unknown	112 (1.7%)	49 (0.6%)
Age (years), *N (%)*		
18–30	649 (9.9%)	1,618 (19.3%)
31–50	1,810 (27.5%)	4,036 (48.1%)
51–65	2,143 (32.5%)	2,609 (31.1%)
66–79	1,620 (24.6%)	57 (0.7%)
80+	292 (4.4%)	10 (0.1%)
Unknown	72 (1.1%)	57 (0.7%)
Characteristic of Hospitals		**Frequency (n = 19)**
Licensed beds, *N (%)*		
<400 beds		8 (42.1%)
>400 – <800 beds		6 (31.6%)
>800 beds		5 (26.3%)

Research question 1: Intraindividual variation

To examine whether patients/kin and professionals experience quality as a multidimensional concept, variation between respondents' minimum and maximum scores for the 15 domains and three global scores of the FlaQuM-Quickscan were analysed; this included 6,590 patients/kin and 8,387 professionals. This intraindividual variation showed that 55.0% of patients/kin and 78.6% of professionals scored the domains in part 1 with a minimum difference of 3 points between the minimum and maximum score on the 11-point Likert-scale; in part 2, these values were 41.5% and 80.9%, respectively. Based on the one-sample t-test, we rejected our null hypothesis, meaning that patients/kin and professionals differentiate experiences across quality domains. The P-value for patients/kin and professionals in both FlaQuM-Quickscan parts was smaller than 0.001 (Figure 5.1).
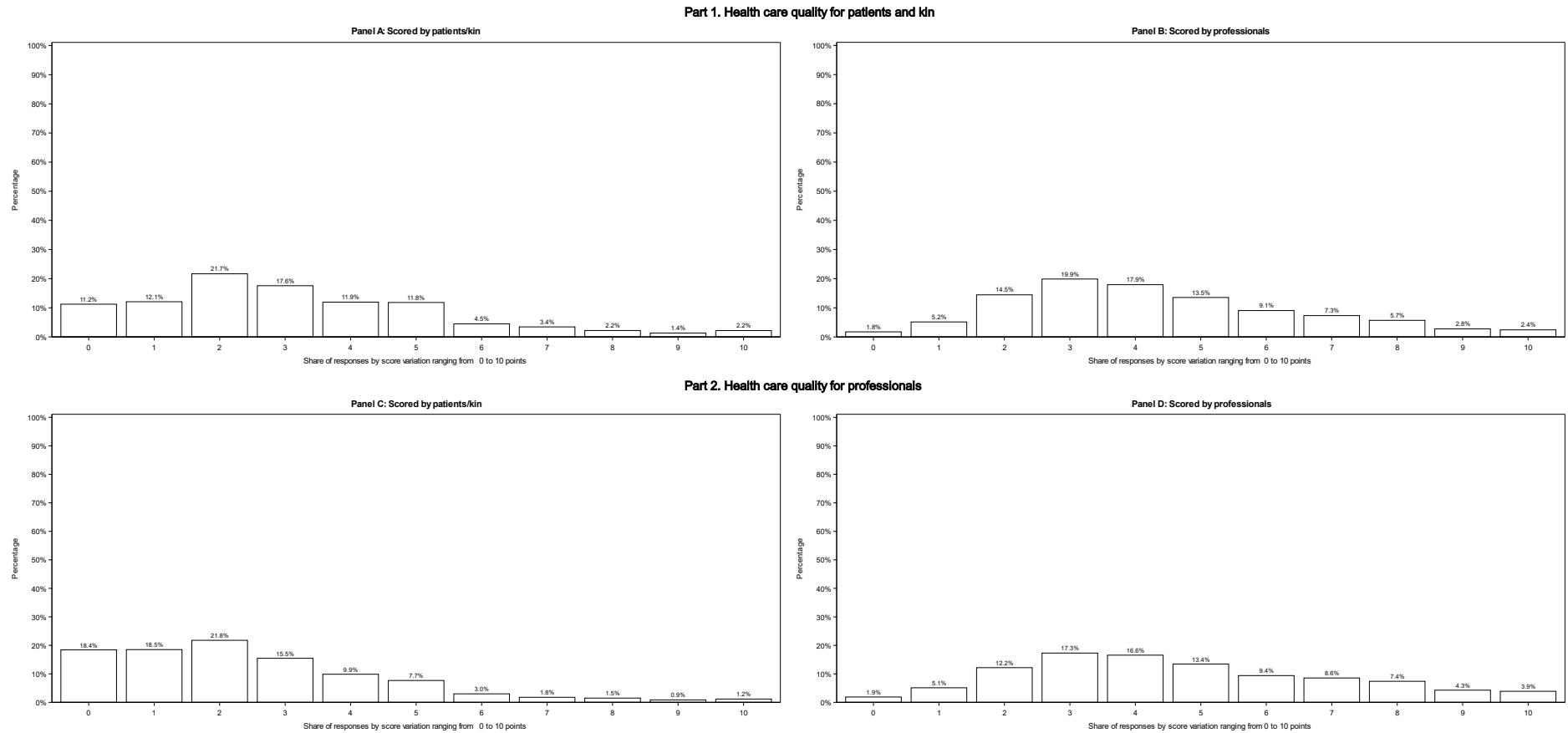
Part 1. Health care quality for patients and kin

Figure 5.1 Differences in stakeholders' maximum and minimum scores on the 11-point Likert scale in FlaQuM-Quickscan.

Note Figure 5.1: Each panel (A–D) represents the percentage of differences in stakeholders' maximum and minimum scores for each instrument part and for each stakeholder group. For example, in Panel A, which shows Part 1 of the FlaQuM-Quickscan as scored by patients/kin, 11.2% had no difference between their minimum and maximum scores on the 18 rated statements in part 1, whereas 2.2% had a difference of 10 points between their minimum and maximum score on the 18 rated statements in part 1. Among the part 1 statements scored by professionals, a smaller share, only 1.8%, had no difference between their minimum and maximum scores.

Research question 2: Between-Stakeholder Variation Across Healthcare Quality Experiences of Patients/Kin and Professionals

To set quality priorities from a multistakeholder perspective, managers and policy makers need to be aware of the variation in scores between stakeholder groups (patients/kin and professionals). Patients/kin scored all domains of FlaQuM-Quickscan (part 1 and part 2) statistically significantly higher than professionals, except for the domain Equity in part 2 (Figure 5.2). In part 1 (Healthcare Quality for Patients and Kin), the domains Eco-friendliness, Efficiency, and Accessibility and Timeliness showed the largest variation between experiences of patients/kin and professionals. The domains Equity, Dignity and Respect, Safety, Holistic Care, and Kin-centeredness showed the smallest variation. Overall, the domains Kindness with Compassion and Equity scored the highest means in part 1, while domains Eco-friendliness and Kin-centeredness showed the largest potential to gain (lowest means).

In part 2 (Healthcare Quality for Professionals), the domains Accessibility and Timeliness, Efficiency, Eco-friendliness, Partnership and Co-production, and Resilience showed the largest variation between stakeholder groups. The domains Equity, Transparency, and Kindness with Compassion showed the smallest variation. Generally, Kindness with Compassion and Equity scored the highest means. From patients' and kin's perspective, differences between mean scores of all other domains were small, ranging between 8.1 and 7.5, which makes it challenging to prioritize quality domains in hospital management. From professionals' perspective, the domains Efficiency, Resilience, Partnership and Co-production, and Accessibility and Timeliness showed the largest potential to gain (lowest means).
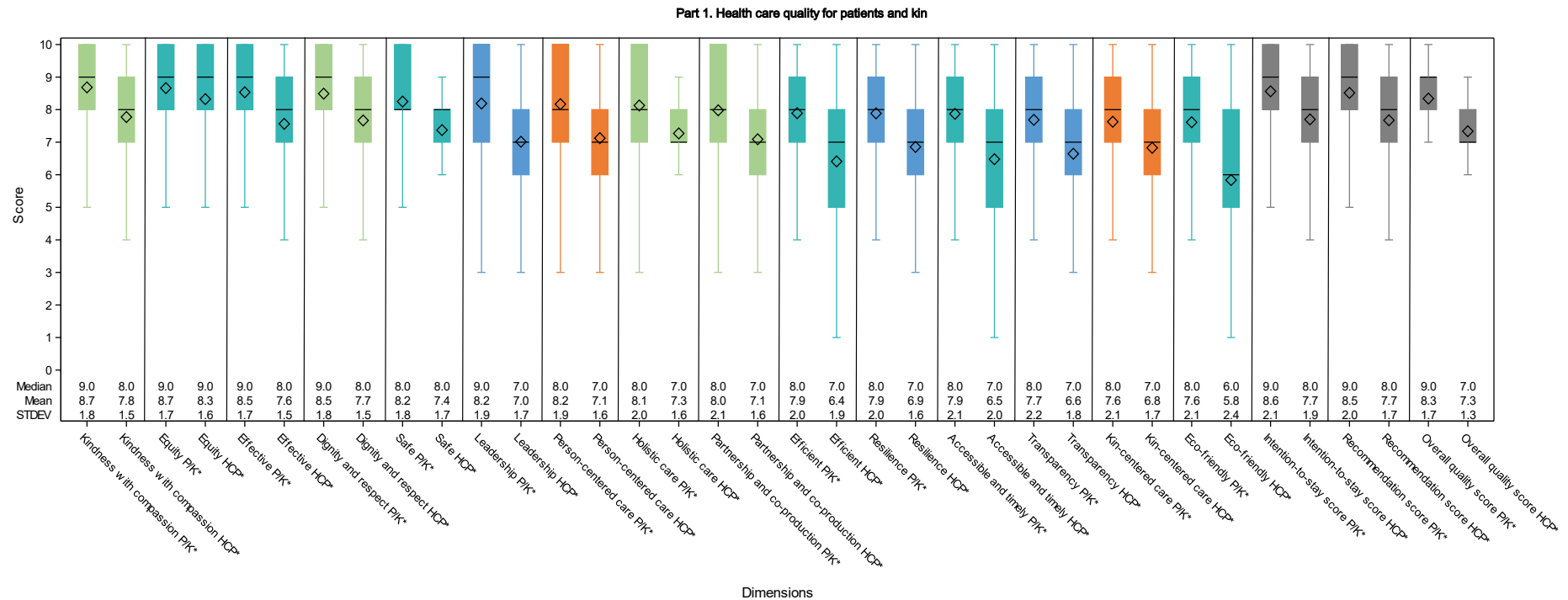
Figure 5.2 Comparison of How Patients/Kin and Healthcare Professionals Scored Part 1 and Part 2 of FlaQuM-Quickscan.

This figure shows the box plots of scores for the 15 items reflecting quality domains (person- and kin-centred care, orange; catalysts, blue; technical domains, purple; core values, green) according to Lachman's multidimensional quality model [10] and the three global ratings (grey). Box plots of quality domains are ranked from left to right based on the mean of each domain scored by 6,590 patients and kin (P/K) and by 8,387 healthcare professions (HCP). The median score is represented by a horizontal line, and the mean is represented by a diamond. *Unpaired t-test to test differences in mean scores on healthcare quality domains between patients/kin and professionals, P < 0.05. *Notes: Outliers are not presented in this figure but were included in the analysis. The association of the themes presented in this figure with the statements presented in the survey is indicated in Supplemental Material 1.*

Figure 5.2 (Continued) Comparison of How Patients/Kin and Healthcare Professionals Scored Part 1 and Part 2 of FlaQuM-Quickscan.

This figure shows the box plots of scores for the 15 items reflecting quality domains (person- and kin-centred care, orange; catalysts, blue; technical domains, purple; core values, green) according to Lachman's multidimensional quality model [10] and the three global ratings (grey). Box plots of quality domains are ranked from left to right based on the mean of each domain scored by 6,590 patients and kin (P/K) and by 8,387 healthcare professions (HCP). The median score is represented by a horizontal line, and the mean is represented by a diamond. *Unpaired t-test to test differences in mean scores on healthcare quality domains between patients/kin and professionals, P < 0.05. *Notes: Outliers are not presented in this figure but were included in the analysis. The association of the themes presented in this figure with the statements presented in the survey is indicated in Supplemental Material 1.*
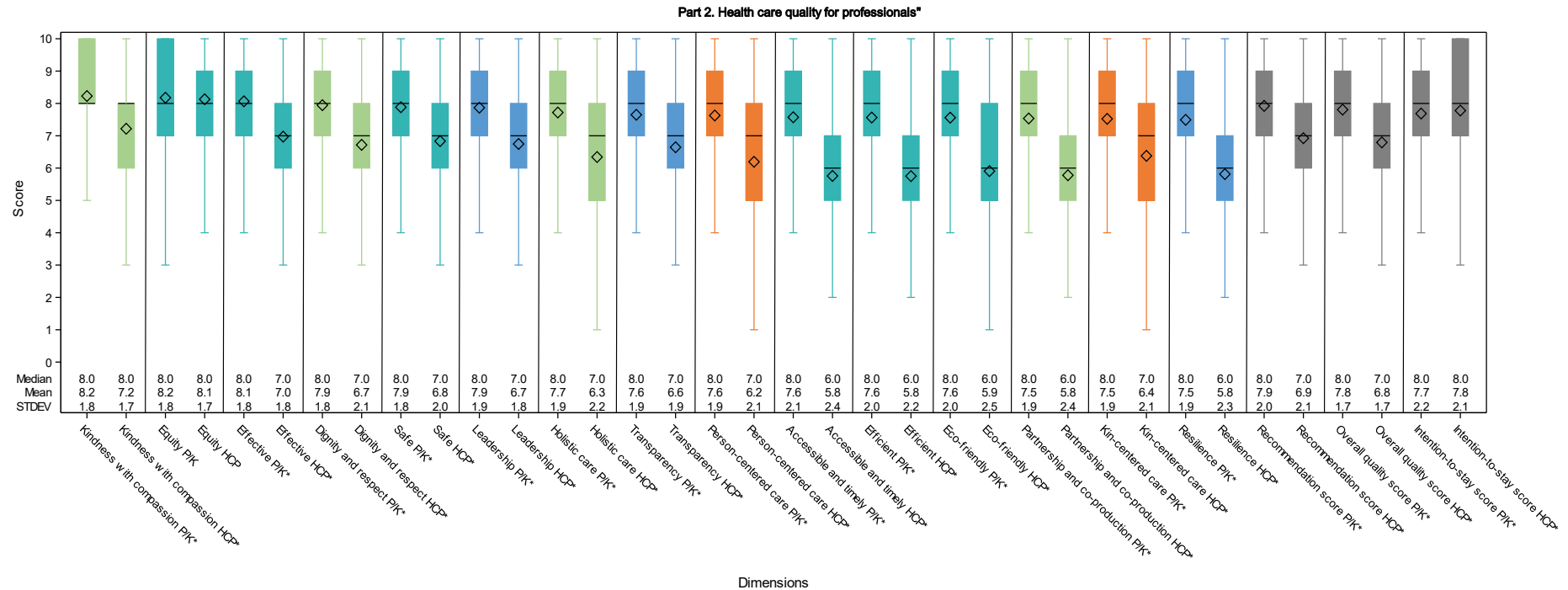
Research question 3: Between-Hospital Variation in Healthcare Quality Experiences

Multicentre experiences are important to set quality priorities at the organisational and national levels. Variation of hospitals' mean scores for each domain (Figure 5.3) reveal on which quality domains interhospital learning can be focused. Statistically significant variation in mean scores between hospitals was observed for all items of the FlaQuM-Quickscan. For part 1, the largest between-hospital variation was shown for the domains Kindness with Compassion, Transparency, Dignity and Respect, Resilience and Accessibility and Timeliness scored by patients/kin. Scored by professionals, the largest variation was shown for the domains Eco-friendliness, Safety, Resilience, Person-centeredness, Holistic Care, and Efficiency. The smallest between-hospital variation was shown for the domains Equity scored by patients/kin and Transparency and Effectiveness scored by professionals. For part 2, the largest between-hospital variation was shown for the domains Partnership and Co-production, Transparency, Person-centeredness, Kin-centeredness, Accessibility and Timeliness, and Eco-friendliness scored by patients/kin. Scored by professionals, the domains Eco-friendliness, Partnership and Co-production, and Dignity and Respect showed the largest variation. The smallest between-hospital variation was shown for the domains Effectiveness, Safety, and Resilience scored by patients/kin and Equity, Leadership, and Kin-centeredness scored by professionals.
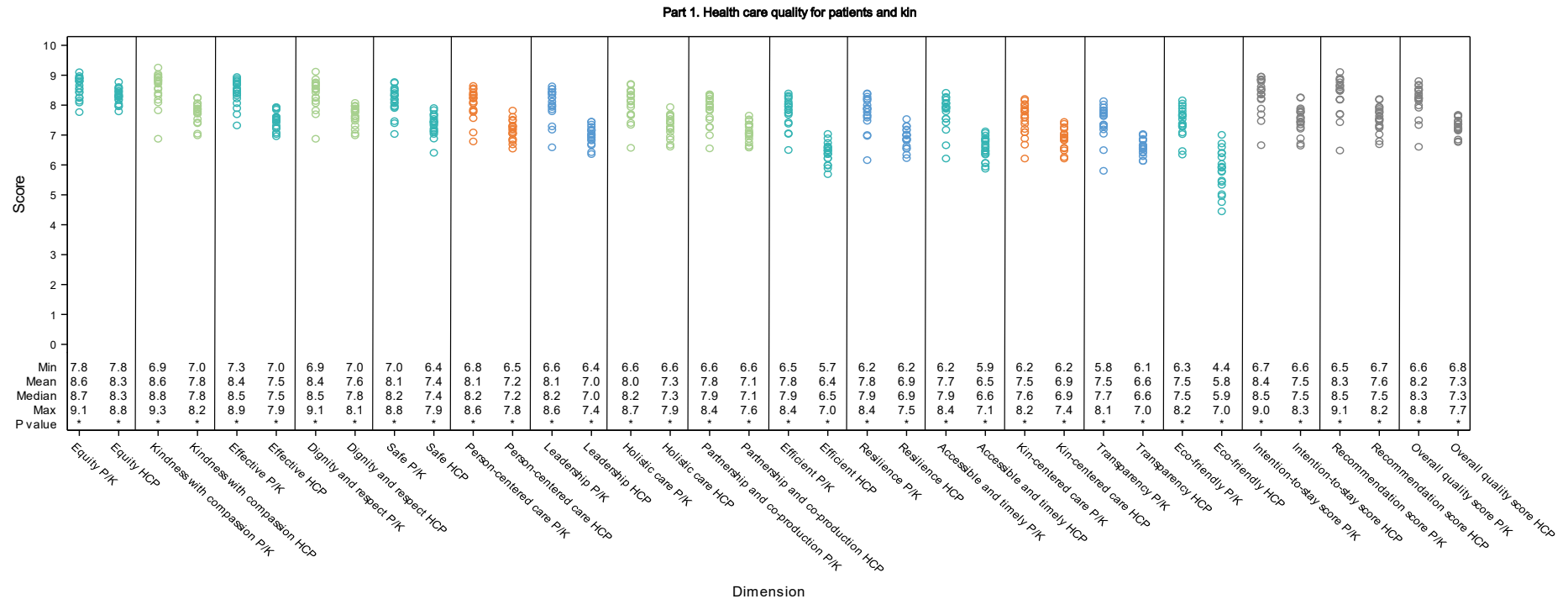
Figure 5.3 Comparison of Scores on Part 1 and Part 2 of the FlaQuM-Quickscan Between Hospitals.

This figure shows the variation of hospitals' mean scores on the 15 items reflecting quality domains (person- and kin-centred care, orange; catalysts, blue; technical domains, purple; core values, green) according to Lachman's multidimensional quality model [10] and global ratings (grey). Quality domains are ranked from left to right based on hospital's mean scores of patients and kin. P/K = Patients and kin, HCP = Healthcare professionals. Each dot represents one hospital. *Notes: One-way analysis of variance was used to evaluate whether differences in hospitals' mean scores on quality domains were statistically significant, P < 0.05. Outliers are not presented in this figure but were included in the analysis. The association of the themes presented in this figure with the statements presented in the survey is indicated in Supplemental Material 1.*

Figure 5.3 (Continued) Comparison of Scores on Part 1 and Part 2 of the FlaQuM-Quickscan Between Hospitals.

This figure shows the variation of hospitals' mean scores on the 15 items reflecting quality domains (person- and kin-centred care, orange; catalysts, blue; technical domains, purple; core values, green) according to Lachman's multidimensional quality model [10] and global ratings (grey). Quality domains are ranked from left to right based on hospital's mean scores of patients and kin. P/K = Patients and kin, HCP = Healthcare professionals. Each dot represents one hospital. *Notes: One-way analysis of variance was used to evaluate whether differences in hospitals' mean scores on quality domains were statistically significant, P < 0.05. Outliers are not presented in this figure but were included in the analysis. The association of the themes presented in this figure with the statements presented in the survey is indicated in Supplemental Material 1.*
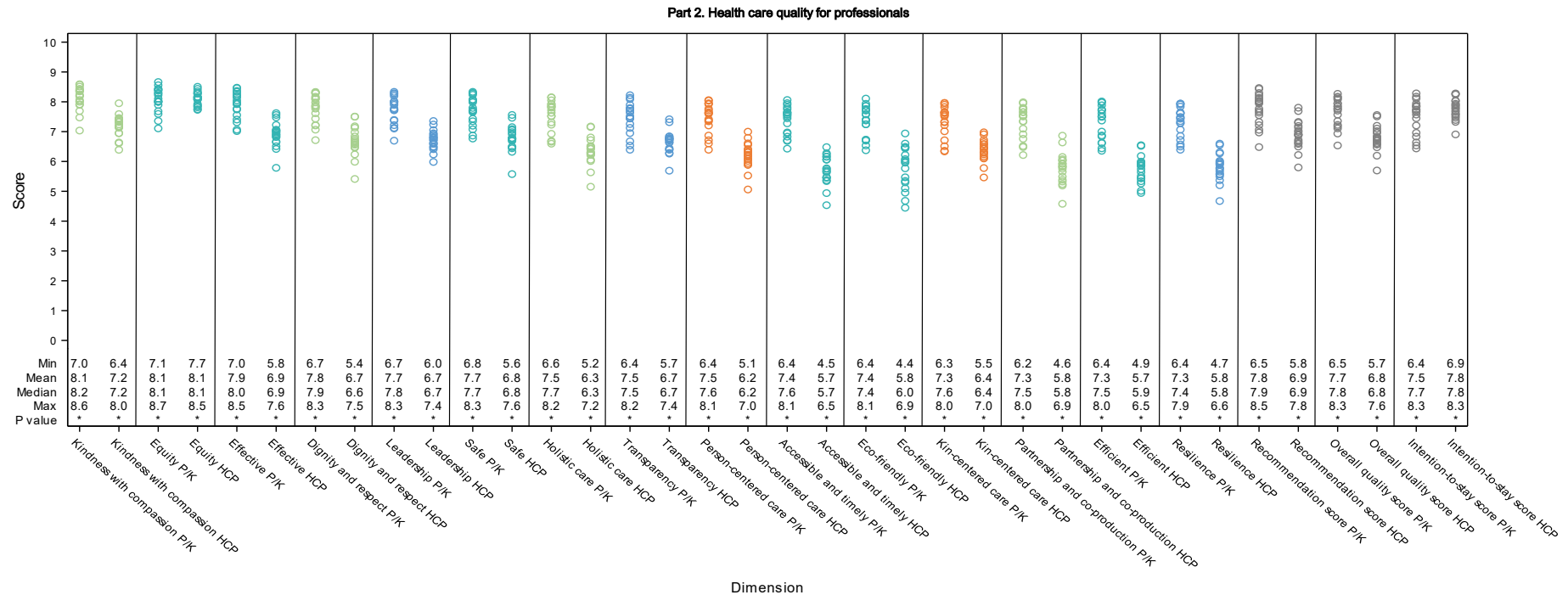
Research Question 4: Setting Priorities for Hospital Management and Policy Makers Based on Multistakeholder and Multicentre Data

The multistakeholder and multicentre results of the previous research questions revealed that quality priorities are multidimensional — i.e., technical dimensions, person- and kin-centred care, core values, and catalysts (Table 5.2) — and that priority-setting in healthcare quality is a complex undertaking. Examples of multifaceted quality interventions are the Mangomoment project [41], focusing on the positive resonance between patients/kin and professionals, and the What Matters to You? Movement [42] in the context of person-centred care and shared decision-making, as supported by the Institute for Healthcare Improvement. Moreover, prioritization of quality domains is dependent on the focus of the stakeholder group. The complexity of priority-setting in healthcare quality is reflected in results of previous studies, in which patients prioritized several domains, such as empathy [22], accessibility and timeliness [20–22], dignity and respect [33], effectiveness [20,21], communication [20,33] and safety [21] and in which professionals prioritized mainly accessibility and timeliness [33,36] and information exchanging [34].

Because quality priorities appear to be multidimensional, further prioritization can be supported by combining mean scores of domains with correlations of the overall quality scores. These correlations show which domains contribute the most to patients', kin's, and professionals' overall experiences of healthcare quality (Table 5.2). The highest correlation with the overall quality score was observed with the domain Dignity and respect in both instrument parts. The lowest correlation with the overall quality score was observed with the domains Eco-friendliness and Equity in part 1 and part 2, respectively. The overall quality scores showed a high correlation with the core values and the domain Person-centeredness of Lachman's quality model [10].

Table 5.2 Overview of prioritised quality domains.

| Part 1 "Healthcare quality for patients and kin" | | | | | | | | Part 2 "Healthcare quality for professionals" | | | | | | | |
| Scored by patients and kin | | | | Scored by professionals | | | | Scored by patients and kin | | | | Scored by professionals | | | |
Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores	Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores	Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores	Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores
Dignity and respect	**0.811**	8.5	**2.2**	Dignity and respect	**0.707**	7.7	1.1	Dignity and respect	**0.806**	7.9	1.6	Dignity and respect	**0.819**	6.7	**2.1**
Partnership and co-production	**0.788**	8.0	1.8	Holistic care	**0.682**	7.3	**1.3**	Resilience	**0.793**	**7.5**	1.5	Holistic care	**0.801**	6.3	2.0
Kindness with compassion	**0.785**	8.7	**2.4**	Kindness with compassion	**0.670**	7.8	1.2	Holistic care	**0.790**	7.7	1.6	Person-centered care	**0.790**	6.2	1.9
Leadership	0.783	8.2	2.0	Person-centered care	0.668	7.1	**1.3**	Partnership and co-production	0.788	**7.5**	**1.8**	Resilience	0.757	**5.8**	1.9
Resilience	0.782	7.9	**2.2**	Safe	0.662	7.4	**1.5**	Person-centered care	0.783	7.6	**1.7**	Partnership and co-production	0.752	**5.8**	**2.3**
Holistic care	0.782	8.1	2.1	Partnership and co-production	0.656	7.1	1.0	Safe	0.783	7.9	1.5	Kin-centered care	0.718	6.4	1.5
Person-centered care	0.781	8.2	1.8	Resilience	0.642	6.9	**1.3**	Efficient	0.780	7.6	1.6	Safe	0.697	6.8	2.0
Effective	0.779	8.5	1.6	Kin-centered care	0.633	6.8	1.2	Transparency	0.779	7.6	**1.8**	Accessible and Timely	0.690	**5.8**	2.0
Safe	0.736	8.2	1.8	Leadership	0.627	7.0	1.0	Leadership	0.777	7.9	1.6	Transparency	0.687	6.6	1.7
Accessible and Timely	0.729	7.9	**2.2**	Effective	0.622	7.6	0.9	Kin-centered care	0.773	**7.5**	**1.7**	Efficient	0.665	**5.8**	1.6
Efficient	0.727	7.9	1.9	Transparency	0.609	6.6	0.9	Effective	0.765	8.1	1.5	Leadership	0.664	6.7	1.4
Transparency	0.724	**7.7**	**2.3**	Efficient	0.572	**6.4**	**1.3**	Accessible and Timely	0.758	7.6	**1.7**	Effective	0.651	7.0	1.8
Kin-centered care	0.698	**7.6**	2.0	Accessible and Timely	0.571	**6.5**	1.2	Kindness with compassion	0.755	8.2	1.6	Kindness with compassion	0.582	7.2	1.6
Equity	0.631	8.7	1.3	Equity	0.479	8.3	1.0	Eco-friendly	0.698	7.6	**1.7**	Eco-friendly	0.459	5.9	**2.5**
Eco-friendly	0.542	**7.6**	1.9	Eco-friendly	0.367	**5.8**	**2.6**	Equity	0.695	8.2	1.6	Equity	0.430	8.1	0.8

Notes: Quality domains are presented according to Lachman's multidimensional quality model [10]. Quality domains are ranked from top to bottom based on their correlations with the overall quality scores. The association of the themes presented in this table 5.2 with the statements presented in the survey is indicated in Supplemental Material 1.

Overall managerial and research reflections

Based on the FlaQuM-Quickscan results, important intraindividual, between-stakeholder, and between-hospital variation in quality experiences of patients and kin and of professionals could be observed. The multistakeholder and multicentre variation provides managerial knowledge for hospitals and policy makers, which can be used to set quality priorities and define future improvement strategies at the meso and macro levels. Despite previous research stating that patients are unable to assess technical quality [43], the intraindividual variation in our results demonstrated that patients, kin, and professionals are able to differentiate experiences between the quality domains of the FlaQuM-Quickscan tool and, therefore, experience quality as a multidimensional concept. The lowest intraindividual variation was observed in patients' and kin's scores in part 2 (Healthcare Quality for Professionals). Nonetheless, the FlaQuM-Quickscan results reveal experienced perceptions by stakeholders and provide insights for hospital management. We therefore recommend that hospitals explore these signals in depth by using additional qualitative methods — such as focus groups or interviews with patients and kin — to obtain a comprehensive overview of experiences of healthcare quality for professionals. In practice, the intraindividual variation confirms that priorities can be set based on results of individual quality domains, which are essential in quality management systems to build a vision of future quality and related objectives [39].

We do note that although we think that the method and the 3-point threshold used in this phase of the study are appropriate to provide a first understanding of the variation in the scoring and insights into how patients/kin and professionals can make a distinction between the different items in the survey, we will further analyse this in our future work.

Discussion

The results of this study showed that priorities in healthcare quality are multidimensional and that the combination of the correlation of the overall quality scores with the different quality domains, the difference in mean scores for domains, and the variation between hospitals' mean scores can be used to develop tailored action plans at the meso and macro levels. By following this broad recommendation for hospitals, the identified priorities based on the FlaQuM-Quickscan results (Table 5.2) revealed that, in addition to technical dimensions and person- and kin-centred care, the core values and catalysts of Lachman's quality model [10] should be part of future, multifaceted improvement strategies. Multifaceted strategies, e.g., focusing on both technical dimensions and core values, give hospitals the opportunity to increase their positive, person-centred outcomes regarding quality as experienced by patients, kin, and healthcare professionals. This is especially relevant in instances of what we call the "moment of truth," i.e., the moment where care really takes place, such as when a doctor explains the results of medical tests to a patient and kin or when a multidisciplinary team meets with a patient and/or kin to discuss the progress of a patient's treatment. But these multifaceted strategies would apply more broadly, including to organisational initiatives such as guidelines, pathways, and processes, as well as to those that occur at the point of care. The implementation of the FlaQuM-Quickscan tool in hospitals fosters the evaluation by patients, kin, and professionals and will enhance not only the technical dimensions, but also the hospital management's understanding of person- and kin-centred healthcare quality.

Despite the multidimensionality of identified priorities, there are some quality domains we must highlight within the Flanders region of Belgium. First, the domain Eco-friendliness was not prioritized, because it had one of the lowest correlations with the overall quality score and a low mean score. Still, considerable variation between hospitals' mean scores could be observed. Because healthcare pollution has received increasing attention in the current climate change movement [44], we recommend that hospital management and policy makers target environmentally friendly solutions for current healthcare practice as well as working toward increased awareness of the issue among patients, kin, and professionals [44]. Second, the domain Dignity and Respect was found to play a crucial role in quality management by showing the highest correlation with the overall quality score and through the ability for hospitals to learn from the identified between-hospital variation. In agreement with previous studies [11,12,36,45], we recommend including dignity and respect as a priority at the macro level. Third, we observed that Equity had one of the lowest correlations with the overall quality score, the highest mean, and one of the smallest variations between hospitals' mean scores. Based on this result, this quality dimension should not be targeted as a future quality focus

within the Flanders region of Belgium. However, this result is different than expected in terms of the World Health Organisation's 2015 report on evidence regarding healthcare inequity [15] and the current focus on inequities in healthcare that have been exposed by the Covid-19 pandemic [46]. In this study, priority-setting was supported by the correlation of the overall quality scores with quality domains. Because of the growing shortage of healthcare professionals and the need to address staff retention [27], human resources departments can also include the intention-to-stay scores and the recommendation scores in future priority-setting. Moreover, because the Covid-19 pandemic had a destructive impact on professionals' well-being [47], policy makers should consider the introduction of a professional pulse–style assessment of experiences [3,25] in public reporting initiatives.

Currently, the FlaQuM-Quickscan tool, which can be tailored to existing quality structures in any hospital, provides a snapshot of current experiences. Systematic understanding of experiences in a prospective study is required to evaluate or compare the impact of initiatives on a continuum, exemplified by Press Ganey surveys [48] or the evaluation of the National Health Service–Virginia Mason Institute collaboration [49]. In addition, a nationwide study in Belgium (beyond the Flanders region) could raise different priorities that could encourage policy makers to expand their quality policy ambition to the next level. Additionally, FlaQuM-Quickscan can be disseminated internationally to examine between-country variation.

Strengths and limitations

A major strength of this study is the analyses of variation from a multistakeholder perspective to define priorities at different healthcare system levels. Measuring quality multidimensionally has raised awareness about the role of quality and stakeholders' experiences in the included hospitals and may itself be regarded as a quality initiative, such as at the micro level. Several study limitations merit attention. First, no response rate could be calculated; individual hospitals were able to determine their own distribution/collection periods and the professional segments of the recipients. Related to this distribution process, we cannot guarantee that there was no selection bias. But as hospitals use this survey to critically analyse their own quality and service to patients, kin, and professionals and because external benchmarking is not a primary goal, we assume that the risk for selection bias is rather limited. Second, it remains unclear whether respondents' characteristics — such as differences between patients and kin [50]; between professional groups in terms of physicians, nurses, or other healthcare professionals [51] between the range of services provided, such as consultation, admissions, or other treatments; and between hospital contextual factors — influence experiences [35]; suggesting the need for multilevel analysis to explain the variations observed. Specific research questions focused on these variations will be part of future research, which should be used in conjunction with qualitative

data, such as focus groups, to comprehensively understand the difference in experiences. Third, it should be noted that the respondents' inclusion criteria were restricted by language (only Dutch-speaking individuals), and neither cultural background nor socioeconomic determinants were surveyed, which might have led to an overestimation of equity-related experiences. To obtain a comprehensive view on this quality domain, the FlaQuM-Quickscan tool will be expanded with socioeconomic demographics and translated into other languages. Fourth, because the quality domains measured by FlaQuM-Quickscan are broad domains, distinct themes are combined in single statements representing one domain. On the one hand, this characteristic of the survey may complicate the ability of the respondent to score the statements. On the other hand, policy makers or those responsible for hospital management who interpret the survey results must be aware of the distinct themes. Fifth, based solely on the use of FlaQuM-Quickscan in Flanders, we were not able to understand when policy makers or hospital management should not focus on already high-scoring results, such as the Equity domain. Last, the expansion of quality domains to focus on communication and the interactions among stakeholders in real-world practice settings enhances our ability to appreciate and develop person- and kin-centred care. These supplemental domains have potential for extension of the current FlaQuM-Quickscan tool.

Conclusion

In this multistakeholder and multicentre study, the results of FlaQuM-Quickscan demonstrated that patients and kin as well as professionals experience quality as a multidimensional concept. The study reveals significant between-stakeholder variation and significant between-hospital variation in healthcare quality experiences. The identified quality priorities at the meso and macro levels are multidimensional and include technical dimensions, person- and kin-centred care, core values, and catalysts. For hospital management and policy makers, the combination of the correlation of the overall quality scores with the different quality domains, the mean scores of domains, and the variation between hospitals' mean scores is recommended as a tool and practice to help set priorities. One of the main challenges for hospital managers is to support care during what we call the moment of truth, i.e., that point in a care episode when patients, kin, and professionals meet to discuss the progress and the next steps of a patient's treatment. This moment of truth can be experienced by patients, kin, and professionals in an optimal way only if management supports the seamless integration of the care delivery initiatives with a targeted focus on healthcare quality. Future research will focus on the influence of respondents' characteristics and hospitals' contextual factors on experiences and on assessing the transferability to other healthcare systems to examine international variation.

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Supplemental Material 1: FlaQuM-Quickscan survey

The FlaQuM-Quickscan contains two parts. Patients, kin, and professionals were asked to complete both instrument parts. The first part explores perspectives on *Healthcare quality for patients and kin*, i.e., how professionals care for patients and their kin, while the second part focuses on *Healthcare quality for professionals*, i.e., how the organisation cares for their professionals.

Each item is rated on a 11-point Likert-type scale.

Responses to the first 15 instrument items on quality domains of healthcare will reflect the respondent's level of disagreement or agreement with the item statement, scored from *0* (strongly disagree) to *10* (strongly agree).

The first general item includes the overall quality assessment of received care (in part 1) and the overall quality assessment of the hospital as employer (in part 2), and is scored from *0* (worst possible quality) to *10* (best possible quality). The second general item concerns the willingness to recommend the hospital to family and friends for receiving care (in part 1) or to work as an employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes). The third general item reflects on a respondent's intention-to-stay in the next year to receive care (in part 1) or to work as employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes).

Part 1: Healthcare quality for patients and kin

Instrument items	Quality domains
This organisation takes into account the wishes, needs and requirements of patients.	Person-centred
This organisation pays close attention to family, caregivers and/or other kin.	Kin-centred
Patients and kin are informed about the quality of care in this organisation.	Transparency
All staff consistently demonstrate their commitment to the organisation and set a good example so that patients and their kin feel comfortable and safe.	Leadership
This organisation takes into account what a patient and their kin can cope with (e.g. stress or new information).	Resilience
The care provided to patients and kin in this organisation is safe and actions are taken to prevent or resolve unsafe situations.	Safe
The staff in this organisation know their jobs and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on patients where possible.	Efficient
Care services are always accessible and offered without postponement or unnecessary delay.	Accessible and timely
All patients and kin are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
This organisation has a policy to reduce its ecological footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats patients and their kin with dignity and respect.	Dignity and respect
This organisation considers the individual behind the patient and their kin: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation patients and their kin are involved in decisions, listened to and their knowledge and experience are taken into account.	Partnership and co-production
In this organisation people are friendly and kind to patients and their loved ones.	Kindness with compassion
Which score would you give the overall quality of care, provided to patients and their kin, in this organisation?	Overall quality score
Would you recommend this organisation to your friends and family?	Recommendation score
If you need care in the coming year, would you choose this care organisation?	Intention-to-stay score

Part 2: Healthcare quality for professionals

Statements	Domain
This organisation takes into account the wishes, needs and requirements of staff.	Person-centred care
This organisation takes into account familial circumstances of staff.	Kin-centred care
Staff are informed about the quality of care in this organisation.	Transparency
Staff always show their commitment and set a good example that makes other staff feel trusted and safe.	Leadership
In this organisation, what staff can cope with (e.g. stress or new information), is taken into account.	Resilience
This organisation does everything within their power to keep a safe working environment for its staff and ensures that they dare to call each other to account for unsafe situations.	Safe
This organisation ensures that staff know their job and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on staff where possible.	Efficient
This organisation ensures an adequate staffing level that works together optimally to provide care that is accessible, timely and without unnecessary delays.	Accessible and timely
All staff are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
Staff is motivated to reduce their environmental footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats staff with dignity and respect.	Dignity and respect
This organisation considers the individual behind the staff: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation, staff is actively involved in decisions, changes or improvement projects; they are listened to and their knowledge and experience is taken into account.	Partnership and co-production
In this organisation staff are friendly and kind to each other.	Kindness with compassion
Which score would you give this organisation as an employer?	Overall quality score
Would you recommend this organisation as an employer to your friends and family?	Recommendation score
Would you continue to work in this organisation in the coming year?	Intention-to-stay score

The FlaQuM-Quickscan: A starting point to include primary care professionals' perspectives in the evaluation of hospital quality priorities

The FlaQuM-Quickscan: A starting point to include primary care professionals' perspectives in the evaluation of hospital quality priorities

Abstract

Background: Today, primary care professionals' (PCPs) perspectives on hospital quality are unknown when evaluating hospital quality priorities. We aimed to identify key healthcare quality attributes from PCPs' perspective, to validate an instrument that measures PCPs' experiences of healthcare quality multidimensionally and to define hospital quality priorities based on PCPs' experiences.

Methods: Focus groups with PCPs were conducted to identify quality attributes through a qualitative in-depth analysis. A multicentre study of 18 hospitals was used to quantitatively assess construct, discriminant and criterion validity of the FlaQuM-Quickscan, an instrument that measures 'Healthcare quality for patients and kin' (part 1) and 'Healthcare quality for professionals' (part 2). To set quality priorities, scores on quality domains were analysed descriptively and between-hospital variation was examined by evaluating differences in hospitals' mean scores on the quality domains using one-way Analysis of Variance (ANOVA).

Results: Identified key attributes largely corresponded with Lachman's multidimensional quality model. Including 'Communication' as a new quality domain was recommended. The FlaQuM-Quickscan was completed by 550 PCPs. Confirmatory factor analyses showed reasonable to good fit, except for the Root Mean Square Error of Approximation (RMSEA) in part 2. The 'Equity' domain scored the highest in part 1 and 2. Domains 'Kin-centred care' and 'Accessibility and timeliness' scored the lowest in part 1 and 'Resilience' and 'Partnership and co-production' in part 2. Significant variation in hospitals' mean scores was observed for eleven domains in part 1 and sixteen domains in part 2.

Conclusion: The results gained a better understanding of PCPs' perspective on quality. The FlaQuM-Quickscan is a valid instrument to measure PCPs' experiences of hospital quality. Identified priorities indicate that hospital management should focus on multifaceted quality strategies, including technical domains, person-and kin-centredness, core values and catalysts.

Introduction

In the pursuit of excellence in healthcare, ensuring high-quality care has become an essential objective for healthcare systems worldwide. Currently, quality improvement efforts are mainly driven to enhance patient outcomes. Recently, Lachman et al. proposed a new, multidimensional definition of healthcare quality [1]. Next to technical domains, this state-of-the-art definition embraces interpersonal characteristics of quality [2] and recognizes the importance of partnership and co-production [3]. Within this context, co-production with all stakeholders, i.e. patients, kin, hospitals and primary care, has been promoted by expanding 'patient-centred' to 'person-centred' care [3]. This expansion is in line with the definition of integrated care, which focuses on overcoming fragmentation through better collaboration of system levels to improve outcomes and satisfaction [4,5]. Although primary care professionals (PCPs) are usually patients' and kin's first confidant before and after their hospital admission and play a pivotal role in patients' outcome after discharge, they do not use hospital quality indicators consistently [6]. Moreover, little research has been paid on how to actively involve PCPs in hospital quality improvement [7,8]. As the lack of knowledge sharing between hospitals and primary care has been identified as a major cause of ineffective and unsafe care [9,10], efforts to improve quality should focus on involvement, integration [11] and collaboration between hospitals and primary care [5,12].

Currently, Flemish (Belgian) hospitals are implementing a new model towards sustainable quality management, hereinafter referred to as Flanders Quality Model (FlaQuM), that encompasses three pillars: 1) "thinking" based on a quality vision model [1]; 2) "doing" by focusing on the implementation of a co-creation roadmap [13] and 3) "learning" from social capital in inter-hospital collaboratives (https://flaqum.org/english/). To measure stakeholders' experiences based on Lachman's aforementioned multidimensional definition of quality (pillar 1) [1], the FlaQuM-Quickscan is developed and validated from patients', kin's and professionals' perspective [14,15]. Consequently, evaluation of quality priorities in current hospital management is based on a non-comprehensive view on quality because PCPs' perspective has not yet been integrated [16]. Hospitals can benefit from PCPs' experiences to drive future quality improvement strategies [11]. By examining PCPs' perspective on healthcare quality, valuable insights can be gained into attributes they consider essential for delivering high-quality care and in-hospital quality priorities can be evaluated from a holistic approach. Therefore, the objectives of this study were:

1) To identify key healthcare quality attributes from PCPs' perspective.
2) To validate an instrument, i.e. the FlaQuM-Quickscan, which measures experiences of healthcare quality multidimensionally by PCPs.
3) To define hospital quality priorities based on PCPs' experiences.

Methods

Objective 1: Identifying key healthcare quality attributes

Key healthcare quality attributes were identified through a qualitative design with the focus group technique. Focus groups were conducted with PCPs to gain insights into their experiential knowledge, without having previous knowledge about Lachman's multidimensional quality model [1]. The method to conduct focus groups and perform the data-analysis were similar to focus groups with patients and kin conducted by our research team [17]. Via the regional community network, a call was made for PCPs. Two focus groups, with a mean duration of two hours, took place in October 2021. Two postdoctoral fellows (EMC and AJ) moderated the focus groups supported by a semi-structured guide, which started with the question: 'Which are the attributes that positively or negatively affect healthcare quality?'. Participants noted keywords independently on three green cards and red cards, for negatively and positively influencing attributes, respectively. After clustering keywords on a blackboard, open-ended questions were used to stimulate the in-depth group discussion. An observer (FC) took notes. Focus groups were audio-recorded and transcribed verbatim. The classical content analysis described by Morgan [18] was used to inductively derive attributes from keywords and interview transcripts and compare those deductively to Lachman's multidimensional quality model [1].

Objective 2: Validating the FlaQuM-Quickscan

Validation steps of the FlaQuM-Quickscan (Supplemental Material 1) started with a multicentre study of 18 Flemish (Belgian) hospitals, which are members of FlaQuM-consortium, to test the construct, discriminant and criterion validity (Figure 6.1). The instrument contains two parts. The first part explores perspectives on 'Healthcare quality for patients and kin', i.e. how professionals care for patients and their kin, while the second part focuses on 'Healthcare quality for professionals', i.e. how the organisation cares for their professionals [15]. PCPs, who provided care for patients discharged at the respective hospital, were asked to complete both instrument parts. Each instrument part contains 15 items, measuring domains of the multidimensional quality model [1], three global ratings and sociodemographic questions (gender and age). The 15 items reflecting the quality domains were divided into four subscales: person- and kin-centred care (2 items), catalysts (3 items), technical domains (6 items) and core values (4 items). Each item is rated on a 11-point Likert-type scale reflecting the respondent's level of disagreement or agreement with the item statement [score from "0" (strongly disagree) to "10" (strongly agree)] (Supplemental Material 1). Participating hospitals distributed the electronic, Dutch-language instrument to PCPs via mail between May 2021 and June 2022. Only fully completed instruments were included in this study. A minimum sample size of 360 PCPs was considered acceptable for testing the psychometric properties [19].

1. Multi-centre testing	Disseminated the FlaQuM-Quickscan, i.e. a two-part instrument with 18 items in each part, in a multi-centre study of 18 hospitals to primary care professionals, who provided care for patients discharged at the respective hospitals.
2. Construct validity	Assessed the tetradimensional structure of the FlaQuM-Quickscan (4 factors: person- and kin-centred care, catalysts, technical domains and core values) defined a priori by Lachman's multidimensional quality model through confirmatory factor analysis (CFA), for instrument part 1 and 2 separately.
3. Discriminant validity	Assessed significance in differences between primary care professionals' minimum and maximum score on instrument items through the one-sample t-test (H_0= no difference minimum and maximum scores on 18 instrument items), for instrument part 1 and 2 separately.
4. Criterion validity	Assessed the degree of Pearson's correlation between the 15-item instrument and the three global ratings (overall quality score, recommendation score and intention-to-stay score), for instrument part 1 and 2 separately.

Figure 6.1 Validation steps of the FlaQuM-Quickscan.

To assess construct validity, confirmatory factorial analysis (CFA) was performed to evaluate the tetradimensional structure of the FlaQuM-Quickscan (person- and kin-centred care, catalysts, technical domains and core values) defined a priori by the multidimensional quality model. We assessed whether the hypothesised subscales of part 1 and 2 are conceptualized as such by PCPs. Model fit was assessed by conducting single-group CFA to investigate whether the established dimensionality of the instrument parts fit the respondents. Model fit evaluation was based on international recognised cut-off criteria [20] and Chen's [21] allowed changes in fit indices when studying invariance for the Comparative Fit Index (CFI) (ranges between 0 and 1; reasonable if >.90 and very good if >.95), the Tucker–Lewis index (TLI) [22] (ranges between 0 and 1; reasonable if >.90 and very good if >.95), and the Root Mean Square Error of Approximation (RMSEA) [23] (ranges between 0 and 1; good fit if <.1). Mplus version 7.1 was used to estimate factor analytic models [24].

To assess discriminant validity, i.e. the extent to which an item is novel and not simply a reflection of some other construct [19], respondents' differences between minimum and maximum scores on items of both instrument parts are analysed. Significance in differences were studied by one-sample t-test. Our null hypothesis is that there is no difference between the minimum and maximum scores on the 18 instrument items, meaning that respondents do not distinguish experiences between dimensions and perceive quality as a unidimensional construct. Nevertheless, in Lachman's model, quality is described as a multidimensional construct.

To assess criterion validity, which is defined as the degree of a relationship between a given test score and performance on another measure [19], the degree of Pearson's correlation between the 15-item instrument and three global ratings (overall quality score, recommendation score and intention-to-stay score) is determined for each instrument part. Coefficients exceeding r=0.3 were considered as meaningful [25]. Scores on global ratings were treated as a substitute for a gold standard with which

the instrument items were correlated, as no other instrument was available to measure PCP's experiences of in-hospital quality. Analyses were generated using the SAS software, Version 9.4 of the SAS System for Windows. Significance for all analyses in this study was determined at an alpha-level of $p<0.05$.

Objective 3: Defining in-hospital quality priorities

The multicentre data was used to set priorities based on PCPs' experiences of hospital quality which are measured by the FlaQuM-Quickscan. Descriptive analyses are performed for each of the 15 quality domains and three global ratings, including mean, percentage distribution of scores and percentage of scores between 0-5 and between 8-10. Hospital quality priorities were defined by examining boxplots with an interquartile range, mean and median. Outliers were excluded in the presentation of results. Between-hospital variation was examined by hospitals' mean scores on quality domains of both instrument parts. Only hospitals with at least 10 respondents were included (n=15 hospitals). Differences in hospitals' mean scores on quality domains were studied by one-way ANOVA. Analyses were generated using the SAS software, Version 9.4 of the SAS System for Windows. Significance for all analyses in this study was determined at an alpha-level of $p<0.05$.

Results

In total, 22 PCPs participated in two focus groups and 550 PCPs completed the FlaQuM-Quickscan (Table 6.1).

Table 6.1 Characteristics of focus group participants and FlaQuM-Quickscan respondents.

	Focus group participants Total (N = 22)	FlaQuM-Quickscan respondents Total (N = 550)
Gender, *N (%)*		
Female	17 (77.3%)	417 (75.8%)
Male	5 (22.7%)	126 (22.9%)
Other	0 (0%)	4 (0.7%)
Unknown	0 (0%)	3 (0.6%)
Age (years), *N (%)*		
18-30	4 (18.2%)	78 (14.2%)
31-50	12 (54.6%)	251 (45.6%)
51-65	3 (13.6%)	201 (36.5%)
66-79	0 (0%)	16 (2.9%)
80+	0 (0%)	1 (0.2%)
Unknown	3 (13.6%)	3 (0.6%)

Objective 1: Identifying key healthcare quality attributes

During focus groups, 56 green cards and 48 red ones, were collected. In phase 1, 37 (35.6%) cards were classified in the 15 aforementioned domains based on definitions of Lachman's multidimensional quality model (Supplemental Material 2). In phase 2, 44 cards (42.3%) or 81 cards (77.9%) in total were classified after reading verbatim transcripts of focus groups. Peer review discussions with our research team led to the expansion of Lachman's model with a new domain 'Communication'. During phase 3, 23 cards (22.1%) were classified.

Identified key quality attributes relevant to PCPs are deductively compared to Lachman's multidimensional quality model. Cards were mainly classified in domains 'Partnership and Co-Production' (18.3%), 'Effectiveness' (11.5%). and 'Transparency' (8.7%). 'Equity' was only mentioned once and 'Eco-friendly' was not mentioned (Figure 6.2).
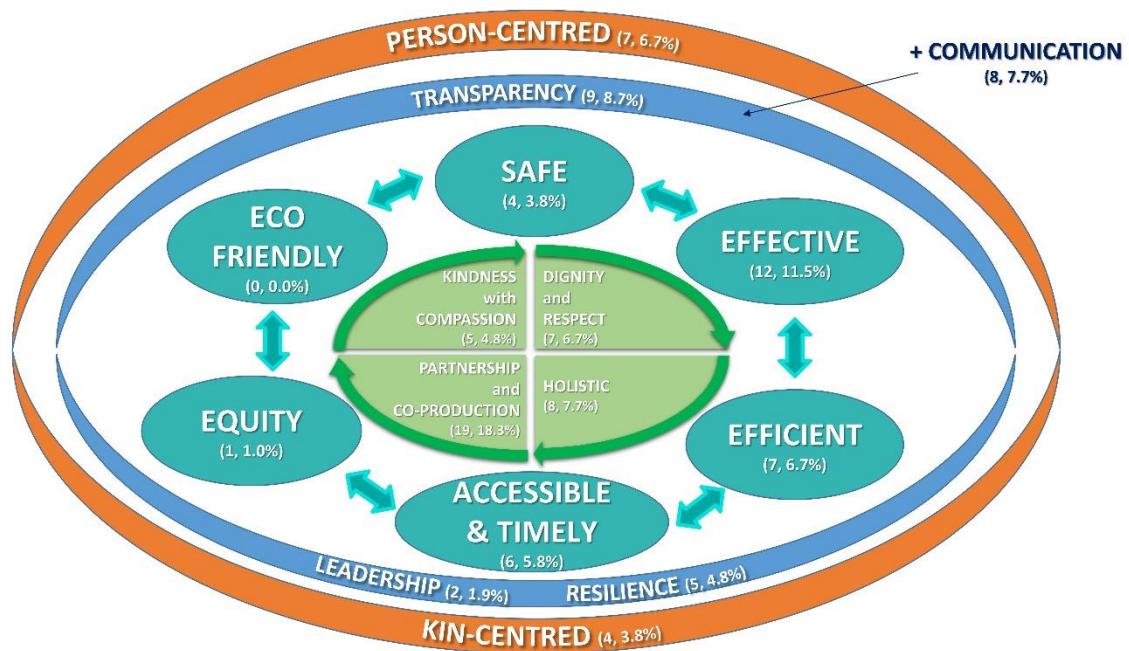
Figure 6.2 Overview of the classification of PCPs' key healthcare quality attributes in Lachman's model [1] (N, %).

Objective 2: Validating the FlaQuM-Quickscan

1. Descriptive results

For part 1, the item with the lowest mean was the same as the one with the highest percentage of scores between 0-5 ('Kin-centredness') and vice versa for the highest average and highest percentage of scores between 8-10 ('Equity'). For part 2, the item with the lowest mean was the same as the one with the highest percentage of scores between 0-5 ('Resilience') and vice versa for the highest mean and highest percentage of scores between 8-10 ('Equity') (Supplemental Material 3).

2. Construct validity

For part 1, the CFA with 4 factors showed very good to reasonable fit (CFI=0.948, TLI=0.935 and RMSEA=0.095). For part 2, the model fits the data well for two indices (CFI=0.930 and TLI=0.912) and poor for one index (RMSEA=0.119).

3. Discriminant validity

This intrapersonal variation, i.e. the variation between respondents' minimum and maximum scores, showed that 72.3% and 58.2% of PCPs scored domains with a minimum difference of 3 points on the 11-point Likert-type scale in part 1 and part 2, respectively (Figure 6.3). Based on the one-sample t-test, we rejected our null hypothesis for both instrument parts, meaning that PCPs differentiate experiences across quality domains (p<0.001).

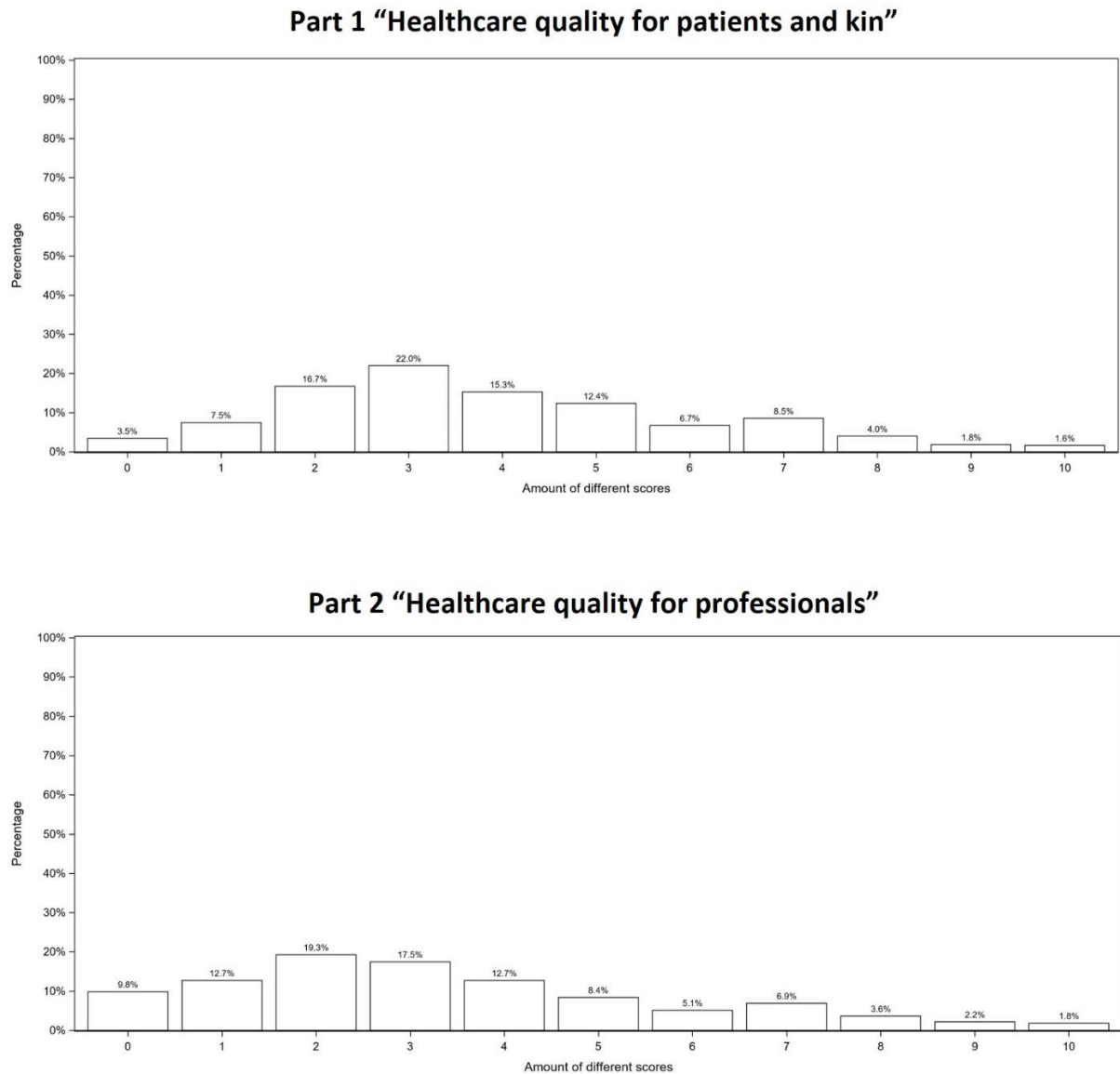## Part 1 "Healthcare quality for patients and kin"

Part 2 "Healthcare quality for professionals"

Figure 6.3 Differences in PCP's maximum and minimum scores on the 11-point Likert scale in FlaQuM-Quickscan.

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4. Criterion validity

All coefficients were statistically significant. 'Eco-friendliness' has the lowest association with global ratings in both instrument parts, except for the association between 'Equity' and the recommendation score in part 2. 'Dignity and respect' has the highest associations with global ratings in part 1 and with the overall quality score in part 2. 'Holistic care' has the highest association with the recommendation score and intention-to-stay score in part 2 (Table 6.2).

Table 6.2 Item-to-global-ratings correlations.

	Overall quality score (N = 550)	Recommendation Score (N = 550)	Intention-to-stay score (N = 550)
Part 1 'Healthcare quality for patients and kin'			
Person-centred	0.767	0.720	0.667
Kin-centred	0.726	0.656	0.605
Transparency	0.739	0.713	0.639
Leadership	0.765	0.724	0.671
Resilience	0.756	0.710	0.653
Safe	0.768	0.736	0.667
Effective	0.743	0.711	0.657
Efficient	0.680	0.637	0.584
Accessible and timely	0.656	0.651	0.603
Equity	0.576	0.562	0.547
Eco-friendly	0.492	0.471	0.417
Dignity and respect	0.797	0.759	0.696
Holistic	0.778	0.730	0.676
Partnership and co-production	0.740	0.722	0.682
Kindness with compassion	0.771	0.747	0.687
Part 2 'Healthcare quality for professionals'			
Person-centred	0.821	0.789	0.662
Kin-centred	0.782	0.750	0.614
Transparency	0.778	0.707	0.613
Leadership	0.798	0.754	0.642
Resilience	0.801	0.767	0.611
Safe	0.766	0.730	0.631
Effective	0.770	0.713	0.615
Efficient	0.751	0.711	0.587
Accessible and timely	0.742	0.710	0.552
Equity	0.608	0.543	0.580
Eco-friendly	0.607	0.559	0.436
Dignity and respect	0.859	0.798	0.653
Holistic	0.842	0.818	0.690
Partnership and co-production	0.815	0.766	0.613
Kindness with compassion	0.756	0.741	0.676

Objective 3: Defining in-hospital quality priorities

In part 1, domains 'Equity' (mean=8.0), 'Effectiveness' (mean=7.3), 'Kindness with compassion' (mean=7.2) and 'Dignity and respect' (mean=7.2) scored the best. Domains 'Kin-centredness' (mean=6.2), 'Accessibility and timeliness' (mean=6.2), 'Transparency' (mean=6.3), 'Eco-friendliness' (mean=6.3) and 'Resilience' (mean=6.3) showed the largest potential gain (lowest means). In part 2, domains 'Equity' (mean=7.5), 'Effectiveness' (mean=6.9) and 'Kindness with compassion' (mean=6.8) scored the best. Domains 'Resilience' (mean=5.9), 'Partnership and co-production' (mean=5.9) and 'Accessibility and Timeliness' (mean=6.0) showed the largest potential gain (lowest means) (Figure 6.4).
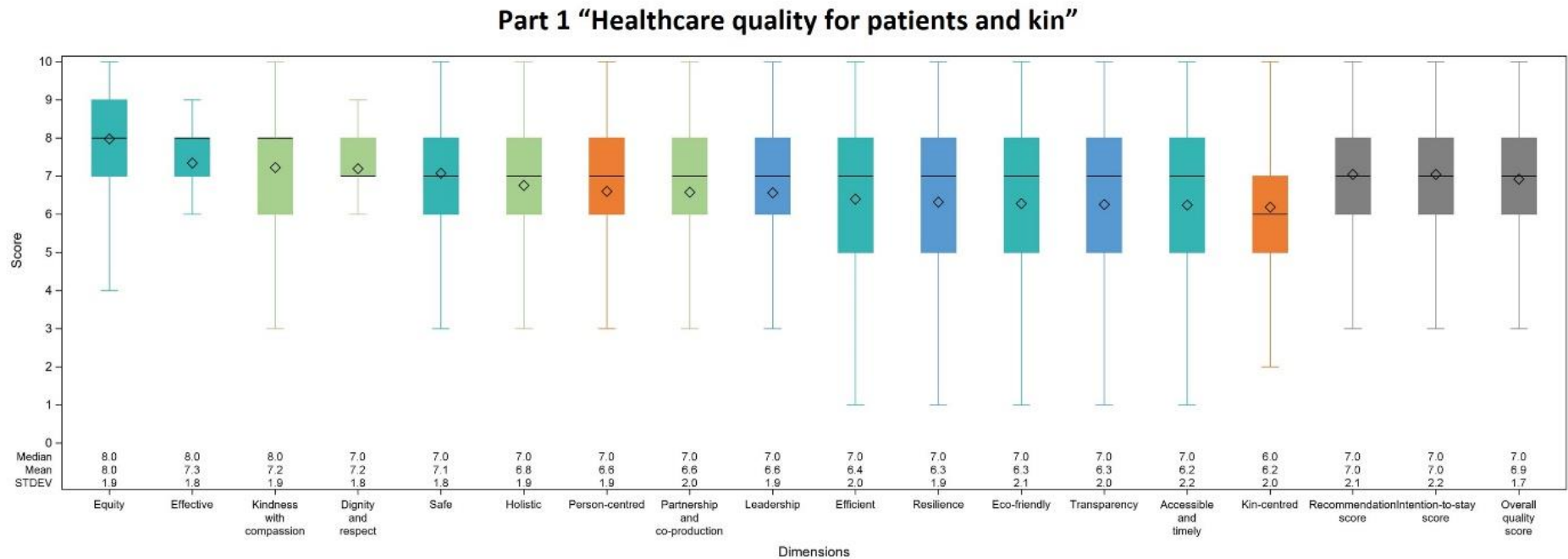
Figure 6.4 Boxplots of scores on each instrument part of the FlaQuM-Quickscan. Boxplots of scores on each instrument part of the FlaQuM-Quickscan that contain 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise, core values: green) according to Lachman's multidimensional quality model1 and global ratings (grey). Boxplots of quality domains are ranked from left to right based on the mean of each domain. - = median, ◊ = mean. Outliers are not included in this visualization.
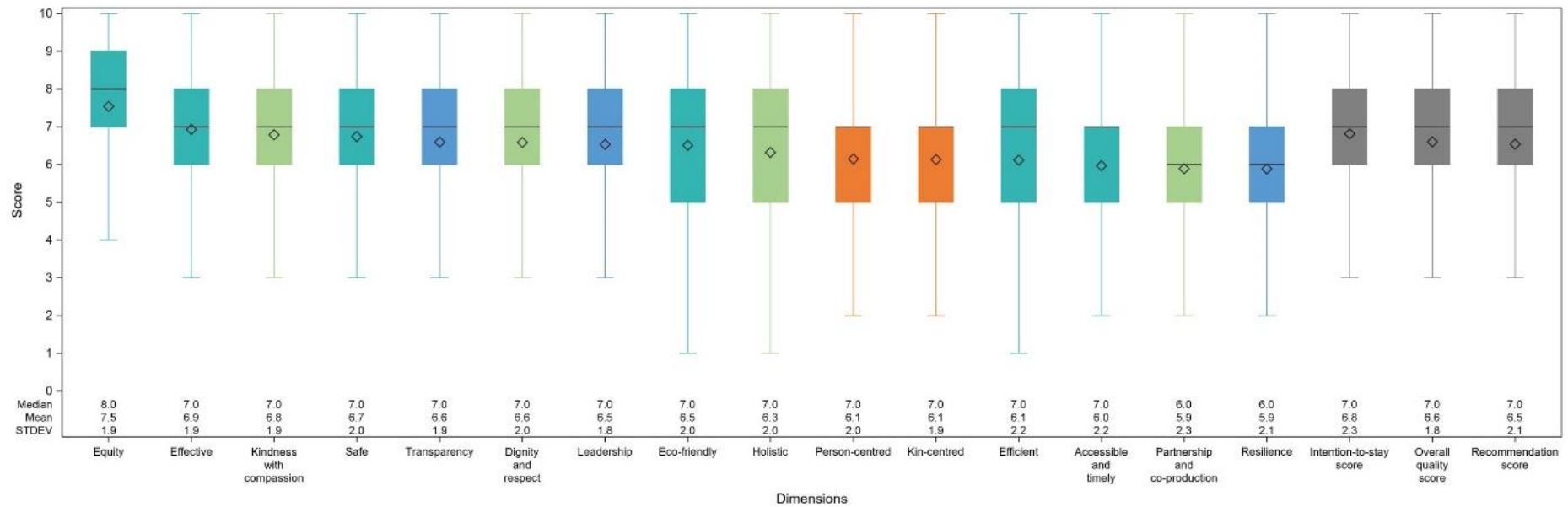
Figure 6.4 (Continued) Boxplots of scores on each instrument part of the FlaQuM-Quickscan. Boxplots of scores on each instrument part of the FlaQuM-Quickscan that contain 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise, core values: green) according to Lachman's multidimensional quality model1 and global ratings (grey). Boxplots of quality domains are ranked from left to right based on the mean of each domain. - = median, ◊ = mean. Outliers are not included in this visualization.

Variation between hospitals' mean scores for each domain are presented in Figure 6.5. In part 1, the largest variation between hospitals is shown for domains 'Accessibility and Timeliness' (max-min difference=3.6), 'Partnership and co-production' (max-min difference=3.5) and 'Holistic care' (max-min difference=2.7); the smallest variation for domains 'Equity' (max-min difference=1.3), 'Eco-friendliness' (max-min difference=1.5) and 'Safety' (max-min difference=1.7). In part 2, the largest variation between hospitals is shown for domains 'Holistic care' (max-min difference=2.8), 'Efficiency' (max-min difference=2.8), 'Person-centredness' (max-min difference=2.6) and 'Partnership and co-production' (max-min difference=2.6); the smallest variation for domains 'Equity' (max-min difference=1.6) and 'Eco-friendliness' (max-min difference=1.6). Significant variation in hospitals' mean scores is observed for eleven domains in part 1 and for sixteen domains in part 2.
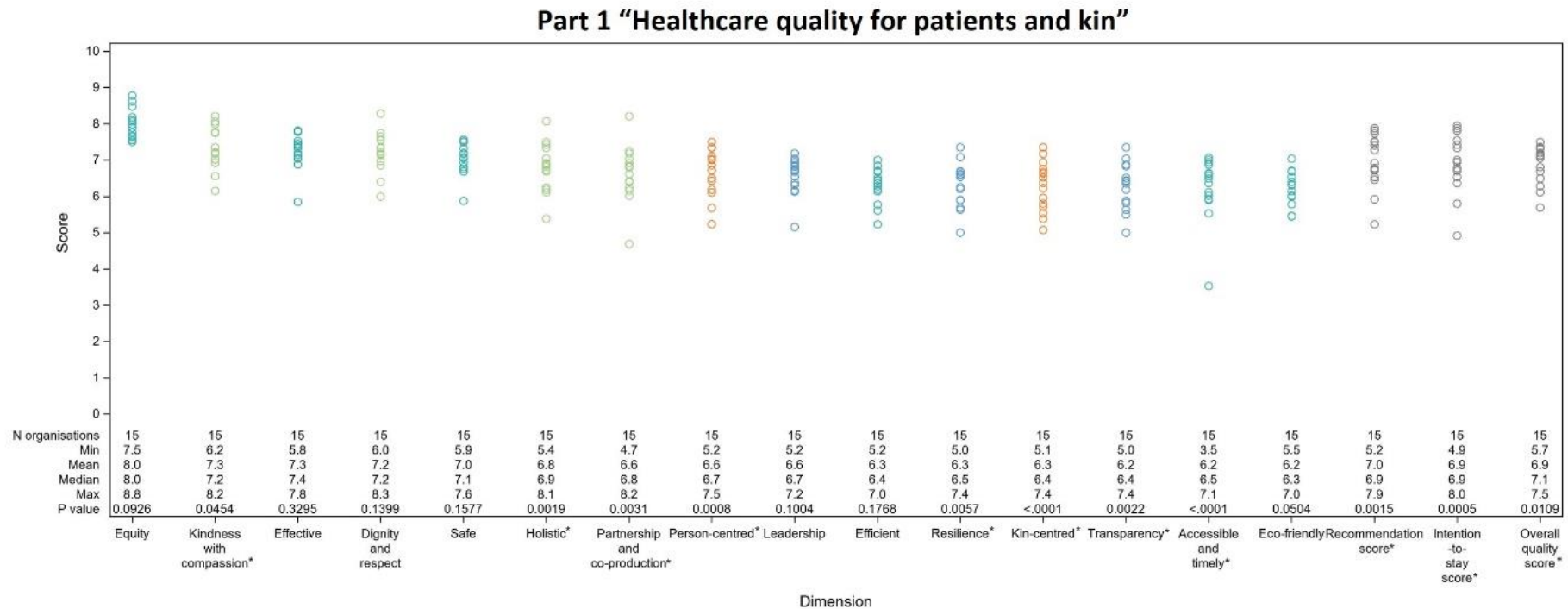
Figure 6.5 Variation of hospitals' average mean scores on each instrument part of the FlaQuM-Quickscan. Variation of hospitals' mean scores on each instrument part of the FlaQuM-Quickscan that contains 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise, core values: green) according to Lachman's multidimensional quality model1 and global ratings (grey). Quality domains are ranked from left to right based on the mean of each domain. Each dot represents one hospital with at least 10 respondents. *One-way ANOVA was used to evaluate whether differences in hospitals' mean scores on quality domains were statistically significant, $p < 0.05$.
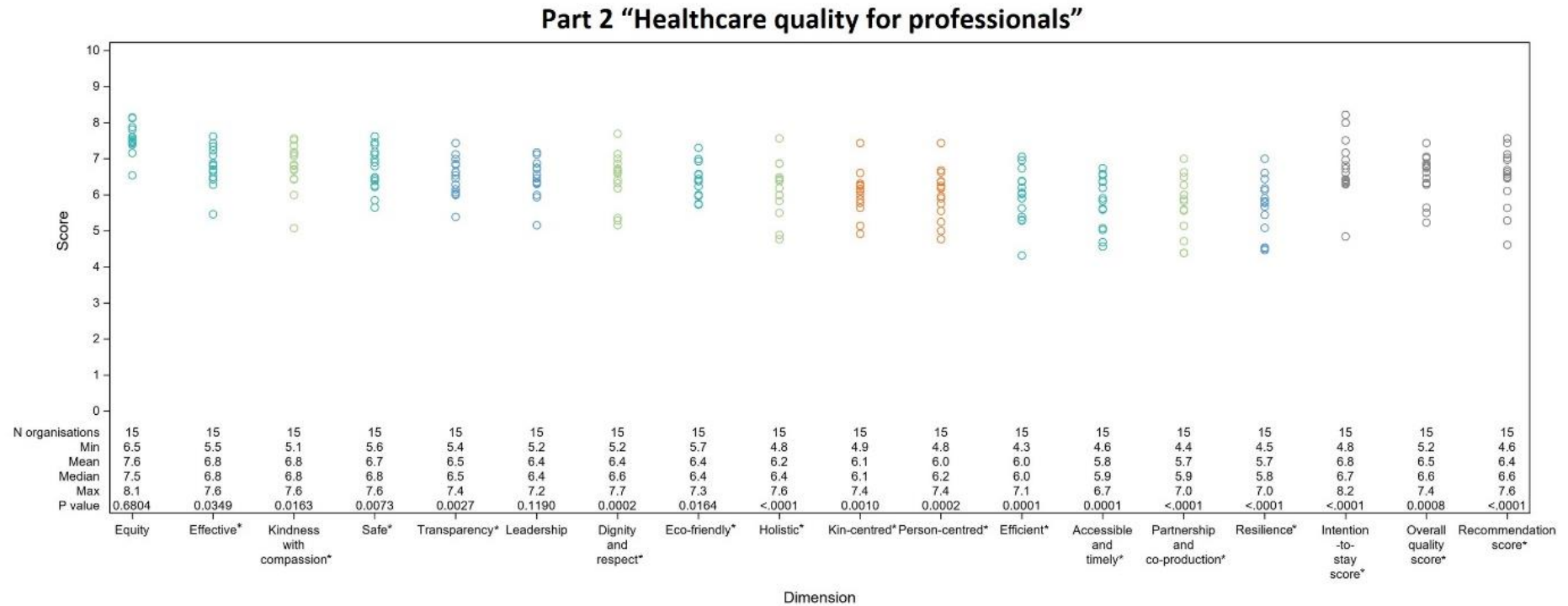
Part 2 "Healthcare quality for professionals"

	Equity	Effective*	Kindness with compassion*	Safe*	Transparency*	Leadership	Dignity and respect*	Eco-friendly*	Holistic*	Kin-centred*	Person-centred*	Efficient*	Accessible and timely*	Partnership and co-production*	Resilience*	Intention -to- stay score*	Overall quality score*	Recommendation score*
N organisations	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Min	6.5	5.5	5.1	5.6	5.4	5.2	5.2	5.7	4.8	4.9	4.8	4.3	4.6	4.4	4.5	4.8	5.2	4.6
Mean	7.6	6.8	6.8	6.7	6.5	6.4	6.4	6.4	6.2	6.1	6.0	6.0	5.8	5.7	5.7	6.8	6.5	6.4
Median	7.5	6.8	6.8	6.8	6.5	6.4	6.6	6.4	6.4	6.1	6.2	6.0	5.9	5.9	5.8	6.7	6.6	6.6
Max	8.1	7.6	7.6	7.6	7.4	7.2	7.7	7.3	7.6	7.4	7.4	7.1	6.7	7.0	7.0	8.2	7.4	7.6
P value	0.6804	0.0349	0.0163	0.0073	0.0027	0.1190	0.0002	0.0164	<.0001	0.0010	0.0002	0.0001	0.0001	<.0001	<.0001	<.0001	0.0008	<.0001

Figure 6.5 (Continued) Variation of hospitals' average mean scores on each instrument part of the FlaQuM-Quickscan. Variation of hospitals' mean scores on each instrument part of the FlaQuM-Quickscan that contains 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise, core values: green) according to Lachman's multidimensional quality model1 and global ratings (grey). Quality domains are ranked from left to right based on the mean of each domain. Each dot represents one hospital with at least 10 respondents. *One-way ANOVA was used to evaluate whether differences in hospitals' mean scores on quality domains were statistically significant, p<0.05.

Discussion

This study identified key healthcare quality attributes relevant to PCPs, validated the FlaQuM-Quickscan from PCPs' experiences, and defined in-hospital quality priorities based on PCPs' experiences. In objective 1, focus groups with PCPs resulted in the inductive identification of quality attributes, which subsequently confirmed Lachman's multidimensional quality model deductively [1]. PCPs were strong advocates of domains 'Partnership and co-production', 'Effectiveness' and 'Transparency'. These findings are supported by evidence that emphasized PCPs' personality as a determinant of quality [26]. Interestingly, PCPs paid more attention to transparency as a key quality attribute compared to patients and kin [17] and similarly to them, identified 'Communication' from an interdisciplinary and transmural approach as a new quality domain. The latter confirms studies that highlighted the importance of communication in care according to patients and professionals [9,17,27]. So, Lachman's model can be extended to include the domain 'Communication'. Although 'Equity' and 'Eco-friendliness' were not identified as quality domains, this should not be interpreted as an indication that these domains are not important in quality management. In our view, it is more likely that PCPs didn't consider them as being a feature of quality in the strict sense. Nevertheless, the World Health Organization calls attention for equality as a common challenge in healthcare [11,28]. Moreover, in light of the current changing worldview of climate change, hospitals are recommended to raise awareness about the importance of eco-friendliness in hospitals [29]. To summarize, identified quality attributes reveal that PCPs perceive quality as a multidimensional concept in which technical dimensions of quality, person- and kin-centredness, core values of care and catalysts are central.

As the FlaQuM-Quickscan was validated from patients', kin's and in-hospital professionals' perspectives [15], objective 2 in this study focused on the validation of the instrument from PCPs' perspective. The construct validity, which assessed the hypotheses to divide each instrument part in four subscales, as a priori defined in Lachman's model [1], was confirmed in our analyses by two fit indices. Nevertheless, the fit indices are less excellent compared to validation results from patients', kin's and in-hospital professionals' perspectives [15]. The discriminant validity demonstrated that PCPs are able to differentiate experiences between items and thus experience quality as a multidimensional concept. Similarly to results of research with patients, kin and in-hospital professionals [15], strong correlations between the majority of instrument items, especially the core values, and the overall quality assessment were demonstrated in terms of criterion validity. Therefore, the FlaQuM-Quickscan is a validated instrument to measure experiences of PCPs. By extending the validation of the FlaQuM-Quickscan from PCPs' perspective, hospital management and policymakers can truly integrate

experiences from all kind of stakeholders, i.e. patients/kin and professionals, and include PCPs' experiences in strategic quality approaches [16].

In objective 3, mean scores of domains and between-hospital variation were used to set priorities by hospital management. Priority setting can be supported by the correlation of the overall quality score with quality domains, which are visualised in an overview (Supplemental Material 4). This overview demonstrates that priorities are multidimensional. According to perspectives of patients, kin and professionals [14], 'Dignity and respect' showed the highest correlation with the overall quality score. Similarly, domains 'Holistic care', 'Kindness with compassion', 'Partnership and co-production' showed also a high correlation with this overall score and a significant variation between hospitals' scores, highlighting their ability to learn from each other. Based on these correlations, 'Eco-friendliness' is not prioritized, but there is an opportunity for improvement given the low mean score. So, in addition to technical domains and person-centeredness, hospital management should consider core values, catalysts and kin-centeredness in their quality management systems. This multidimensionality is reflected in previous research, in which communication, coordination and transparency are prioritised [9]. By integrating feedback from PCPs, patients, kin and professionals, hospitals can develop a shared quality vision and an action plan with relevant strategies in their practice [13]. Using the FlaQuM-Quickscan as an integrated care intervention enables the successful transformation to more integrated care systems by identifying potential problems in progress, by focusing on collaboration between healthcare systems levels and by monitoring changes in experiences as part of integration efforts [4,5]. Moreover, benchmarking reports are the basis for inter-hospital improvement collaboratives, where hospitals can learn from each other and share best practices to improve care for patients/kin and professionals. Learning can start at domains with statistically significant variation between hospitals. Correlations of domains with the recommendation and intention-to-stay score can be used by hospitals' human resources department to refine organisational action plans. In conclusion, the FlaQuM-Quickscan supports the value-driven movement towards integrated care systems by involving both hospitals and PCPs and by enhancing collaboration between hospitals.

This study is the first to measure PCPs' experiences of hospital quality and use them in prioritisation. This study is strengthened by a mixed-methods design consisting of focus groups and a validated instrument that combined qualitative and quantitative perspectives of PCPs. A mean average of 11 focus group participants represents the ideal size in line with recommendations [18]. The sample of PCPs that completed the FlaQuM-Quickscan consisted of a female/male ratio that is similar to other healthcare studies [9,28]. However, because almost half of the sample were female aged 50 years or younger, a possible sampling bias is observed. The results of the RMSEA in FlaQuM-Quickscan part 2 may be caused by small degrees of freedom and a small sample size [30] or because healthcare

professionals are more able to score healthcare quality for patients and kin (part 1) than how a hospital cares for its professionals (part 2). Future quantitative and qualitative research with a larger sample size is recommended to validate the FlaQuM-Quickscan across gender, age and professional groups, such as general practitioners and home nurses. The FlaQuM-Quickscan is only distributed to Dutch-speaking respondents and no cultural or social determinants were surveyed. In future research, the FlaQuM-Quickscan will be translated into other languages and expanded with socio-economic determinants.

Conclusion

The identified key attributes of healthcare quality from PCPs' perspective largely correspond with those of Lachman's multidimensional quality model. PCPs identified 'Communication' as an essential quality domain that should not be missing from theoretical quality models. In our multi-centre study, the FlaQuM-Quickscan is considered as valid to measure PCPs' experiences of hospital quality. The validation of the FlaQuM-Quickscan from PCPs' experiences strengthens the integration of different perspectives in quality management and reinforces a holistic, well-informed approach towards quality. Interpretation of PCPs' experiences based on correlations of overall quality scores with quality domains, differences in mean scores on domains and the variation between hospitals' mean scores, revealed that hospital management should prioritise technical domains, person-and kin-centredness, core values and catalysts in their future, integrated quality management system.

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Supplemental Material

Supplemental Material 1: FlaQuM-Quickscan survey

Supplemental Material 2: Classification of cards

Supplemental Material 3: Descriptive results

Supplemental Material 4: Overview of prioritised quality domains

Supplemental Material 1: FlaQuM-Quickscan survey

The FlaQuM-Quickscan contains two parts. Patients, kin, and professionals were asked to complete both instrument parts. The first part explores perspectives on *Healthcare quality for patients and kin*, i.e., how professionals care for patients and their kin, while the second part focuses on *Healthcare quality for professionals*, i.e., how the organisation cares for their professionals.

Each item is rated on a 11-point Likert-type scale.

Responses to the first 15 instrument items on quality domains of healthcare will reflect the respondent's level of disagreement or agreement with the item statement, scored from *0* (strongly disagree) to *10* (strongly agree).
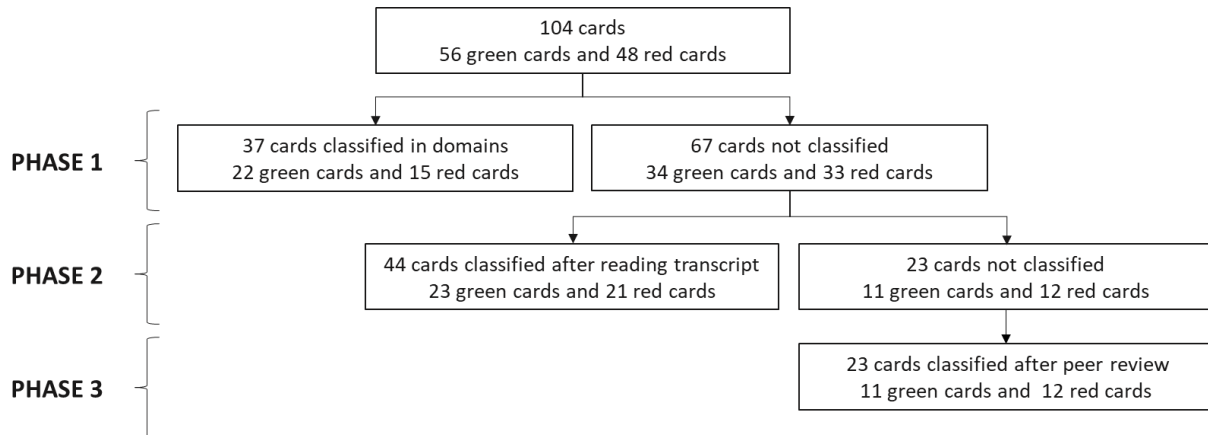
The first general item includes the overall quality assessment of received care (in part 1) and the overall quality assessment of the hospital as employer (in part 2), and is scored from *0* (worst possible quality) to *10* (best possible quality). The second general item concerns the willingness to recommend the hospital to family and friends for receiving care (in part 1) or to work as an employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes). The third general item reflects on a respondent's intention-to-stay in the next year to receive care (in part 1) or to work as employee (in part 2), scored from *0* (definitely no) to *10* (definitely yes).

Part 1: Healthcare quality for patients and kin

| Instrument items	Quality domains
This organisation takes into account the wishes, needs and requirements of patients.	Person-centred
This organisation pays close attention to family, caregivers and/or other kin.	Kin-centred
Patients and kin are informed about the quality of care in this organisation.	Transparency
All staff consistently demonstrate their commitment to the organisation and set a good example so that patients and their kin feel comfortable and safe.	Leadership
This organisation takes into account what a patient and their kin can cope with (e.g. stress or new information).	Resilience
The care provided to patients and kin in this organisation is safe and actions are taken to prevent or resolve unsafe situations.	Safe
The staff in this organisation know their jobs and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on patients where possible.	Efficient
Care services are always accessible and offered without postponement or unnecessary delay.	Accessible and timely
All patients and kin are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
This organisation has a policy to reduce its ecological footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats patients and their kin with dignity and respect.	Dignity and respect
This organisation considers the individual behind the patient and their kin: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation patients and their kin are involved in decisions, listened to and their knowledge and experience are taken into account.	Partnership and co-production
In this organisation people are friendly and kind to patients and their loved ones.	Kindness with compassion
Which score would you give the overall quality of care, provided to patients and their kin, in this organisation?	Overall quality score
Would you recommend this organisation to your friends and family?	Recommendation score
If you need care in the coming year, would you choose this care organisation?	Intention-to-stay score

Part 2: Healthcare quality for professionals

| Statements	Domain
This organisation takes into account the wishes, needs and requirements of staff.	Person-centred care
This organisation takes into account familial circumstances of staff.	Kin-centred care
Staff are informed about the quality of care in this organisation.	Transparency
Staff always show their commitment and set a good example that makes other staff feel trusted and safe.	Leadership
In this organisation, what staff can cope with (e.g. stress or new information), is taken into account.	Resilience
This organisation does everything within their power to keep a safe working environment for its staff and ensures that they dare to call each other to account for unsafe situations.	Safe
This organisation ensures that staff know their job and are adequately trained for it.	Effective
This organisation takes actions to avoid unnecessary or duplicate activities in care and reduces the administrative burden on staff where possible.	Efficient
This organisation ensures an adequate staffing level that works together optimally to provide care that is accessible, timely and without unnecessary delays.	Accessible and timely
All staff are welcome, without any discrimination, based on gender, ethnicity, financial situation, sexual orientation or disability.	Equity
Staff is motivated to reduce their environmental footprint, for example by means of reducing plastic use, by sorting waste and by water and energy management.	Eco-friendly
This organisation treats staff with dignity and respect.	Dignity and respect
This organisation considers the individual behind the staff: physical, spiritual, emotional, social and mental health are important.	Holistic
In this organisation, staff is actively involved in decisions, changes or improvement projects; they are listened to and their knowledge and experience is taken into account.	Partnership and co-production
In this organisation staff are friendly and kind to each other.	Kindness with compassion
Which score would you give this organisation as an employer?	Overall quality score
Would you recommend this organisation as an employer to your friends and family?	Recommendation score
Would you continue to work in this organisation in the coming year?	Intention-to-stay score

Supplemental Material 2: Classification of cards

Supplementary Figure 6.1 Overview of the classification of green (positively influencing attributes) and red cards (negatively influencing attributes) identified by PCPs.

Supplemental Material 3: Descriptive results
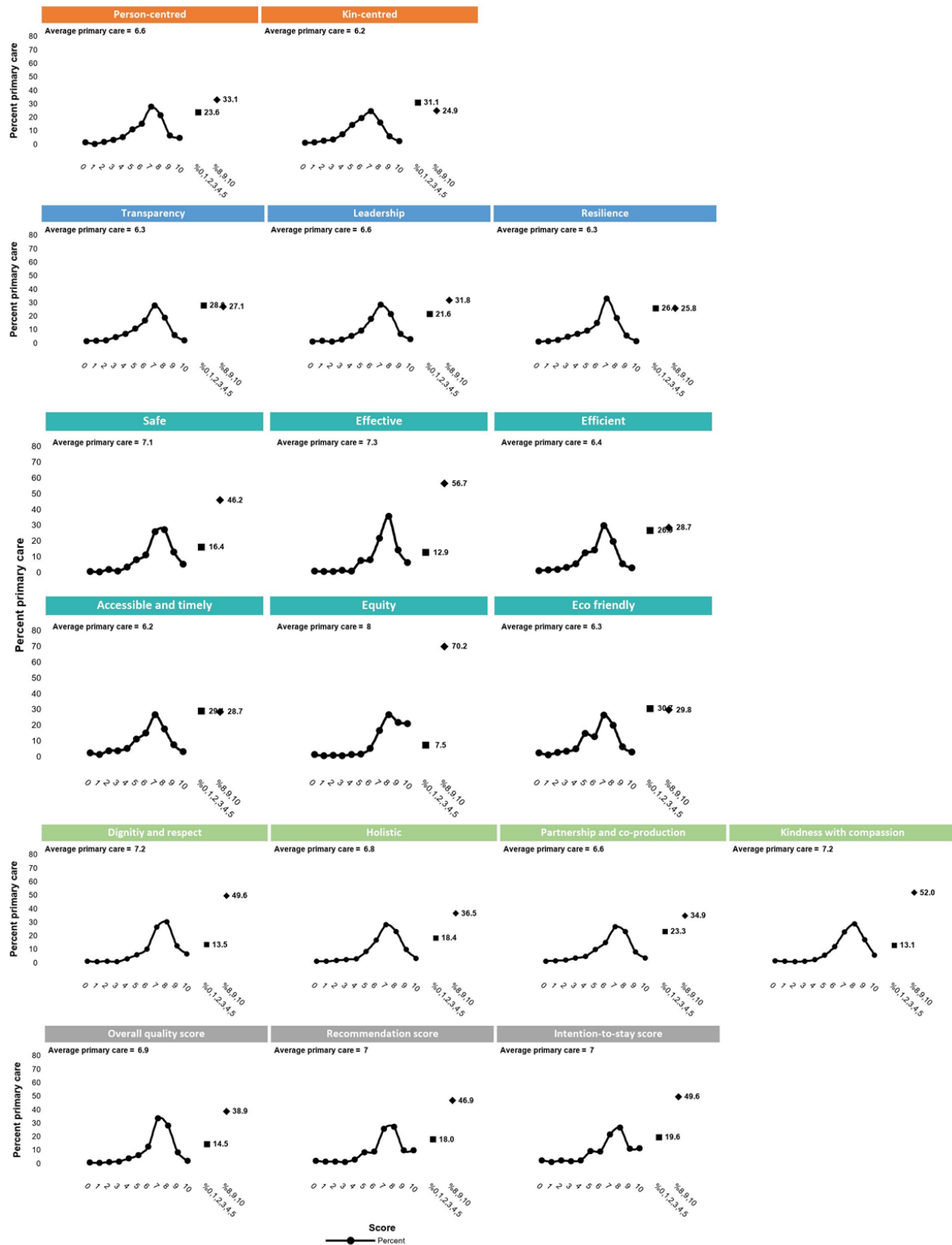
Supplementary Figure 6.2 Distribution of scores for part 1 'Healthcare quality for patients and kin' on the 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by primary care professionals. Next to the distribution of each item, the percentage of scores between 0-5 (square) and between 8-10 are shown (diamond).
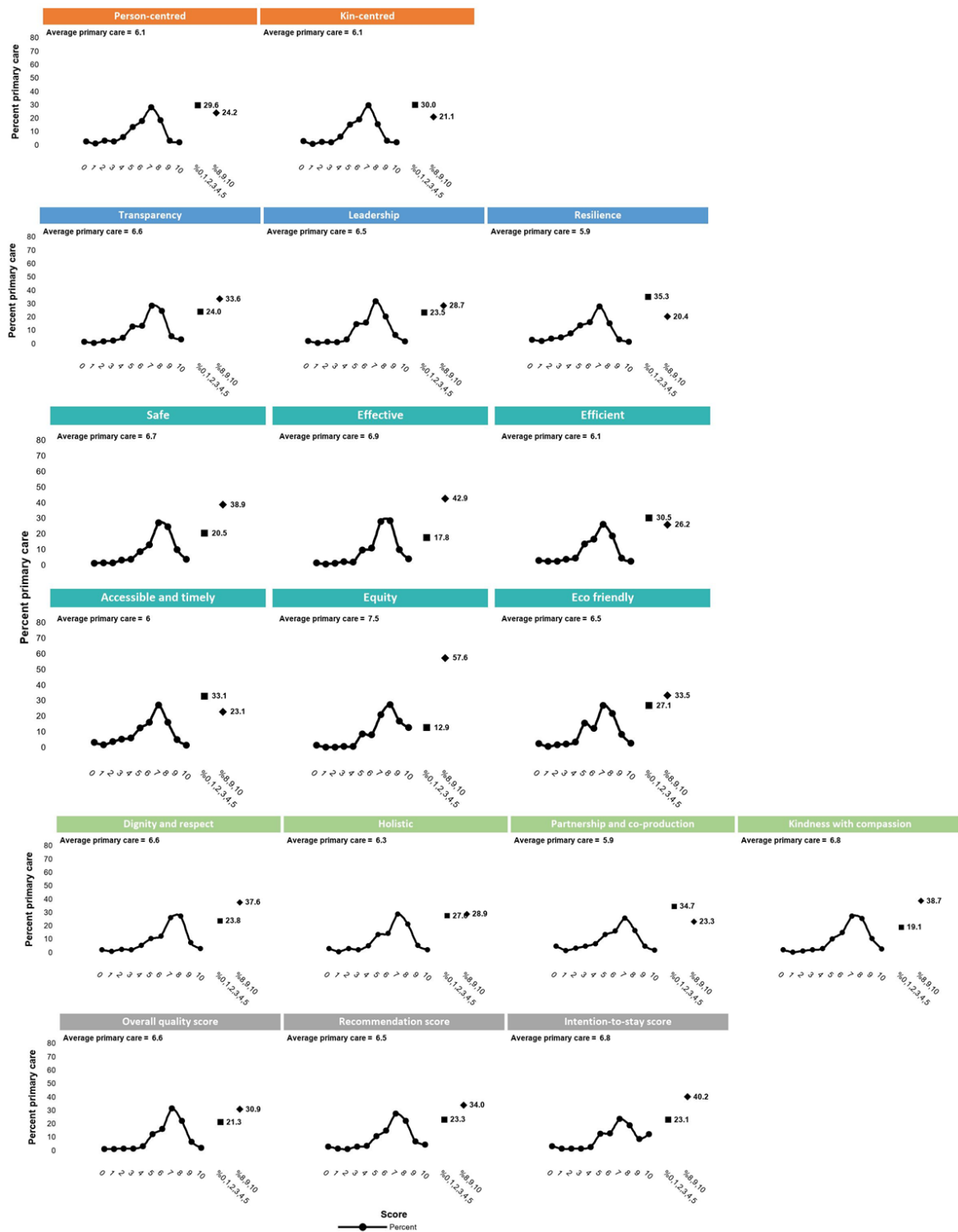
Supplementary Figure 6.3 Distribution of scores for part 1 'Healthcare quality for professionals' on the 15 items reflecting quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise and core values: green) and 3 general items (grey) scored by primary care professionals. Next to the distribution of each item, the percentage of scores between 0-5 (square) and between 8-10 are shown (diamond).

Supplemental Material 4: Overview of prioritised quality domains

Supplementary Table 6.1 Overview of prioritised quality domains.

Part 1 "Healthcare quality for patients and kin"				Part 2 "Healthcare quality for professionals"			
Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores	Quality domains	Correlations with overall quality score	Mean scores of domains	Variations between hospitals' mean scores
Dignity and respect	**0.797**	7.2	2.3	Dignity and respect	**0.859**	6.6	2.5*
Holistic care	**0.778**	6.8	**2.7***	Holistic care	**0.842**	6.3	**2.8***
Kindness with compassion	**0.771**	7.2	2.0*	Person-centred care	**0.821**	6.1	**2.6***
Safe	0.768	7.1	1.7	Partnership and co-production	0.815	**5.9**	**2.6***
Person-centred care	0.767	6.6	2.3*	Resilience	0.801	**5.9**	2.5*
Leadership	0.765	6.6	2.0	Leadership	0.798	6.5	2.0
Resilience	0.756	**6.3**	2.4*	Kin-centred care	0.782	6.1	2.5*
Effective	0.743	7.3	2.0	Transparency	0.778	6.6	2.0*
Partnership and co-production	0.740	6.6	**3.5***	Effective	0.770	6.9	2.1*
Transparency	0.739	**6.3**	2.4*	Safe	0.766	6.7	2.0*
Kin-centred care	0.726	**6.2**	2.3*	Kindness with compassion	0.756	6.8	2.5*
Efficient	0.680	6.4	1.8	Efficient	0.751	6.1	**2.8***
Accessible and Timely	0.656	**6.2**	**3.6***	Accessible and Timely	0.742	**6.0**	2.1*
Equity	0.576	8.0	1.3	Equity	0.608	7.5	1.6
Eco-friendly	0.492	**6.3**	1.5	Eco-friendly	0.607	6.5	1.6*

Notes Supplementary Table 6.1: Quality domains (person- and kin-centred care: orange, catalysts: blue, technical domains: turquoise, core values: green) are presented according to Lachman's multidimensional quality model [1]. Quality domains are ranked from top to bottom based on the correlations of domains with the overall quality scores. The highest correlation scores, the lowest mean scores of domains and the largest variations between hospitals' mean scores are highlighted in bold. *One-way ANOVA was used to evaluate whether differences in hospitals' mean scores on quality domains were statistically significant, $p < 0.05$.

A concept analysis of sustainability of quality management systems in healthcare organisations

A concept analysis of sustainability of quality management systems in healthcare organisations. Will this help the implementation and follow-up?

Abstract

Background: In healthcare organisations, quality management systems (QMS) constitute an important method of improving patient outcomes, and ensuring QMS sustainability is critical. The exact meaning of sustainability in QMS is unclear. This leads to poor communication between managers, healthcare professionals, policymakers and researchers and issues related to implementation, follow-up and comparison of QMS. To address the lack of a univocal definition of sustainability in healthcare organisations' QMS, this study aimed to bring conceptual clarity by proposing a comprehensive definition.

Methods: Walker and Avant's approach was used to define prerequisites, essential components and consequences.

Results: A total of 31 original definition articles were included in the concept analysis. The four prerequisites of sustainable QMS are: (1) Planning and preparing the QMS with predefined goals, (2) Availability of internal and external resources and building capacity for continuous QMS delivery, (3) Predefining QMS components, adaptation and adoption, progress monitoring and (4) Cognitive components, competences, engagement and participation, influential leaders and champions. The four essential components are: (1) Continued focus on predefined goals and maintained efforts to achieve these goals, (2) Maintained internal and external resources and having adequate capacity for continuous QMS delivery, (3) Institutionalization of QMS components, re-assessment of progress, further adaptation and evolvability and (4) Cognitive components fully supporting the QMS, routinization of QMS components in daily practice, prolonged engagement and participation. A sustainable QMS must lead to: (1) Consistent achievement of goals leading to optimised healthcare delivery and benefits for patients and professionals, (2) Cost-effectiveness of the QMS and maintained capacity to continue delivering and adapting the QMS, (3) Continuation of QMS components, further development and spread organisation-wide and (4) Increased proportion of professionals who are fully engaged to improving the quality of their services.

Conclusion: Sustainability of QMS in healthcare organisations is a multi-factorial concept related to the goals, resources, QMS and individuals, which are continuously evolving and dynamically interacting

over time. The present study provides an actionable, comprehensive definition that can guide managers, healthcare professionals and policymakers towards sustainable quality management and improved healthcare quality. Future research can focus on the implementation and further development of this definition to advance our understanding of sustainable QMS in healthcare organisations.

Introduction

Sustainability research in healthcare is mainly related to environmental, financial and social sustainability. Existing research, theory and practices related to sustainability of 'quality management systems' (QMS) in healthcare organisations have been wrestling with its definition and determinants [1] as common language constructs like "maintenance", "continuation", "durability", "integration" and "holding the gains" relate the concept of sustainability to a magnitude of meanings, complicating its meaning in practice [2–4]. QMS play a vital role in healthcare organisations, especially as the quality of services directly impacts patient outcomes [5,6]. QMS are generally understood as a set of activities, methods and procedures used to direct, control and improve quality of care organisation-wide [7]. They are a prerequisite for the homogeneous and systematic application of quality improvement activities throughout smaller organisational units [8], with the aim of integrating these activities in professionals' routine practices instead of being added on top of existing routines [9,10]. Nevertheless, previous research showed that many quality strategies fail to become part of professionals' routines as they often fall back to old work habits [10]. Unstainable QMS are not only a waste of time and money, but indicate that effective quality strategies never reach patients [11] and professionals' support for future strategies is diminished [12].

For healthcare organisations today, it is a strategic imperative to embed QMS, to improve their 'stickability' and to increase their contribution to patients' and professionals' outcomes [13,14]. The debate on how to sustain organisations' QMS is more relevant than ever. Nevertheless, existing definitions of sustainability mainly focused at the unit-level in terms of evidence-based practices [15,16], whose meaning is not necessarily the same as sustainability at the organisational level in terms of an organisation-wide QMS [17,18]. To maximise the benefits of organisations' QMS, managers of healthcare organisations and researchers need the ability to rigorously define and assess whether QMS are sustainable [17,19]. Current definitions that inform organisation-wide quality management fell short of comprehensively addressing actionable processes required for sustainability [4,17]. The absence of a clear definition leads to poor communication between managers, healthcare professionals, policymakers and researchers and issues related to implementation, follow-up and comparison of QMS [20]. The need for a clear conceptualisation of sustainability in light of complex real-life settings is increasingly emphasized [4,17,21]. Therefore, the definition of the sustainability of QMS has been identified as one of the most critical gaps in implementation and healthcare management science.

To address the lack of a univocal definition of sustainability in healthcare organisations' QMS, this study aimed to propose a definition of sustainability by defining its prerequisites (antecedents), essential components (attributes) and consequences (results/outcomes). This concept analysis aims to present an overview and synthesis of existing literature regarding sustainability in healthcare organisations' QMS.

Methods

Phase 1: Original search strategy and selection of articles

Original articles, theoretical and conceptual articles as well as review articles, written in English or Dutch, were included in two phases (Figure 7.1). The first phase focused on an original search strategy, combined with a secondary search (snowballing), following the recommendations of Greenhalgh and Peacock [22]. The second phase focused on backward citation tracking of included articles in the first phase, i.e. the process of obtaining and assessing the relevance of all records cited within the reference lists of a set of articles as described by Haddaway et al. [23].
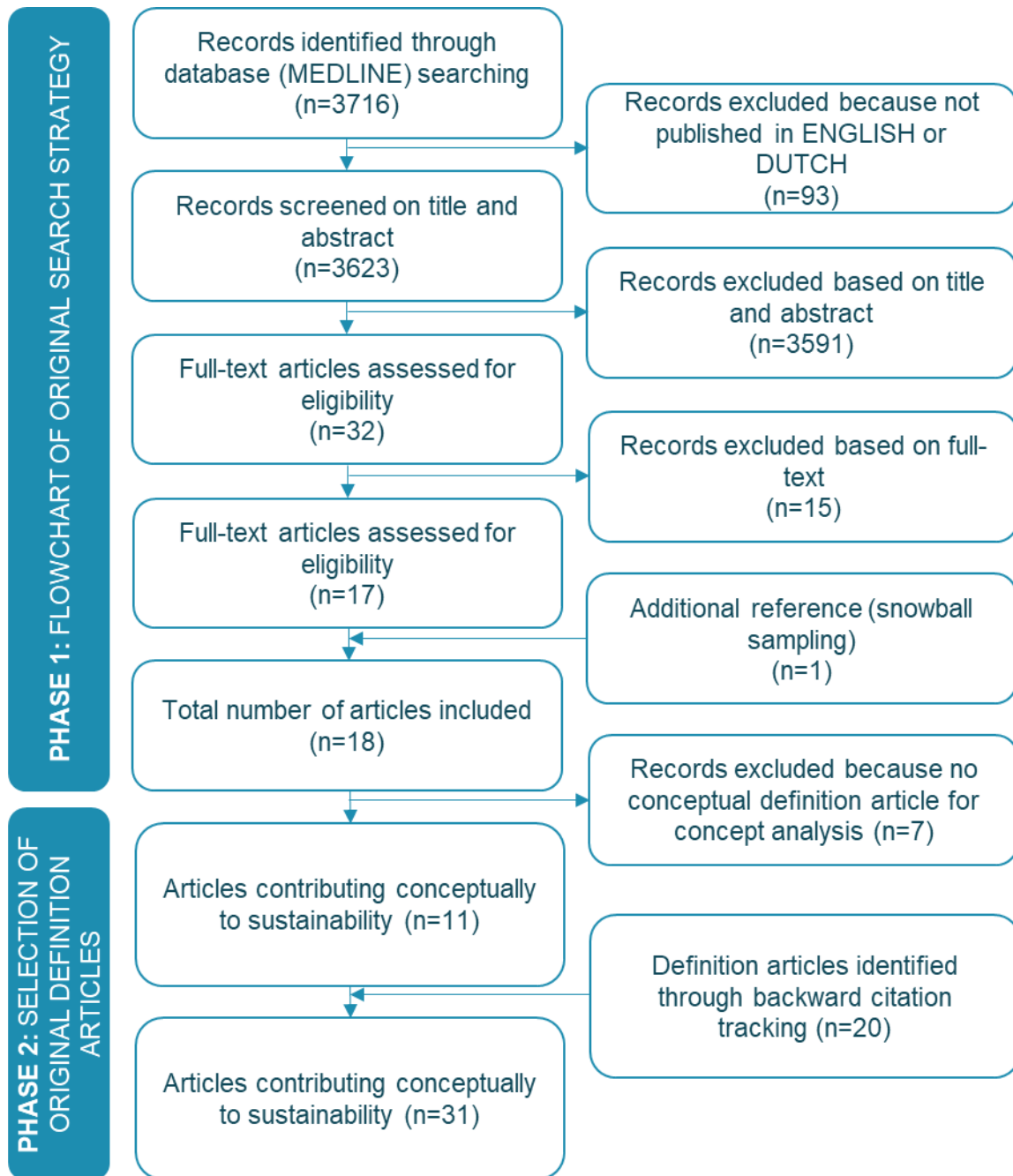
Figure 7.1 Flowchart of original search strategy and selection of original definition articles.

The first phase started with searching MEDLINE for literature published between January 2013 and August 2022 on a combination of keywords in their title and abstract: (sustain* OR durability OR fidelity OR institutionalization OR routinization OR longitudinal OR long-term OR maintenance OR normalization OR embed* OR integration OR continuation OR persist* OR assurance) AND (defin* OR construct OR attribute* OR determinant* OR concept*) AND (healthcare). All articles were purposively screened for selection criteria. We included peer-reviewed journal articles with a conceptual definition or framework of sustainability in healthcare organisations while focusing on a dimension of healthcare

quality. As Pluye et al. described that articles on health program sustainability are centred on sustainability only within organisations [24], articles focusing on program sustainability with a clear link to healthcare quality were also included in this study. We excluded literature describing sustainability in the fields of ecological or environmental, financial, food, clinical and health information technology. Research conducted outside Europe, the United States of America or Australia was also excluded. To start the article selection, duplicates were removed and titles were screened by one author (FC) in Endnote V20. Next, Rayyan, a web and mobile app for systematic reviews, was used for the blinded abstract review by two authors (FC and EMC). Then, full-text articles were retrieved and screened to see whether they fulfilled the inclusion criteria in a purpose-designed Microsoft Excel Spreadsheet. As the aim was to identify a broad range of conceptual definitions used in the literature, no further assessment of the validity or quality of the full-text was conducted.

Phase 2: Selection of original definition articles

In the second phase of article selection, all included articles from the original search strategy were screened via backward citation tracking to find other original definition articles that described how sustainability was understood and operationalized. Finally, all original definition articles were screened by two peers (FC and EMC) from the same research unit who evaluated the definitions' appropriateness.

Phase 3: Concept analysis

A concept analysis is a rigorous, systematic way to establish a clear understanding of and consistent language for describing a complex concept [25]. Clearly defining and describing the major concept of sustainability in QMS through a concept analysis, allows to build a coherent body of research in that field and guides healthcare organisations towards a future, sustainable QMS. After comparing methods for concept analysis in our research team [26], the stepwise method for concept analysis of Walker & Avant [25], which is the most commonly used in nursing literature, seemed the most appropriate approach to base our analysis on and has been used within our research team [27]. The strength of the method of Walker & Avant is that it provides a structural guideline starting with selecting a concept; determining the aim and purpose of analysis; identifying all uses of concept from a literature search; identifying the attributes, hereinafter referred to as essential components, antecedents, hereinafter referred to as prerequisites and consequences of the concept. Throughout each analysis step, abstract phenomena are transformed into a meaningful definition with elements that are practical enough to guide actions that improve sustainable quality management in healthcare organisations.

Results

Phase 1: Original search strategy and selection of articles

We identified 5852 records via the MEDLINE database (Figure 7.1). Screening of title and abstract led to the exclusion of 5821 records. Subsequently, 32 full-text articles were read. After conducting snowball sampling, the final number of included studies totalled 18 (Supplemental Material 1).

Phase 2: Selection of original definition articles

Of the 18 included articles, 11 articles described how sustainability was understood and operationalized and 20 additional original definition articles were identified through manual backward citation tracking. Finally, 31 original definition articles were included (Supplemental Material 2).

Phase 3: Concept analysis

1. Definition of sustainability in QMS

Sustainability of QMS in healthcare organisations is a multi-factorial concept consisting of four factors that interact dynamically over time: (1) the goals, (2) the resources, (3) the QMS and (4) the individuals (Figure 7.2). These sustainability factors evolve in terms of prerequisites, essential components and consequences, which are described in detail below.
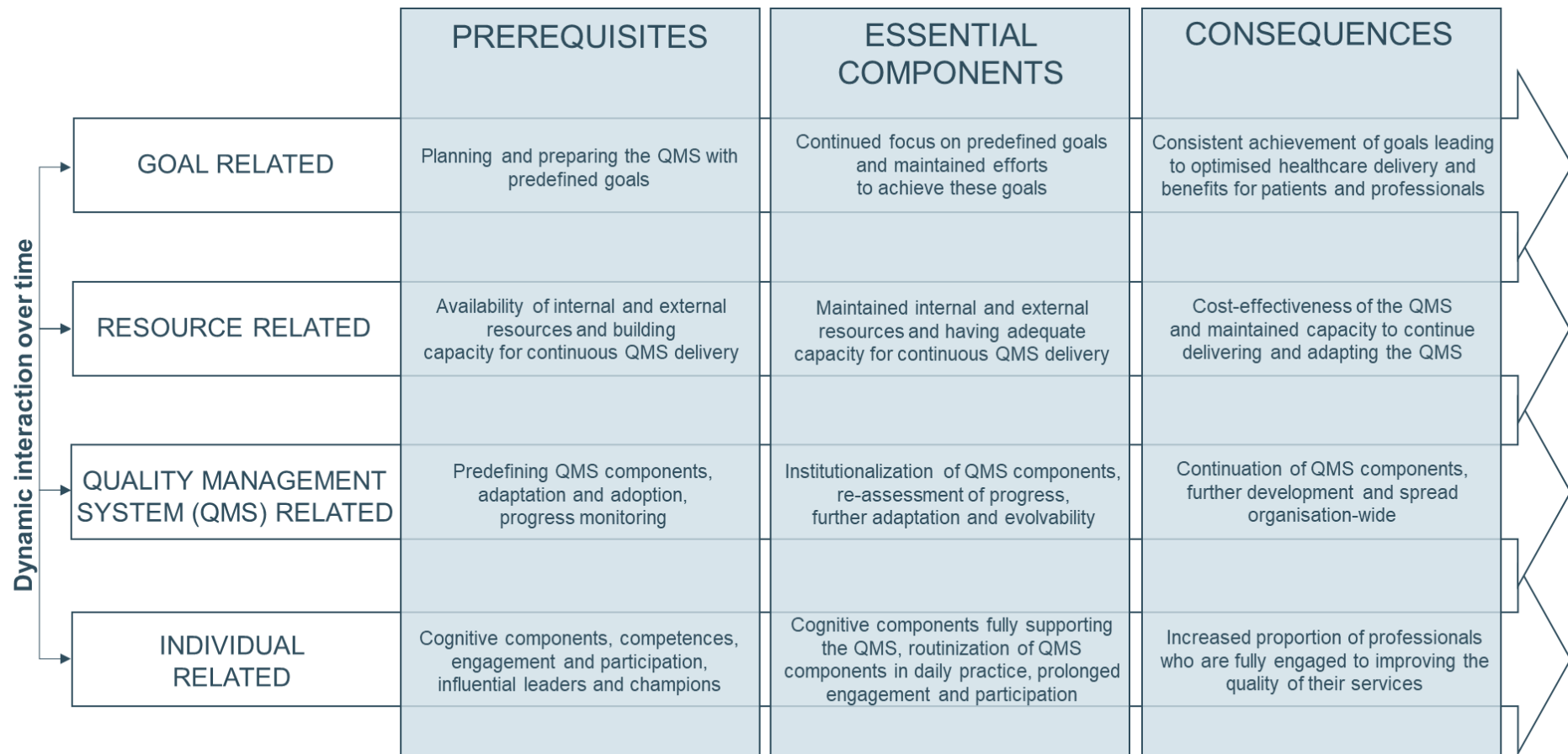
	PREREQUISITES	ESSENTIAL COMPONENTS	CONSEQUENCES
GOAL RELATED	Planning and preparing the QMS with predefined goals	Continued focus on predefined goals and maintained efforts to achieve these goals	Consistent achievement of goals leading to optimised healthcare delivery and benefits for patients and professionals
RESOURCE RELATED	Availability of internal and external resources and building capacity for continuous QMS delivery	Maintained internal and external resources and having adequate capacity for continuous QMS delivery	Cost-effectiveness of the QMS and maintained capacity to continue delivering and adapting the QMS
QUALITY MANAGEMENT SYSTEM (QMS) RELATED	Predefining QMS components, adaptation and adoption, progress monitoring	Institutionalization of QMS components, re-assessment of progress, further adaptation and evolvability	Continuation of QMS components, further development and spread organisation-wide
INDIVIDUAL RELATED	Cognitive components, competences, engagement and participation, influential leaders and champions	Cognitive components fully supporting the QMS, routinization of QMS components in daily practice, prolonged engagement and participation	Increased proportion of professionals who are fully engaged to improving the quality of their services

Dynamic interaction over time

Figure 7.2 Overview of prerequisites, essential components and consequences of sustainability in QMS of healthcare organisations.

2. Prerequisites

In literature, four prerequisites were described: (1) Planning and preparing the QMS with predefined goals, (2) Availability of internal and external resources and building capacity for sustainability, (3) Predefining QMS components, adaptation and adoption, progress monitoring and (4) Cognitive components, competences, engagement and participation, influential leaders and champions.

2.1 Planning and preparing the QMS with predefined goals

Sustainability of a QMS in a healthcare organisation starts with thoughtful planning and preparing it in co-production with key stakeholders (patients and professionals) to predefine the QMS goals and align the long-term mission [1,28–30]. These goals and mission are the start of an action plan that will serve as a roadmap to build a sustainable QMS by describing the actions needed to achieve sustainability, defining the metrics to track progress towards benefits at the organisational and individual level and assembling the resources and capacity needed to execute the outlined action plan [1,2,4,21,24,28–36].

2.2 Availability of internal and external resources and building capacity for continuous QMS delivery

To build a sustainable QMS, the organisation needs sufficient internal resources including funding, staff, technical assistance and time [4,10,21,24,29,34–39]. These resources are also used to communicate consistently in order to establish a common language and way of thinking concerning quality and to promote QMS components as part of the organisational culture [29,33,38,40]. Moreover, building capacity, which involves staff skills as well as structures and processes that enable a QMS to leverage resources to effectively implement the QMS, is described as influencing sustainability. Capacity building of staff skills can be operationalised through education and training [1,2,30]. Obviously, sustainability of a QMS also depends on a number of externalities in the broader community, such as political support, financial incentives and legislation [3,10,21,28,29,35,37], and on environmental and sociocultural characteristics, such as the needs of patients or communities surrounding the QMS [3,28,32].

2.3 Predefining QMS components, adaptation and adoption, progress monitoring

Sustainability is likely to be affected by the QMS itself [10] and all its preceding activities [21]. In the QMS design, which is suggested to be a joint event that belongs to both implementation and sustainability [24], key components need to be defined to increase transparency on what must be present to be counted as sustained [21,30,41] or what can be modified over time [21,28]. As the QMS

is the main unit that needs to be sustained, it is important to ensure that stakeholders have a clear understanding of its components and characteristics [30]. Next to the clarification of QMS components, their compatibility with the organisation's mission and vision [21,29,37], fit and integration with existing frameworks implemented in the organisation [10,29,33,36,38,42,43] and adaptations resulting from mutually negotiation processes to meet emerging needs of internal and external stakeholders [2,21,28,29,32,35,36,38,40,42] are crucial. The latter is also described as 'responsivity' of the QMS [32]. Once QMS components are defined, adoption of these in practice and adherence of professionals is a key factor leading to sustainability [12,37]. Tracking progress of this adoption and adherence to practices as well as the QMS effectiveness will influence its sustainability [9,42]. If short-term and long-term benefits for patients and professionals and improved healthcare quality is perceived, this is expected to positively influence professionals' perception of the QMS advantage and to trigger their motivation and accountability to sustain it [9,21,24,29,35,40,44]. Moreover, progress monitoring and reflection on the progress is important to stimulate a learning and innovative culture and to co-evolve generated knowledge [3,35,39].

2.4 Cognitive components, competences, engagement and participation, influential leaders and champions

Different individual characteristics are influencing sustainability as individuals are continuously interacting with the QMS. First, alignment between the cognitive components of individuals, such as their beliefs, ideas and values, and the principles underlying the QMS is crucial to enhance its sustainability [3,21,43]. Second, competences in terms of knowledge, skills and attitudes towards the QMS components increased professionals' empowerment and shared accountability to sustain quality [10,33,35,40,44]. These competences can be strengthened by education and training programs [38,44], also related to 'building capacity' [10,28,29,34]. Third, engagement of stakeholders, in terms of both care recipients and care providers, and participation in internal [30,36,42,44] or external collaborations [24,38,41], such as in advisory committees with a panel of multidisciplinary experts [38], are needed to ensure buy-in in the QMS. Furthermore, its facilitates to build a broad support base for the QMS and to accomplish desired results [24,32]. Fourth, influential, visionary and competent leaders and the presence of champions, both inside and outside the QMS [30], with clearly identified responsibilities and placed strategically in the organisation to advocate for the QMS are vital to facilitate and catalyse QMS sustainability [21,30,32,33,35,38,39,44]. The latter is also defined as 'leadership commitment' [39] and 'management capability' [45].

3. Essential components

Sustainability of QMS is characterized by four essential components: (1) Continued focus on predefined goals and maintained efforts to achieve these goals, (2) Maintained internal and external resources and adequate capacity to deliver the QMS continuously, (3) Institutionalization of QMS components, re-assessment of progress, further adaptation and evolvability and (4) Sustained cognitive components, routinization of QMS components in daily practice, prolonged engagement and participation.

3.1 Continued focus on predefined goals and maintained efforts to achieve these goals

Since sustainability is not a one-time effort and cannot be perceived as self-evident, the continued or ongoing focus on the delivery of the predefined core goals and maintained efforts to implement the sustainability plan are essential [12,14,30,32]. Reminders can be used to repeatedly communicate and increase visibility of the goals pursued and to maintain attention to the initial reason for the implementation of the QMS and the observed quality problems addressed by the QMS [33,37,44,46].

3.2 Maintained internal and external resources and having adequate capacity for continuous QMS delivery

To ensure QMS sustainability, maintained internal and external resources such as funding stability, the ability to recover costs and staff stability are essential [2,3,14,21,28,29,32,33,44,46,47]. To deliver the QMS over time, having adequate capacity is necessary to ensure the organisation and the staff are able to undertake QMS components and improve benefits over time [1,2,10,21,28,30,32,34,41].

3.3 Institutionalization of QMS components, re-assessment of progress, further adaptation and evolvability

Continued or ongoing delivery of the QMS components and its features is an essential component of QMS sustainability [1,2,4,10,14,21,24,29,32,37,39,41,42,46]. When working as prescribed by QMS components becomes the norm in a healthcare organisation, institutionalization of the QMS is reached [4,10,21,24,29,37,39,46]. Over time, re-assessment is needed to monitor the progress of adoption of QMS components, the needs of internal and external stakeholders and whether benefits for patients [2–4,9,10,14,21,29,32,42,44,48] and professionals [21,44] is needed [2,10,30,34,36,39,42] continue to improve. By doing so, the healthcare organisation can learn from the progress in order to further adapt the QMS accordingly and evolve the QMS components [2–4,10,14,24,29,32–34,37,39,42,44]. Evolvability includes that removal or de-implementation of QMS components without benefits and replacement of QMS components with new ones is important [36].

3.4 Cognitive components fully supporting the QMS, routinization of QMS components in daily practice, prolonged engagement and participation

The cognitive components of individuals, i.e. their ideas, beliefs and values, must be fundamentally altered in order for them to support the principles underlining the QMS and achieve sustainability [2,14,21,33,40,46]. Having the competences in terms of knowledge, skills and attitudes that leads to behaviour change of professionals and the incorporation of quality into their daily workflow, and certainly not returning to ineffective practices [3,12], is described as routinization [4,14,21,24,28,29,33,37,44]. Routinization is encouraged by a focus on what really matters to professionals [34,40] and by shared cultural and organisational artefacts [33,35]. Prolonged stakeholder engagement and participation of patients, professionals and leader in collaborations is needed to ensure good 'relationships' between stakeholders that drive the QMS forward and to act as coordinating structures in the QMS [1,2,4,10,28,32,39–41,46]. Institutionalization and further adaption of the QMS are promoted by leadership actions [39].

4. Consequences

Sustainability is defined as an outcome in some definitions [1,32,37,46]. Shelton et al. mentioned to actively engage with stakeholders to prioritize the sustainability outcomes that will be measured and when [42]. Literature described that when the processes described in the prerequisites and essential components are successful in practice, four main consequences can occur. A first consequence of a sustainable QMS is the consistent achievement of goals, leading to continuous optimisation of healthcare delivery and benefits for patients and professionals [31,35,38,39,44]. If sustainability is reached, an increased proportion of patients receives effective quality strategies [1,10,12,38,46], so the QMS will perform more effectively and efficiently over the long term [30]. A second consequence of sustainability is the cost-effectiveness of the QMS [2,3,45], i.e. the comparison of relative costs versus outcomes/benefits, that no further investment is needed to keep the QMS alive and that the system surrounding professionals is transformed in supporting them to deliver QMS components [14], and maintaining the capacity to continue delivering and adapting QMS components over time [30–32,41,46,49]. Another consequence related to sustainability is the continuation of QMS components [3,10,31] and their further development and spread organisation-wide [44,46]. Further development includes continuous adaptations based on the needs of patients, professionals and the community [14,44], and subsequently resulting in increased value of the QMS for these stakeholders [45]. The ultimate aim of sustainability is that professionals do not perceive the QMS components as additional workload, but that professionals believe in and are aware of QMS benefits and experience it as aligned to their values and needs for improvement [3,40,41,44]. This fourth outcome of sustainability is the

increased proportion of professionals who are fully engaged to improving the quality of their services [10,12], even after implementation strategies are no longer actively carried out [48] or QMS sustainability efforts have been withdrawn [10]. Despite these positive outcomes for sustainability, Buchanan et al. described that while sustained change may appear to be more beneficial, sustainability may also be damaging if QMS components rendered obsolete or block other potentially more significant developments and then prevent professionals from acquiring new skills and experiences [14].

Discussion

Based on our concept analysis of original definition articles on sustainable quality management in healthcare organisations, we propose a univocal, operational definition of sustainability of QMS by describing its prerequisites, essential components and consequences. In this study, the comprehensive definition of sustainability of QMS is situated on four key factors that evolve and interact over time: (1) the goals, (2) resources, (3) the QMS and (4) individuals. A rich description of prerequisites related to these four factors preceding sustainability's essential components took place. The essential components are described from a prolonged, maintained view after the QMS is installed in the organisation. The definition ends with the consequences sustainability must lead to. By integrating them in one holistic definition, we inform theory development by uncovering key factors concerning sustainable quality management in healthcare organisations. As described in previous research [29,39,46], sustainability is thus a multi-factorial construct related to the system level, organisational level and individual level. The identified factors echo those found in a recent developed sustainability framework describing that interconnections between factors emerged as mechanisms of improvement sustainability [18]. Over time, the described key factors are not discrete, they will interact and interrelate dynamically while being part of ongoing cycles of reflection, planning and actions needed to make the QMS sustainable [28].

Identified key dimensions are not exclusively related to sustainability; they are described as a continuing and ongoing process that starts while the QMS is implemented [24,37,46]. In line with the complexity theory to model transitions to sustainability [50], the path towards sustainability starts with a profound preparation that is occurring concomitantly with the implementation processes [21,24,33]. The preparation phase transforms sustainability from a latent goal to a planned approach, as described by Shediac-Rizkallah et al. in 1998 [29]. Pluye et al. [33] called for a vision of sustainability that is much broader than just the last stage of a funded, phased approach. Defining the concept of sustainability

as a 'process' rather than an 'outcome', introduces a focus on a culture of learning, innovation and continuous development and adaptation [35,38]. In line with the definition of Moore et al. [4], we found that the ability to adapt and continuously improve healthcare quality has been recognised as an essential characteristic of sustainability. This finding can be related to the resilience that healthcare organisations need to adapt their QMS to overcome major challenges, such as during the COVID-19 pandemic [51]. As explained by Lennox et al. [2], this reflexive and adaptive character of sustainability is in paradox with the linear, static perspective on sustainability [14,42]. Fleiszer et al [39] described that the interaction between a "reflection-and-course-correction" strategy and QMS adaptations implicates that the QMS development "never finish". Moreover, in literature, the process of institutionalization, that is an essential component of sustainability originated in theories of organisational change [52], is mainly linked to inflexibility and adoption of QMS components in total [24]. Nevertheless, by emphasising adaptation strategies alongside institutionalization in our definition of sustainability makes the concept a dynamic one that addresses the continuous balance between meeting the changing needs of patients, professionals and the broader community [32] and enduring QMS components in practice. By adapting the QMS based on what values for key stakeholders and by engaging them to co-create in quality management, a broad support base for the QMS is ensured. With the emergence of co-creation in quality management [53,54], highlighting the participation of both stakeholders (patients and professionals) might foster the misconception that only professionals should be part of a sustainable QMS and strengthens the importance of involving all stakeholders from the inception towards sustainability.

In the current value-based quality paradigm [55], our definition of sustainability of QMS has far-reaching implications in practice settings. The definition can support healthcare organisations as an actionable guide for building a sustainable, organisation-wide QMS instead of continuously 'reinventing the wheel' with new guidelines and theories [37]. Where the review of Lennox et al. [2] stated that readers can determine which sustainability constructs may fit for their setting, we integrate the key dimensions of sustainability in one comprehensive definition with specified strategies and involved stakeholders. The complex setting of healthcare organisations require comprehensive strategies to involve stakeholders continuously across the organisation to achieve sustainable QMS organisation-wide. As described in our definition, healthcare organisations and their leaders have a responsibility and unique role in quality management in order to ensure continuous optimisation of healthcare delivery and improved patient and professional outcomes. The introduction of 'benefits for professionals' in the sustainability definition strengthens the aims of the Institute for Healthcare Improvement that evolved from Triple Aim to Quadruple Aim by adding 'care for the caregiver' [56]. Healthcare organisations can plan, monitor and evaluate the included sustainability factors over time

and measure whether sustainability is actually achieved. A recent review described that measuring sustainability is a complex issue, with the number of measures increasing and measurement quality variable [19]. 'Gold standards' for measuring sustainability may not be appropriate as there is a wide variability in different contexts of what should be sustained in their QMS [29]. Scheirer et al. [21] and Gruen at al. (2008) [28] suggested that the assessment of sustainability is a multifaceted process. Schalock et al. recommended a balanced approach to performance-based evaluation that incorporates both the perspective of patients and professionals and the organisation's growth, financial analyses and internal processes [34]. A dashboard showing temporal trends of sustainability measures can support healthcare organisations in their path towards sustainability [34,35] and creates the opportunity to compare the progress of sustainability elements within hospital-departments and between hospitals.

A main strength of our concept analysis is the comprehensive range of search terms covering sustainability in combination with backward citation tracking that reduced the number of relevant studies missed. The structured guideline of Walker and Avant was used to conduct a systematic, in-depth concept analysis [25] leading to the subdivision of prerequisites, essential components and consequences. The current concept analysis stimulates the expansion of knowledge and provides directions for future research. Despite being recommended in literature reviews, double data extraction was not possible due to time and resource constraint. This may have resulted in bias in inclusion or in missing articles being collected. Because of the recognition that sustainability determinants are not static, but may evolve over time [42], our theoretical model and strategies need to be evaluated by empirically testing, starting with a feasibility study of which the lessons learned can be used to design a multi-centre study on sustainability in QMS of healthcare organisations [27]. By doing so, ways of operationalising sustainability and prerequisites influencing it, can be compared and accumulated. Conceptually, the study results should be the research base for a logic model [21] focusing on measuring outcomes included in our definition. To measure the described prerequisites, essential components and consequences in practice settings, a comprehensive measurement instrument for sustainable QMS is needed that takes into account the flexible character of sustainability and allows growth in maturity of QMS in healthcare organisations. The instruments found in the recent review of Hall et al. can be a profound basis to develop a comprehensive instrument of sustainability [19].

Conclusion

This study systematically analysed the concept of sustainability in QMS by presenting its prerequisites, essential components and consequences. Sustainability of QMS in healthcare organisations is a multi-factorial concept consisting of four factors that interact dynamically over time: (1) the goals, (2) the resources, (3) the QMS and (4) the individuals. By integrating prerequisites, essential components and consequence in one holistic definition, we inform theory development concerning sustainable quality management in healthcare organisations. Over time, the described key factors are not discrete, they will interact and interrelate dynamically. It can be seen as a continuing process that begins while the QMS is implemented. The present study may provide a useful, comprehensive definition that improves communication between managers, healthcare professionals, policymakers and researchers and can used to facilitate quality management. Clearly, more research is required to further identify and compare observable dimensions of sustainability in QMS of healthcare organisations and to develop a comprehensive instrument to measure these in practice.

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Supplemental Material

Supplemental Material 1: Overview of included articles

Supplemental Material 2: Overview of definitions

Supplemental Material 1: Overview of included articles

Supplementary Table 7.1 Summary of included articles (n=18) from search strategy and backward citation tracking.

First author (publication year)	Journal	Country	Sustainability setting	Link with healthcare quality	Backward citation tracking (i.e. the process of obtaining and assessing the relevance of all records cited within the reference lists of a set of articles)
Hudson *et al.* (2013) [1]	BioMed Research International	USA	Concerning the level of continuation of healthcare programs and their institutionalization	This paper calls for a more limited use of sustainability that focuses on public health and well-being, rather than policies and programs and their survival. When used with health programs, the paper argues that sustainability should only be used as one of a range of evaluative criteria and their tradeoffs, including innovation, adaptability, responsiveness, equity, effectiveness, efficiency, and efficacy.	• M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311. • P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001.
Lega *et al.* (2013) [2]	Value Health	Italy	Sustainability of healthcare systems and organisations	Objective: presenting and discussing the streams of knowledge regarding how management can influence the quality and sustainability of health systems and organizations	No backward citation tracking.
Ramirez *et al.* (2013) [3]	Journal of Health Organization and	USA	Sustainability in healthcare organisations	This paper aims to examine the concept of sustainability in health care organizations and the key managerial	• T. Greenhalgh, F. MacFarlane, C. Barton-Sweeney, F. Woodard, "If we build it, will it stay?" A case study of the sustainability of whole-system change in London, Milbank Quarterly. 90 (2012) 516–547. https://doi.org/10.1111/j.1468-0009.2012.00673.x.

	Managem ent			competencies and change management strategies needed to implant a culture of sustainability	• B. Ramirez, R. Oetjen, D. Malvey, "Sustainability and the health care manager: part I", The Health Care Manager, (2011a) Vol. 30 No. 2, pp. 133-138. (NO FULL TEXT AVAILABLE) • B. Ramirez, R. Oetjen, D. Malvey, "Sustainability and the health care manager: part II", The Health Care Manager, (2011b) Vol. 30 No. 3, pp. 261-265. (NO FULL TEXT AVAILABLE)
Schell *et al.* (2013) [4]	Implement ation science	USA	Program sustainability in public health	Aims to achieving program goals and positively affect health	• M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • R.M. Goodman, A. Steckler, A model for the institutionalization of health promotion programs. Fam Community Health 1989, 11:63–78. (FULL TEXT NOT AVAILABLE) • J.A. Mancini, L.I. Marek, Sustaining Community-Based Programs for Families: Conceptualization and Measurement *, 2004. • P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001. • M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311. • M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. • C. Evashwick, M. Ory, Organizational Characteristics of Successful Innovative Health Care Programs Sustained Over Time, 2003. • P. Pluye, L. Potvin, J.L. Denis, J. Pelletier, C. Mannoni, Program sustainability begins with the first events, Eval Program Plann. 28 (2005) 123–137. https://doi.org/10.1016/j.evalprogplan.2004.10.003. • S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17.

Fleiszer _et al._ (2015) [5]	BMC Health Services Research	Canada	Sustainability of a nursing best practice guidelines	The guidelines aims to ensure high quality practice at the frontline	• M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • R.L. Gruen, J.H. Elliott, M.L. Nolan, P.D. Lawton, A. Parkhill, C.J. McLaren, J.N. Lavis, Sustainability science: an integrated approach for health-programme planning, The Lancet. 372 (2008) 1579–1589. https://doi.org/10.1016/S0140-6736(08)61659-1. • D. Buchanan, L. Fitzgerald, D. Ketley, R. Gollop, J.L. Jones, S. Saint Lamont, A. Neath, E. Whitby, No going back: A review of the literature on sustaining organizational change, International Journal of Management Reviews. 7 (2005) 189–205. https://doi.org/10.1111/j.1468-2370.2005.00111.x. • M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. • T. Greenhalgh, F. MacFarlane, C. Barton-Sweeney, F. Woodard, "If we build it, will it stay?" A case study of the sustainability of whole-system change in London, Milbank Quarterly. 90 (2012) 516–547. https://doi.org/10.1111/j.1468-0009.2012.00673.x. • A.R. Fleiszer, S.E. Semenic, J.A. Ritchie, M.C. Richer, J.L. Denis, A unit-level perspective on the long-term sustainability of a nursing best practice guidelines program: An embedded multiple case study, Int J Nurs Stud. 53 (2016) 204–218. https://doi.org/10.1016/j.ijnurstu.2015.09.004. • M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311.

Fleiszer et al. (2016) [6]	International Journal of Nursing Studies	Canada	Sustainability of a nursing best practice guideline program	Best practice guidelines are a tool for narrowing research-to-practice gaps and improving care outcomes	• M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • R.L. Gruen, J.H. Elliott, M.L. Nolan, P.D. Lawton, A. Parkhill, C.J. McLaren, J.N. Lavis, Sustainability science: an integrated approach for health-programme planning, The Lancet. 372 (2008) 1579–1589. https://doi.org/10.1016/S0140-6736(08)61659-1. • M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. • D. Buchanan, L. Fitzgerald, D. Ketley, R. Gollop, J.L. Jones, S. Saint Lamont, A. Neath, E. Whitby, No going back: A review of the literature on sustaining organizational change, International Journal of Management Reviews. 7 (2005) 189–205. https://doi.org/10.1111/j.1468-2370.2005.00111.x. • D. Buchanan, L. Fitzgerald, D. Ketley, 2007. The Sustainability and Spread of Organizational Change: Modernizing Healthcare. Routledge, London, UK. (FULL TEXT NOT AVAILABLE) • T. Greenhalgh, F. MacFarlane, C. Barton-Sweeney, F. Woodard, "If we build it, will it stay?" A case study of the sustainability of whole-system change in London, Milbank Quarterly. 90 (2012) 516–547. https://doi.org/10.1111/j.1468-0009.2012.00673.x.
Francis et al. (2016) [7]	BMJ Open	Australia	The sustainability of chronic disease health programs empirically measured in hospital and related	In this paper, sustainability of chronic disease health programmes focuses on programme processes as opposed to health outcomes	• P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001. • M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • M.A. Scheirer, G. Hartling, D. Hagerman, Defining sustainability outcomes of health programs: Illustrations from an on-line survey,

| | | | healthcare services | | Eval Program Plann. 31 (2008) 335–346. https://doi.org/10.1016/j.evalprogplan.2008.08.004.

• M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311.

• T. Greenhalgh, F. MacFarlane, C. Barton-Sweeney, F. Woodard, "If we build it, will it stay?" A case study of the sustainability of whole-system change in London, Milbank Quarterly. 90 (2012) 516–547. https://doi.org/10.1111/j.1468-0009.2012.00673.x.

• R.L. Gruen, J.H. Elliott, M.L. Nolan, P.D. Lawton, A. Parkhill, C.J. McLaren, J.N. Lavis, Sustainability science: an integrated approach for health-programme planning, The Lancet. 372 (2008) 1579–1589. https://doi.org/10.1016/S0140-6736(08)61659-1.

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• M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. |

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Pronovost *et al.* (2016) [8]	The Joint Commission Journal on Quality and Patient Safety	USA	Sustaining performance of accountability measures at The Johns Hopkins Hospital	The initiative methods enabled the transition of quality improvement from an isolated project to a way of leading an organization	• S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17.
Ament *et al.* (2017) [9]	Journal of Evaluation in Clinical Practice	The Netherlands	The sustainability of a quality improvement program in Maastricht University medical centre	The more general aim of this study was to explore factors related to sustainability of quality improvements in health care	• S.M.C. Ament, F. Gillissen, J.M.C. Maessen, C.D. Dirksen, T. Van Der Weijden, M.F. Von Meyenfeldt, Sustainability of healthcare innovations (SUSHI): Long term effects of two implemented surgical care programmes (protocol), BMC Health Serv Res. 12 (2012). https://doi.org/10.1186/1472-6963-12-423. • D.A. Forster, M. Newton, H.L. McLachlan, K. Willis, Exploring implementation and sustainability of models of care: Can theory help?, BMC Public Health. 11 (2011). https://doi.org/10.1186/1471-2458-11-S5-S8. • R.L. Gruen, J.H. Elliott, M.L. Nolan, P.D. Lawton, A. Parkhill, C.J. McLaren, J.N. Lavis, Sustainability science: an integrated approach for health-programme planning, The Lancet. 372 (2008) 1579–1589. https://doi.org/10.1016/S0140-6736(08)61659-1. • M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. • M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and

					future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311.
Moore _et al._ (2017) [10]	Implementation Science	Canada	Definitions of the sustained implementation of evidence in the same setting, not on the scale-up or spread of evidence implementation to different settings	Focus on how to sustain program (or the clinical intervention) delivery, implementation strategies, and outcomes	• S.M.C. Ament, J.J.A. De Groot, J.M.C. Maessen, C.D. Dirksen, T. Van Der Weijden, J. Kleijnen, Sustainability of professionals' adherence to clinical practice guidelines in medical care: A systematic review, BMJ Open. 5 (2015). https://doi.org/10.1136/bmjopen-2015-008073. • S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • R.L. Gruen, J.H. Elliott, M.L. Nolan, P.D. Lawton, A. Parkhill, C.J. McLaren, J.N. Lavis, Sustainability science: an integrated approach for health-programme planning, The Lancet. 372 (2008) 1579–1589. https://doi.org/10.1016/S0140-6736(08)61659-1.
Flynn _et al._ (2018) [11]	Systematic reviews	Canada	The sustainability of Lean, which is defined as a quality improvement program, implemented in healthcare organizations	Lean is defined as a quality improvement management system	• S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • J.E. Moore, A. Mascarenhas, J. Bain, S.E. Straus, Developing a comprehensive definition of sustainability, Implementation Science. 12 (2017). https://doi.org/10.1186/s13012-017-0637-1. • P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001.
Lennox _et al._ (2018) [12]	Implementation Science	United Kingdom	Sustainability in healthcare	Approaches to guide healthcare teams and researchers in sustainability of healthcare improvement	• S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17.

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McCreight *et al.* (2019) [13]	Translational Behavioral Medicine	USA	Sustainability of health service programs	Draws on a model developed by the Institute for Healthcare Improvement.	No backward citation tracking.
Oosterveld-Vlug *et al.* (2019) [14]	Implementation Science	The Netherlands	Long-term care facilities	Focus on an intervention for staff to improve palliative care in long-term care facilities	No backward citation tracking.
Braithwaite *et al.* (2020) [15]	BMJ Open	Australia	Sustainability of healthcare system improvements, programs and interventions	Objective: We aimed to describe theoretical frameworks, definitions and measures of sustainability, as applied in published evaluations of healthcare improvement programs and interventions	• S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17 • M.A. Scheirer, Is sustainability possible? A review and commentary on empirical studies of program sustainability, American Journal of Evaluation. 26 (2005) 320–347. https://doi.org/10.1177/1098214005278752. • M.C. Shediac-Rizkallah, L.R. Bone, Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy, 1998. https://academic.oup.com/her/article/13/1/87/607311. • M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • J.E. Moore, A. Mascarenhas, J. Bain, S.E. Straus, Developing a comprehensive definition of sustainability, Implementation Science. 12 (2017). https://doi.org/10.1186/s13012-017-0637-1. • L. Lennox, L. Maher, J. Reed, Navigating the sustainability landscape: A systematic review of sustainability approaches in healthcare, Implementation Science. 13 (2018) 1–17. https://doi.org/10.1186/s13012-017-0707-4. • P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001.

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Flynn *et al.* (2020) [16]	Journal of Nursing Scholarship	Canada	The sustainability of one large-scale quality management initiative (Lean) in pediatric health care	The aim was to evaluate a large-scale quality improvement initiative (Lean)	• S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • J.E. Moore, A. Mascarenhas, J. Bain, S.E. Straus, Developing a comprehensive definition of sustainability, Implementation Science. 12 (2017). https://doi.org/10.1186/s13012-017-0637-1. • P. Pluye, L. Potvin, J.L. Denis, Making public health programs last: Conceptualizing sustainability, Eval Program Plann. 27 (2004) 121–133. https://doi.org/10.1016/j.evalprogplan.2004.01.001 • L. Lennox, L. Maher, J. Reed, Navigating the sustainability landscape: A systematic review of sustainability approaches in healthcare, Implementation Science. 13 (2018) 1–17. https://doi.org/10.1186/s13012-017-0707-4.
Shelton *et al.* (2020) [17]	Frontiers in Public Health	USA	The long-term sustainability of evidence-based programs in communities and care organisations	RE-AIM can be used as a tool to complement existing quality improvement (QI) and performance management resources	• M.A. Scheirer, J.W. Dearing, An Agenda for Research on the Sustainability of Public Health Programs, 2011. • S. Wiltsey Stirman, J. Kimberly, N. Cook, A. Calloway, F. Castro, M. Charns, The sustainability of new programs and innovations: A review of the empirical literature and recommendations for future research, Implementation Science. 7 (2012) 17. https://doi.org/10.1186/1748-5908-7-17. • J.E. Moore, A. Mascarenhas, J. Bain, S.E. Straus, Developing a comprehensive definition of sustainability, Implementation Science. 12 (2017). https://doi.org/10.1186/s13012-017-0637-1.

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Bode *et al.* (2022) [18]	International Journal of Environmental Research and Public Health	Germany	Sustainability in quality improvement processes in a hospital setting	Focus on a change in practice quality improvement	No backward citation tracking.

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Supplemental Material 2: Overview of definitions

Supplementary Table 7.2 Overview of original definitions of sustainability.

Author (Year)	Definitions
Shediac-Rizkallah *et al.* (1998) [1]	A framework for conceptualizing program sustainability, listing three major groups of factors as potential influences on sustainability, derived from our review of the available sustainability literature: (1) Project design and implementation factors; (2) Factors within the organizational setting; (3) Factors in the broader community environment. The three categories of definitions reviewed above provide three sharply different perspectives on sustainability. These are: (1) Maintaining health benefits achieved through the initial program; (2) Continuation of the program activities within an organizational structure; (3) Building the capacity of the recipient community.
Evashwick and Ory (2003) [2]	This study resulted in practical lessons learned about sustaining and evolving community-based health care programs for older adults. (1) Project design and implementation: Types of services and training activities, Duration, Community Involvement, Project Effectiveness, Financing. (2) Factors within organizational setting: Institutional Strength, Governing or advisory board, University Involvement, Project Staff, Integration with existing program, Leadership. (3) Factors in the Broader Community Environment: General environment, Level of community participation, Relationships with other organizations in the community, Community marketing techniques.
Mancini *et al.* (2004) [3]	(1) Sustainability is the capacity of programs to continuously respond to community issues. A sustained program maintains a focus consonant with its original goals and objectives, including the individuals, families, and communities it was originally intended to serve. (2) Our framework contains seven major elements of sustainability: leadership competence, effective collaboration, understanding the community, demonstrating program results, strategic funding, staff involvement and integration, and program responsivity.
Pluye *et al.* (2004) [4]	(1) This article proposes a theoretical representation of two sustainability processes, namely routinization or standardization, and three degrees of program sustainability: non-routinized activities, routines, or standardized routines.

	(2) The literature on organizations defines two relevant social structures, one organizational (routines), and one institutional (standards). This in turn suggests three degrees of sustainability. We then emphasize how sustainability is concomitant with the implementation process, by exploring events that characterize these processes.
Buchanan *et al.* (2005) [5]	(1) The sustainability of change can be defined broadly as the process through which new working methods, performance goals and improvement trajectories are maintained for a period appropriate to a given context. (2) Sustainability is when new ways of working and improved outcomes become the norm. Not only have the process and outcome changed, but the thinking and attitudes behind them are fundamentally altered and the systems surrounding them are transformed in support. (3) This review suggests that sustainability is dependent on multiple factors, at different levels of analysis: substantial, individual, managerial, financial, leadership, organizational, cultural, political, processual, contextual and temporal. The relative significance of those factors cannot be determined a priori, raising questions concerning the properties of the sustainability process with regard to different types of change in different contexts.
Pluye *et al.* (2005) [6]	(1) Specific routinization events: 1. Resource stabilization 2. Risk-taking (2) Joint routinization and implementation events 1. Incentives 2. Adaptation of activities 3. Objectives fit 4. Transparent communication 5. Sharing cultural artifacts 6. Integration of rules
Scheirer *et al.* (2005) [7]	(1) Sustainability (or discontinuation): the program components developed and implemented in earlier stages are (or are not) maintained after the initial funding or other impetus is removed. This review focused on three definitional measures of sustainability: (a) continuing to deliver beneficial services (outcomes) to clients (an individual level of analysis); (b) maintaining the program and/or its activities in an identifiable form, even if modified (an organizational level of analysis);

	(c) maintaining the capacity of a community to deliver program activities after an initial program created a community coalition or similar structure (community level of analysis).
Scheirer *et al.* (2008) [8]	We found that large percentages of respondents reported positively to each of four types of sustainability measures: (1) maintaining program activities; (2) continuing to serve substantial numbers of clients; (3) building and sustaining collaborative structures; (4) maintaining attention to the ideas underlying the projects by disseminating them to others.
Gruen *et al.* (2008) [9]	On the basis of the review, we propose that sustainable health programmes are regarded as complex systems that encompass programmes, health problems targeted by programmes, and programmes' drivers or key stakeholders all of which interact dynamically within any given context.
Forster *et al.* (2011) [10]	They used the Normalisation Process Model to define their results in terms of sustainability: (1) Interactional workability; (2) Relational integration; (3) Skill set workability; (4) Contextual integration.
Scheirer *et al.* (2011) [11]	Sustainability is the continued use of program components and activities for the continued achievement of desirable program and population outcomes.
Ament *et al.* (2012) [12]	Sustainability is generally seen as a dynamic process of continuous improvement. In the current study we use the following definition: "Sustainability of change exists when a newly implemented innovation continues to deliver the achieved benefits over a longer period of time, certainly does not return to the usual processes and becomes 'the way things are done around here', until a better innovation comes along, even after the implementation project is no longer actively carried out" (This definition is based on two references: 1. NHS: Sustainability and its relationship with spread and adoption, General improvement skills. Coventry, UK: Improvement NIfIa ed; 2007. 2. Shediac-Rizkallah MC, Bone LR: Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. Health Educ Res 1998, 13:87–108.)
Greenhalgh *et al.* (2012) [13]	In particular, against a background of continuous change in the local health system, the sustainability of the original vision and capacity for quality improvement was strongly influenced by: (1) stakeholders' conflicting and changing interpretations of the targeted health need; (2) changes in how the quality cycle was implemented and monitored; (3) conflicts in stakeholders' values and what each stood to gain or lose.

Wiltsey Stirman *et al.* (2012) [14]	A program or intervention may be considered to be sustained at a given point in time if, after initial implementation support has been withdrawn, core elements are maintained (e.g., remain recognizable or delivered at a sufficient level of fidelity or intensity to yield desired health outcomes) and adequate capacity for continuation of these elements is maintained.
Lega *et al.* (2013) [15]	Sustainability is defined as maintaining quality and service coverage at an affordable cost.
Schell *et al.* (2013) [16]	The concept-mapping process identified nine core domains that affect a program's capacity for sustainability: (1) Political Support, (2) Funding Stability, (3) Partnerships, (4) Organizational Capacity, (5) Program Evaluation, (6) Program Adaptation, (7) Communications, (8) Public Health Impacts, (9) Strategic Planning.
Calhoun *et al.* (2014) [17]	We define sustainability capacity as the ability to maintain programming and its benefits over time. Building this capacity involves developing structures and processes that allow a program to leverage resources to effectively implement evidence-based policies and activities. As a result of increased sustainability capacity in specific organizational and contextual factors, programs can perform more efficiently and improve their ability to maintain efforts over the long term.
Cramm and Nieboer (2014) [18]	Our study demonstrated that effectively improving the quality of care delivery during both the first and second year after program implementation predicted the sustainability of these programs. These findings are interesting, especially in light of the persistence of major problems in the sustainability of quality improvement in other programs with the same aim.
Luke *et al.* (2014) [19]	The pilot PSAT had 63 items and 9 sustainability domain subscales: (1) Political Support [now called Environmental Support] (5 items), (2) Funding Stability (7 items), (3) Partnerships (9 items), (4) Organizational Capacity (11 items), (5) Program Evaluation (5 items), (6) Program Adaptation (7 items), (7) Communications (7 items), (8) Public Health Impacts (6 items),

	(9) Strategic Planning (6 items). Each item assessed an element that was found to be related to sustainability by the literature review and concept mapping processes. Respondents assessed the degree to which each element was present in their program by using a Likert scale with anchors of 1 ("Little or no extent") to 7 ("A very great extent").
Persaud *et al.* (2014) [20]	Given these multiple perceptions of sustainability, a sustainable health care organization can be defined as one that efficiently achieves its strategic goals while providing effective, equitable, evidence-informed, high-quality health services in a manner that allows for continuous adaptation to the environmental and co-evolution with it.
Ament *et al.* (2015) [21]	Sustainability was described as "Sustainability of change exists when a newly implemented innovation continues to deliver the benefits achieved over a longer period of time, certainly does not return to the usual processes and becomes 'the way things are done around here', even after the implementation project is no longer actively carried out, until a better innovation comes along". (This definition is based on two references: 1. NHS: Sustainability and its relationship with spread and adoption, General improvement skills. Conventry, UK: Improvement NIfIaed; 2007. 2. Ament SM, Gillissen F, Maessen JM, et al. Sustainability of healthcare innovations (SUSHI): long term effects of two implemented surgical care programmes (protocol). BMC Health Serv Res 2012;12:423.)
Fleiszer *et al.* (2016) [22]	The framework proposed three characteristics of sustainability (i.e., benefits, institutionalization, and development), influences from four categories of factors (i.e., innovation, context, leadership, and process), and relationships between characteristics and factors.
Fleiszer *et al.* (2016) [23]	Program sustainability was characterized by three elements: benefits, routinization, and development. Seven key factors most accounted for the differences in the level of program sustainability between subcases. These factors were: (1) perceptions of advantages, (2) collaboration, (3) accountability, (4) staffing, (5) linked levels of leadership, (6) attributes of formal unit leadership, (7) leaders' use of sustainability activities.
Francis *et al.* (2016) [24]	In this review, a sustainability outcome was defined as the long-term survival of programme activities: health benefits or continued capacity of organisations to deliver and adapt programme activities. (This definition is based on the next reference: Shediac-Rizkallah MC, Bone LR: Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. Health Educ Res 1998, 13:87–108.)

Schalock *et al.* (2016) [25]	Sustainability is defined as adapting successfully to change and providing a range of valued service delivery opportunities and practices in an effective and efficient manner.
	
	Three set of literature-based factors (which we refer to as 'drivers') accomplish this goal:
	
	(1) accountability drivers:
	
	    - effectiveness: the degree to which an organization's intended results are achieved from the perspective of the customer and the organization's growth.
	
	    - efficiency: the degree to which the organization produces its planned results from the perspective of its financial analyses and internal processes.
	
	(2) leadership drivers:
	
	    - transformational leadership: communicating a shared vision, mentoring and directing, coaching and instructing, inspiring and empowering, and collaborating and partnering.
	
	    - strategic execution: demonstrating highly visible and maintained support of the change/ transformation, communicating progress to all stakeholders, and considering the adoption of the change/transformation as a top organization priority.
	
	(3) organization drivers:
	
	    - high performance teams: horizontally structured work groups who focus on teamwork, synergy, raising the performance bar, "us" accountability, and promoting a learning culture. Such teams are characterized by being involved, informed, organized, accountable, and empowered.
	
	    - continuous quality improvement: an integrative, sequential, participative, and continuous process that is based on best practices and whose primary purpose is to enhance an organization's effectiveness, efficiency, and sustainability from a multiple, performance-based perspective.

Ament *et al.* (2017) [26]	Respondents mentioned the following factors associated with sustainability of the programs: (1) modification and adaptability of the program, (2) cost-effectiveness, (3) institutionalization into existing systems, (4) short communication lines within the multidisciplinary team, (5) an innovative culture, (6) benefits for patients, (7) cosmopolitanism, (8) the existence of external policies and incentives, (9) trust and belief in the program, (10) spread of the program to other settings. Sustainability of change exists when a newly implemented innovation continues to deliver the achieved benefits over a longer period of time, certainly does not return to the usual processes and becomes "the way things are done around here", until a better innovation comes along, even after the implementation project is no longer actively carried out. (This definition is based on two references:

	1. Ament SM, Gillissen F, Maessen JM, Dirksen CD, van der Weijden T, von Meyenfeldt MF. Sustainability of healthcare innovations (SUSHI): long term effects of two implemented surgical care programmes (protocol). BMC Health Serv Res. 2012;12:423 PubMed PMID: 23174024. Pubmed Central PMCID: PMC3545846. Epub 2012/11/24. Eng)
Moore *et al.* (2017) [27]	We reviewed all constructs and created a revised definition: (1) after a defined period of time; (2) the program, clinical intervention, and/or implementation strategies continue to be delivered and/or; (3) individual behaviour change (i.e., clinician, patient) is maintained; (4) the program and individual behaviour change may evolve or adapt while (5) continuing to produce benefits for individuals/systems.
Flynn *et al.* (2018) [28]	Five Context-Mechanism-Outcomes hypotheses from our initial program theory were substantially supported after synthesis: (1) "sense-making and value congruency', (2) "staff engagement and empowerment", (3) the "ripple effect" or causal pathway between Lean implementation outcomes that served as facilitating or hindering contexts for sustainability.
Lennox *et al.* (2018) [29]	Multiple definitions were found across approaches, but 5 distinct definitions for sustainability were identified: (1) Continued programme activities, e.g. 'The ability of activities to continue appropriate to the local context after withdrawal of external funding'. (2) Continued health benefits, e.g. 'Sustainability is the ability to sustain population health outcomes.' (3) Capacity built, e.g. 'our conceptualization of sustainability was on the inter-organizational relationships that might serve as a basis of the collaborative problem-solving capacity'. (4) Further development (adaptation), e.g. 'Adapting successfully to change and providing a range of valued service delivery opportunities and practices in an effective and efficient manner'. (5) Recovering costs, e.g. 'It is the ability of an organization to produce outputs of sufficient value so that it acquires enough inputs to continue production at a steady or growing rate'. Six constructs were included in over 75% of the approaches: (1) 'General resources' (90%), (2) 'Demonstrating effectiveness' (89%), (3) 'Monitoring progress over time' (84%), (4) 'Stakeholder participation' (79%), (5) 'Integration with existing programs and policies' (79%), (6) 'Training and capacity building' (76%).

McCreight *et al.* (2019) [30]	Our initial impressions are that Implementation and Sustainability Infrastructure appears to be of key importance when considering contextual factors to plan, evaluate, and disseminate programs. We offer the following crosscutting lessons learned for researchers and program planners based on our experience with PRISM. These activities may contribute to improved program implementation success: (1) Engage stakeholders from multiple perspectives (recipients and organizational leaders) at multiple phases of program development. (2) Observe results and adjust processes accordingly. (3) Adapt the intervention to one's local context to ensure fit of intervention components and implementation strategies.
Shelton *et al.* (2020) [31]	For this paper, we used the term "sustainability" to refer to both the desired outcome and the characteristics or processes by which it is more likely maintained.

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Chapter 8

Cornerstones of a sustainable national quality policy: A qualitative study based on international expert opinions

Cornerstones of a sustainable national quality policy: A qualitative study based on international expert opinions

Abstract

Background: National initiatives launched to improve the quality of care have grown exponentially over the last decade. Public reporting, accreditation and governmental inspection form the basis for quality in Flemish (Belgian) hospitals. Due to the lack of evidence for these national initiatives and the questions concerning their sustainability, our research aims to identify cornerstones of a sustainable national quality policy for acute-care hospitals based on international expert opinion.

Methods: A qualitative study was conducted using in-depth semi-structured interviews with 12 renowned international quality and patient safety experts selected by purposive sampling. Interviews focused on participants' perspectives and their recommendations for a future, sustainable quality policy. Inductive analysis was carried out with themes being generated from the data using the constant comparison method.

Results: Three major and five minor themes were identified and integrated into a framework as a basis for national quality policies. Quality culture, minimum requirements for quality education and quality control as well as continuous learning and improvement act as cornerstones of this framework.

Conclusion: Complementary to the current national policy, this study demonstrated the need for profound attention to quality cultures in acute-care hospitals. Policymakers need to provide a control system and minimum requirements for quality education of all healthcare workers. A model for continuous learning and improvement with data feedback loops has to be installed in each hospital to obtain a sustainable quality system. This framework can inspire policymakers to further develop bottom-up initiatives in co-governance with all relevant stakeholders adapted to individual hospitals' context.

Introduction

Patient safety and healthcare quality are public health issues that are receiving increasing attention globally [1,2]. Different national quality policies illustrate the various ways in which a government can contribute to improvements in the quality and safety of healthcare [3–5]. These national initiatives, launched to improve the quality of care, have grown exponentially over the last decade. Discussions about the role of the government in quality improvement are a contemporary topic [6,7]. Nowadays, governments, who are not directly delivering care to patients, will routinely measure the performance and quality of this care. Besides, different healthcare providers and healthcare institutions get the feeling that quality is imposed on them and are less motivated to create their own bottom-up quality system [8,9]. This might be detrimental to patient safety, as a recent review has demonstrated that healthcare professionals' contribution to quality can lead to improved patient safety [10].

In Flanders, Belgium, a coalition government agreement was established in 2009 as the basis for quality in acute-care hospitals [11]. This agreement introduced a 'Quality of Care Triad' consisting of three main components: voluntary hospital-wide accreditation by an international external agency, voluntary measurement and public reporting of quality indicators as well as mandatory inspection by the government with an announced and unannounced part. Since 2016, acute-care hospitals in Flanders demonstrated increased effort into these triad components [12]. However, a recent review has shown the lack of evidence for all three 'Quality of Care Triad' components [13]. Furthermore, hospitals and healthcare stakeholders are critical about the sustainability of today's quality policies and voices are rising worldwide for a new approach for future quality of care initiatives [14]. Already various European hospitals announced to stop renewing their accreditation label every three or four years [15–17].

Several countries are reflecting on the future direction of their national strategy for quality in hospitals. The views of international experts in the field of quality and patient safety management can inspire policymakers and health services researchers on how to face the current challenges and to regain healthcare stakeholders' commitment to quality [18]. In this research, we aimed to identify common cornerstones of a future sustainable national quality policy for acute-care hospitals, based on international expert opinion.

Methods

Study design and sample

We conducted in-depth semi-structured interviews with international quality and patient safety experts to identify recommendations for a future quality policy. As recommended by Pope in 2000, we explored the data inductively using content analysis to generate categories and explanations [19]. The participants were purposely selected based on their experiences and expertise in quality and safety policy. Participants included chief executive officers, directors of quality institutes and academics, all of whom had a key leadership position and international experience (Table 8.1). The experts had to be fluent in English or Dutch. To obtain a heterogeneous sample of participants with a wide range of experiences, we used a variety of demographic and geographic characteristics during the sampling process. A structured screening of international quality organisations and quality research groups was performed to obtain an overview of all relevant international healthcare quality experts. The experts were invited to participate in the study by email. After indicating their interest in participating, they were sent information consisting of detailed, explanatory notes about the three components of a quality triad (accreditation, inspection and public reporting). These components form the basis for many healthcare quality systems worldwide as a recent narrative review evaluated [13]. Participants were asked to express their opinion on what elements were lacking or superfluous in this example policy. The purpose of the interview and the focus on these components were clear for the participants. The voluntary nature of their participation was emphasized.

Data collection

The interviews were conducted by video call using Skype or Zoom by three researchers (JB, FC, AVW) between February and May 2020. The interviewers were unbiased as they had no previous experience with formulating a national quality policy. Nine interviews were carried out in English, three interviews in Dutch. A semi-structured interview guide was used to focus on gathering participants' perspectives on a quality triad and recommendations for a future national policy (Supplemental Material 1). By asking open-ended questions, the researchers invited them to tell more about their experiences for a sustainable quality policy. The mean duration of the interviews was 50 minutes. During monthly briefings between the researchers there was consensus that inductive thematic saturation was obtained after ten interviews, as no new themes emerged [20]. All interviews were independently recorded and transcribed verbatim by two researchers (JB and FC).

Data-analysis

After reaching data saturation, the three researchers moved from the data collection phase to the data analysis. Field notes were taken from each interview. Two researchers independently (JB and FC) read the interviews multiple times to identify and understand the experts' recommendations and the underlying motivations for these recommendations. Using the constant comparison method, they gradually developed and refined insights into the cornerstones of a sustainable national quality policy [21]. Open coding was used to derive themes inductively based on the respondents' own words. This open coding process consisted of two steps. In the first step, paper and pencil were used to develop a list of meaningful themes. In the second step, the actual coding process took place with transcripts imported into NVivo 12, a software program for analyzing qualitative data. The researchers repeated this process on a regular basis, individually and as a team, increasing the level of abstraction of the themes. With the third interviewer (AVW), the preliminary results and key themes were reflected and discussed at regular intervals. This cyclical approach, the iterative process and the research team discussions enabled us to identify and understand the preliminary recommendations across the experiences. The methodological process was supervised by an experienced researcher in qualitative research (EMC). Finally, the three interviewers, the qualitative researcher and two senior academic experts (KV and DDR) formulated on a conceptual level a description of the recommendations for a sustainable hospital quality. This description was finally discussed and validated within the research team including all authors.

Methodological quality

To enhance the quality of this study, we used data source and investigator triangulation [22]. International quality and patient safety experts from nine different countries are included. At regular intervals (n = 7), peer review was conducted with an expert in qualitative research (EMC) and the senior experts (KV and DDR). The research team consisted of eight experienced researchers, each with a different academic and clinical background: five health services researchers (four men and one woman, with nursing, medical or allied health professional background, all with PhD degree and with experience in healthcare quality) and three junior researchers (two women and one man; a nurse, a pharmacist and a physician, all PhD Candidates) with clinical experience. Everyone had previous experience with qualitative research. Two of them are full/associate professors (one is an expert in healthcare quality and the other is a clinician and head of the quality department in a university hospital) with more than 20 years of experience in creating policy recommendations. Regular critical self-reflection and discussions in a team about a sustainable national quality policy helped to foster an open attitude to listen to and interpret the recommendations of the participants. There was no

relationship established between the interviewers and the participants prior to study commencement. Before the interview started, the interviewers introduced themselves and explained the goal of the interview and described the research projects they are working on. Verbatim manuscripts were verified by another member of the research team for accuracy of language with the video or audio recording.

Ethical considerations

Consent was obtained from all participants and detailed information about the study was provided. Permission for audio or video recording was asked before starting the interview. We assured their anonymity and all data were treated confidentially. This research protocol was approved in 2019 by the Doctoral Committee of KU Leuven and is in accordance with scientific guidelines.

Results

Study participants

The participants of this study (n = 12) were all healthcare leaders and renowned for their international expertise in health policy and quality of care (Table 8.1). On the one hand, six participants represented international organisations of healthcare policy, such as the International Society for Quality in Health Care (ISQUA), Organization for Economic Co-operation and Development (OECD), European Health Management Association (EHMA), Institute for Healthcare Improvement (IHI) and World Health Organization (WHO). On the other hand, six participants were chosen for their expertise in health policy and quality of care leadership in The Netherlands, Sweden, Italy, Denmark and Australia. One interview was a dual interview.

Table 8.1 Characteristics of the participants (n = 12).

Country	Title	Context	Role description
The Netherlands	Professor	University, hospital	Medical doctor and strategic lead of a quality and patient safety board giving advice about the quality of care at national level.
France	Professor	Policymaker	Medical doctor, researcher in quality of care of health services and systems and strategic lead of a quality and patient safety program at global public health level.
Ireland	Chief Executive Officer	International organisation	Medical doctor, part of the leadership and quality programme to develop clinical leaders in quality improvement at national level and policy role in public health.
Sweden	Chief Executive Officer	Policymaker	Strategic lead of a learning and innovation program, Regional Improvement Authority.
Italy	Professor	University, hospital	Professor in public health policy, coordinator of national and international research programs and research projects about quality of care.
Denmark	Chief Executive Officer	Policymaker	Medical doctor, strategic lead of a quality improvement program, executive leadership position in several healthcare regions.
Italy	Professor	International organisation	Research about healthcare management, health administration and policy, strategic lead of a European management association.
Australia	Professor	University	Program lead within a national institute of health innovation, strategic lead on healthcare resilience and implementation science and policy at national level.
USA	Professor	University, hospital	Medical doctor, strategic lead of a centre for research about patient safety, program lead for research on patient safety and policy and public health on global level.
The Netherlands	Professor	University, hospital	Research about patient safety, strategic lead at a research institute about quality and organisation of health care, policy at national level.
United Kingdom	Vice president	International organisation	Strategic lead of key senior relationships and design and implementation of large-scale health system improvement efforts and networks globally, policy role in the EU and at global level.
Scotland	Senior Director	International organisation	Strategic lead of improvement collaboratives and policy at national and European level.

Three major themes were identified during the interviews with subsequent minor themes as cornerstones for a sustainable national quality policy (Figure 8.1). The first and overarching theme represents the 'quality culture' in hospitals. The second theme specifies the minimum requirements for governments to establish a sustainable, national quality policy and consists of quality education and quality control. The third major theme provides a way to continuous learning and improvement with minor themes as 'clinical collaboratives', 'integrated care systems', 'data infrastructure', 'indicators' and 'feedback'. These themes are all analysed using supporting evidence from the data.
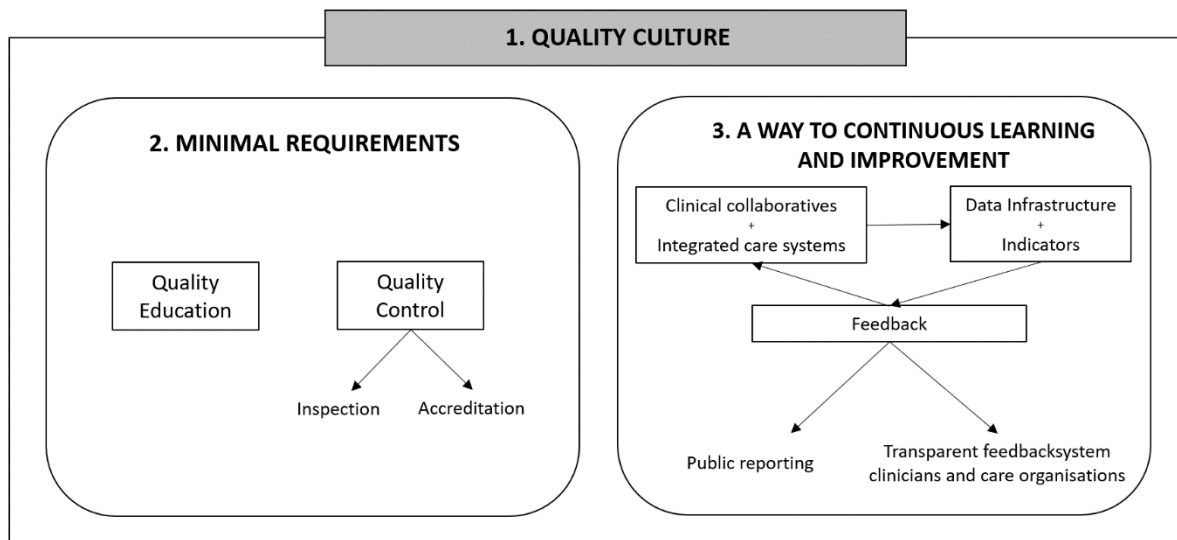
Figure 8.1 Framework with cornerstones for a sustainable, national quality policy.

1. *Quality Culture*

Participants indicated that quality of care has to become a part of the institution's culture so that it is embraced by all healthcare workers, hospital managers and patients. It should be part of the organisational development of the hospital. By giving ownership to healthcare workers and by not giving the feeling that it is imposed on them, policymakers can let this culture for quality evolve from 'bedroom to boardroom' within an organisation. Many of the experts emphasized the need to create an environment where quality of care can become sustainably incorporated into the daily workflow. Bottom-up goals coming from healthcare workers themselves are an opportunity to create an environment where people want to incorporate quality themselves. As one of the participants said:

> *"You want to give the ownership to the healthcare workers, because they have to feel it is their own system. How do you make it sustainable from that perspective? It is the responsibility of clinical leaders to empower their own collaborators and make them feel that it is not imposed. It is part of the strategic cycle they want to develop. Like clinicians say, for the next three years*

we are going to have an ambitious goal, and we are going to use the quality system to do this. They have to use it as their own system to manage the department units. If that doesn't happen, if they are just reporting because they need to report, then you are not there." (Participant 1)

"Quality is sustainable at the moment you have a good fundament and that you have a basis for what is included in the accreditation, that you have a quality policy, that you have properly defined moments of the primary process and that you have indicators. So, just go to the basics and that can be per department and then built up. Start as low as possible in the organisation and then refine or aggregate toward the top, whether or not with a dashboard, whether that can be a part and whether it is not too much of a reflection in a learning cycle, you could keep that sustainable" (Participant 2)

Furthermore, hospital and healthcare leadership can also play an important role in endorsing quality improvement initiatives. Healthcare employee's behaviour is guided by the decisions their management make. So, if there is room to implement quality improvement initiatives, a sustainable culture of improvement can grow:

"A lot of behavior is driven by having a culture of quality improvement, but also by having a capacity for quality improvement. It is okay to give just messages, but if people don't really know how to do it, they are not getting permission to improve quality improvement at local level. Then they are not going to do it. (…) I think that those messages from a leadership perspective are so important to drive quality." (Participant 3)

"It is about people. It is looking at how, at that level, can you really change the model. Interface with humans. Human factors, people, patients. Whatever you do when you design a survey, design with human factors principle. (…) Government inspection has to look at what you have to do." (Participant 4)

2. Minimum requirements

Interviewees recommended several minimum requirements as a starting point for sustainable quality systems in hospitals to reach a base level of quality. Quality education (see 2.1.) and quality control (see 2.2.) are a minimum requirements for quality in healthcare sectors.

2.1. Quality Education

Experts all agree on the fact that a quality education system is required to provide good knowledge of quality concepts for all healthcare workers, starting with a basic education for all healthcare workers. This education program might continue within the healthcare organisations to enhance continuous

learning that fits the healthcare workers' needs. Policymakers can create a national curriculum for quality that could foster all healthcare workers to speak the same language. Some participants advised a different specific national curriculum for healthcare leaders. Quality education is described by the experts as follows:

> *"The system needs to develop training schemes for the different careers and development of professions. You have to have something in medical school (next generation physicians and healthcare workers need to have some classes or an introduction about quality). When they move into becoming resident: they should have another specific training that fits to the medical specialty they are going into, like developing quality measures or PREMS or PROMS in that specific area. And the people getting into clinical leadership positions, so moving to the management side of the organisation, they should have another specific focus on developing a quality system. They need to do more in-depth training on how to either manage the system in the organisation or on how they can develop specific attention to quality in their department." (Participant 1)*

> *"(…) the curriculum they had been working on is publicly available and is now part of most healthcare leadership programs you encounter in our country at the moment and that is the biggest influence that it has done." (Participant 5)*

> *"You need a core of people in a hospital that know the basic things of how to do quality improvement, every hospital, I think, should have a program that teaches everybody in the hospital about quality improvement and we can have several levels of courses, for example a one-day thing which everybody takes actually, where you learn about PDSA cycles and how to do a quality improvement project, a second one is slightly more intensive." (Participant 6)*

> *"If you have a strong education of physicians, nurses, physiotherapists and occupational therapist and you have a strong development of specialty nurses, I think that is an accreditation in itself. And if the education system moves quick enough so that the more knowledge that the daily work has, also is taught in the education system." (Participant 7)*

2.2. Quality Control

Quality control by inspection and/or accreditation bodies is necessary as defined by the experts during the interviews. For accreditation, experts are not unanimous in how many cycles are required in a hospital to ensure sustainable quality of care, but consensus exists on the minimum requirement of one accreditation cycle in every hospital to ensure standardised procedures and basic quality systems are in place.

2.2.1. Inspection

International experts emphasise the need for an external inspection system. An unannounced inspection has the advantage that organisations have to be prepared in a continuous way rather than just be prepared for the inspection to come on a fixed date as described by the following interviewee:

"One thing that has been helpful is unannounced inspection, so that at least organisations don't spend months preparing for the inspection and neglect other priorities in the three months leading up to the inspection." (Participant 6)

Respondents suggest a more appreciative approach of inspection systems with a focus on good practices and positive ways an institution has installed to ensure quality of care mechanisms:

"Inspection is an important pillar, supervision in general and accountability in general. There are a few accent differences: quality versus safety. We come from an era in which the inspection focuses very strongly on security, we no longer know exactly what we think is right with each other and out of pure poverty we look at what we think is wrong and what we should not do. We are very much looking for negatives, we do not know exactly how to deliver good care, but let us not give the wrong care. I see a shift that inspection is going to look more and more at good care: 'How are you going to improve?' " (Participant 8)

2.2.2. Accreditation

Accreditation by an external organisation is recommended for every hospital for at least one cycle. Experts argue that accreditation provides the opportunity to set up procedures and to let them validate their system by external assessment. It leads to a quality framework in which hospitals can work for their quality systems as described by the following quote:

"Because you could say if you are in the beginning and you can work on the house in order, you might benefit more from the accreditation, because it is really elemental to properly set up everything, to describe your processes, to show clarity that everyone knows what you have agreed with each other, then you can switch to or measure at the same time." (Participant 2)

Accreditation enhances those organisations to get their procedures and framework for quality in place. It intends to reach the same base level of quality systems in all hospitals. One of the participants described it as follows:

"In my view, this is most helpful for organisations that are at the bottom of the curve, so it really lifts all the boats and that everyone reaches a standard level. With accreditation, everybody has to achieve a certain level. The hard part is making standards in all the parts of

the organisation that you actually have. It is quite clear that in transitional countries or developing countries accreditation is really helpful. In developed countries it is a little less clear but the role is going forward. And I think accreditation needs to evolve in the coming years, in developed countries in particular." (Participant 6)

3. *A way to continuous learning and improvement*

A third theme was identified as a way to continuous learning and improvement in a healthcare organisation. This is possible with clinical collaboratives (see 3.1.A) and integrated care systems (see 3.1.B). Also, a uniform data infrastructure (see 3.2.A) and a set of fixed indicators (see 3.2.B) to measure are critical aspects to improve healthcare quality each day. Continuous learning requires feedback (see 3.3.) towards clinicians, healthcare organisations, patients and the society.

3.1.A Clinical collaboratives

Clinical collaboratives between clinicians within and between hospitals would facilitate the local involvement and the responsibility for quality improvement projects. It offers the opportunity to encounter other healthcare workers between hospitals to talk and think about quality. As such, they feel responsible for the quality they deliver and they can discuss quality indicators and improvement initiatives that are specific for their discipline.

> *"I think creating collaboratives to improve some sort of clinical outcome, could be hip fractures or outcomes around knee replacement something like that in orthopedics. [This] can actually drive culture really well. And an orthopedic unit where you work, if you are collaborating across the region so creating a collaborative based on a common goal, based on your specialty can be another really useful way of driving culture, driving change and actually improving outcomes."*
> *(Participant 3)*

3.1.B Integrated care systems

Integrated care systems can facilitate vertical integration and collaboration between different healthcare institutions. Many experts emphasised the evolution towards these integrated care systems to improve the continuum of care:

> *"Care integration is probably very important in terms of delivering better care for some populations. Especially safety events, many of them happen at the interfaces, when someone transfers from hospital care to primary care, when they go to different setting. So I think that is very important. It is a little hard to measure, but you know one of the most important things is to make it easy to transfer information across these areas." (Participant 6)*

"In other countries, you can see that they are moving towards accountable care organisations, integral care networks, integrated delivery systems and some are set up without hospitals, etc. and collecting in a network. But most of them have a central role, and that is also what I know about the future of hospitals in the EU countries, how can I put those classic hospital tasks into a broader healthcare system for the future." (Participant 9)

"Integration is absolutely important! The hospital of today, not of the future, must be integrated because the continuum of care is something necessary. We are talking about a short stay in hospital and a long time outside and with out-of-hospital monitoring [required]. In my opinion, it should be on a different level. First level: hospital level. All hospitals in a country/region must work as a network, not only clinical networks (stroke network etc.). But also, in networking of hospital planning and investment and education, research. If the system can modulate and integrate (and it can organise the single hospital). So, I think it is time not for a single plan, [as] it should be a system plan. For hospitals, I think, it could improve the quality of the care of the system." (Participant 10)

Quality initiatives, like care pathways, could be initiated to improve integrated quality care systems. Just as clinical collaboratives, they start with discussions bottom-up that let quality of care initiatives grow.

"Moving from hospital to larger clinical pathways and to other levels of care. Most likely we need to have at least an area, I think, of vascular science or orthopedics, having integrated clinical pathways. The health system authorities should force hospitals and other providers to work together and also use quality indicators so they can make hospitals responsible not just for the intervention, but for the functional recovery of patients over time. For orthopedics e.g. hip refracture: quick intervention within the four hours, but what happens after?" (Participant 1)

3.2.A Data Infrastructure

For the digital registrations and follow-up of quality indicators, a data infrastructure that can be mutually used by healthcare organisations is needed to monitor quality improvement. This data infrastructure could be provided by the government (e.g. on a central platform). As such, the quality indicators, patient experiences and incident-reporting that are collected, are at least measured in a consistent way between all members. A participant expressed the needs as follows:

"But there has to be a common dashboard provided by the government where hospitals should place their figures to have the opportunity for a good comparison between hospitals. Hospitals

should be forced to do whatever they [have to] do about adoption or implementation to be
sure that it is consistent with the information required by the government or external agency
in terms of measures." (Participant 1)

3.2.B Indicators

The choice for a set of quality indicators is an important topic for implementing a continuous learning system whereby indicators can be used to follow improvement trajectories over time and between institutions. Different experts agree on the fact that not all indicators can be measured continuously and that we need to focus on "vital few" indicators over a broad range of "useful many" indicators. These indicators must be evaluated after time and can change in function of the progress. A balance between process, structure and outcome indicators is desired.

"I think that broadly cherry picking is definitely a concern, it is better to have a reasonably
broad market basket of indicators and you know that doesn't mean that sometimes cherry
picking is not an issue. For example, if you look at outcomes of the ERCP in the scopic
cholangiopancreatogram the persons with the worst outcomes are always the person who
deals with the most difficult patients and that is actually the person who performs the
procedure best." (Participant 6)

"We should try to develop a framework for indicators where some of them are more for
research, some of them for public reporting and some for underground quality surveillance."
(Participant 5)

"(…) to take perspective about the systematic evaluation of the system, some kind of
continuous evaluating, not about satisfaction of course, but about the patient experience and
patient journey. A different kind of measurement. Not so quantitative but more qualitative
data. As a part of the system." (Participant 10)

3.3. Feedback

Finally, a feedback system to ensure transparency about quality of care towards healthcare workers and the public is necessary to build a sustainable quality program. We identify two subthemes in this third minor theme 'feedback'.

3.3.1. Transparent feedback system

The indicators that are measured should fit in a transparent feedback system. This has to be installed within a system that is clear for all healthcare workers concerned as well as for the public that needs

the opportunity to consult it. Transparency is essential for quality improvement as described by the following interviewee:

"For transparency for individuals, if it is anonymised and it allows people to compare with each other to learn, it should definitely be part of systems. For systems: transparency is fundamental. I mean honestly, it is part of it." (Participant 11)

3.3.2. Public reporting

The patients and general public need to obtain information about the quality of care they potentially receive. Experts all agree on the fact that a public reporting system of quality indicators should be installed. They emphasise the evidence for public reporting in terms of improvement efforts for healthcare institutions.

"For public reporting I think there is quite good evidence. That things improve with public reporting, it makes a deal with which indicators you pick, how evidence-based they are and how, however they are updated routinely. Which indicators you pick is really important. Most of the evidence about improvement suggest that if hospitals know that they have to publicly report those things, they will be embarrassed and will work harder on those items, the downside of this approach is that anything that is not one of the chosen indicators could get lost." (Participant 6)

Some interviewees also express their concerns for gaming issues if quality indicators would be published on individual caregiver level, so they would prefer a more aggregated hospital or department level:

"I would suggest keeping it at the department or hospital level, but not the single physician, the public one. I would have a physician level one but only on a hospital level and managed by the hospital management. Make it not publicly available. If you make that public, you are going to have a vicious circle: stronger will get stronger, and others not. You have consequences for the training of new ones, the young ones." (Participant 1)

"There is pretty good evidence about public reporting that it has more impact on provider or health service behaviour than it does on public behaviour, on people. So, although it is important from a perspective of transparency, for the public to have access to that information. What you should be doing is designing those public reporting for the health services because they are the ones that work on reputation issues in terms of not wanting to be (a bad one) or all wanting to be at the really good end of the hospital." (Participant 3)

Discussion

In general, three major cornerstones for a sustainable hospital quality system were identified in this study: quality culture, minimum requirements and a way to continuous learning and improvement. Quality culture is considered as an overarching cornerstone and forms the foundation for all national quality initiatives. As we know from previous studies in the past 20 years, quality of care needs a profound quality culture in hospitals [23]. Furthermore, the minimum requirements and the way to continuous learning and improvement match closely with previous studies describing multidimensional quality management models [4,7,24]. The recommendations are not a 'one-size-fits-all' approach but they give the opportunity to policymakers to create a quality community or network where collaborative learning and empowerment of healthcare workers and patients leads to excellent care [25]. During this collaboration within and between hospitals it is important to note that these cornerstones cannot be installed top-down from a management perspective but need to grow bottom-up with healthcare workers feeling involved in the policy of their hospital and workplace [26]. Furthermore, the involvement of stakeholders by a bottom-up approach can lead to different quality focuses within each hospital. Moreover, by making a difference between minimum requirements and the way to continuous learning and improvement, we also highlight the possibility for different initiatives according to the maturity of hospitals' quality systems.

Governments and policymakers should be aware of the challenges hospitals face to implement new quality initiatives. On the one side, they can use the provided framework to create an environment for hospitals to start co-creating new initiatives bottom-up. On the other side, regulatory instances should provide quality control mechanisms such as inspection of hospitals and should ensure that the data infrastructure is in place to establish transparent feedback mechanisms towards all healthcare stakeholders and the public. Governments are responsible to set up an educational program for quality. The framework provided in this research can thus not only be seen from one perspective but hospitals and governments need to work together to create excellent quality of healthcare systems.

The national recommendations for hospital quality presented in this study encompasses the three components of a quality-of-care triad (accreditation, inspection and public reporting) currently in place together or separated in many European countries. Both accreditation and inspection are presented as minimum requirements within this framework. Nevertheless, previous research has shown that the evidence for these components is scarce [13] and expert opinion in this study inspired a new future direction. The need for interconnections between the different cornerstones and the focus on them in a future national quality approach is necessary to ensure that quality can grow throughout the organisation. Accreditation and inspection are therefore not the sole condition for a sustainable quality

policy. Instead, they are a minimum requirement within the bigger picture. Furthermore, quality education for all healthcare workers serves as an additional minimum requirement in order to ensure healthcare stakeholders speak the same "quality language" between them. A curriculum including quality themes is already discussed and tested in different countries and healthcare education programs [27]. A way to continuous learning and improvement is presented as continuous, transparent feedback loops ensured by different concepts such as public reporting with comparative benchmarking, which is already a part of the quality systems in most countries [7]. The power of this feedback loop is the addition of clinical collaboratives. The creation of collaboratives not only gives the opportunity to involve stakeholders, but a recent review also reported significant improvements in clinical processes and patient outcomes after the collaborative implementation [28]. Although clinical collaboratives and a uniform data infrastructure are not yet in place in many countries, they are stressed as critical factors for quality improvement by the international experts through sharing opportunities and ideas for improvement as well as mutual learning across healthcare organisations as is described in international literature [7,29].

Financial implications of current and future quality concepts were not the focus during the interviews with the international experts. When the theme emerged, we lacked clear views on the financial implications of a sustainable quality system in hospitals because of the divergent payment systems and social care reimbursements in European hospitals. Future research on the financial feasibility of the cornerstones presented in this paper is therefore required.

Strengths and limitations

A major strength of this study is the triangulation of contexts in countries, international organizations in quality and patient safety and various policy levels linked to the European quality field. The use of expert opinion for specific policy questions was also already recommended by the European commission [30]. The sample size of twelve renowned experts was adequate to explore the objective of the study and to obtain data saturation [31]. The credibility of our results was enhanced using investigator triangulation and peer review moments. The continuous and systematic stimulation of reflexivity and the method of constant comparison was of great value in developing strong recommendations, grounded in the full potential of the rich interview data. The interviews were performed with experts from different countries and either in Dutch or English. As the latter is not the researchers' mother language, in qualitative research this could introduce possible language bias. We did not translate the interview transcripts to our native language. Nonetheless, another member of the team relistened the recordings to correct language mistakes and minimize this bias. The international experts interviewed in this study are mostly linked to the European context of healthcare

quality. Today, it remains unclear how experts from other continents like Asia, Australia or Africa are recommending a future quality policy.

Implications for policy, practice and research

The proposed recommendations for a sustainable national quality of care approach in hospitals can be an encouragement for policymakers to lift their policy plans to a next level. Each topic can be the start for an in-depth gap-analysis of current healthcare quality policy and future directions. Governments and policymakers can decide within their own context how to implement the presented cornerstones into practice. For example, they can install an inspection of hospitals as a minimum requirement for quality control but they can simultaneously organise systems for quality education on a local level. Also, the use of data infrastructure systems to improve the quality of care and to stimulate clinical collaboratives can be a clear task for governments to promote implementation on macro level. Nowadays, no uniform financial system is in place to financially reward or penalise quality of care and this is experienced as a shortcoming in current research and policy worldwide [32]. Nevertheless, in international literature, different studies on pay for quality systems and value-based healthcare were performed, without a uniform policy recommendation derived from it [33–35]. Important in future research is to involve recommendations of healthcare stakeholders, patients and their kin to include the wide range of experiences with current national quality systems. Recommendations of drivers for a sustainable quality management system on meso and micro level can be explored in pilot projects. Combining worldwide experts with similar views or differences would give us more insight into a global quality policy. Furthermore, it would be an opportunity to include neutral and opposite views in follow-up research. The findings presented here can be used as major themes during RAND or Delphi studies with international experts.

Conclusion

Complementary to the current national policy, this study demonstrated the need for profound attention to quality cultures in acute-care hospitals. Policymakers need to provide a control system and minimum requirements for quality education of all healthcare workers. A model for continuous learning and improvement with data feedback loops has to be installed in each hospital to obtain a sustainable quality system. The proposed framework gives the opportunity to governments, policymakers and researchers to develop a bottom-up supported quality of care policy with attention for each of these cornerstones, adapted to individual hospitals' context. They fit with previously described recommendations for quality of care policies, like accreditation, inspection of hospital facilities and public reporting of indicators but were not yet brought together in one overarching model. Future research on global differences and the national development of a sustainable quality of care policy can be built on the described concepts in this paper.

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Supplemental Material 1: Semi-structured interview guide

Supplementary Table 8.1 Semi-structured interview guide.

Opening questions
1. Could you briefly describe your role(s), your tasks in the organisation and the areas you are responsible for?
2. What does quality improvement/control mean to you? What do you include in the term?
Main questions
1. What is your idea on three components of this Quality Triad?
2. What changes would you suggest?
3. Are there pieces of the puzzle we miss?
4. What are the cornerstones of a state-of-the-art Quality Management System that you would include in a future, national quality policy for acute hospitals?
5. What are your personal experiences with the current quality model in your country or organisation?
6. What do you think about the sustainability of a future quality model?
Concluding questions
2. What would you emphasize as the most important thing regarding the development of a new quality policy for acute hospitals?
3. Is there anything else that you would like to add?

Chapter 9

Sustainable quality management in hospitals: The experiences of healthcare quality managers

Sustainable quality management in hospitals: The experiences of healthcare quality managers

Abstract

Background: Quality management systems are essential in hospitals, but evidence shows a real literature gap on the sustainable implementation of quality. This study aimed to explore and identify enablers towards sustainable quality management in hospitals.

Design: Interviews were conducted with 23 healthcare quality managers from 20 hospitals. Data collection and analysis were conducted simultaneously by using the Qualitative Analysis Guide of Leuven and following the COREQ Guidelines. Thematic analysis from interview transcripts was performed in NVivo 12.

Setting: 20 hospitals in Flanders, Belgium.

Results: The results reveal two categories: (1) quality in the organisation's DNA and (2) quality in the professional's DNA. The first category consists of: bottom-up and top-down management, the organisation-wide integration of quality and an organisational culture shift. The second one consists of: quality awareness, understanding the added value, the encouragement and engagement, the accountability and ownership for quality. Moving towards sustainable quality management systems in hospitals requires a good interaction between a bottom-up approach and leadership to ensure continuous support from healthcare stakeholders.

Conclusion: This study contributes to existing conceptual and theoretical foundations with practical insights into sustainable quality management. The findings can guide quality departments and hospital management to regain professionals' commitment to quality and to establish a sustainable quality management system.

Introduction

Healthcare organisations have been stimulated to implement quality improvement (QI) initiatives for over two decades [1]. Healthcare is characterized by complex processes and rapid changes in order to improve services [2]. Research shows that continuously adapting to this changing workflow can result in professionals experiencing change fatigue and resistance [3], which is negatively associated with well-being and job satisfaction [4]. Recently, a heterogeneity of perceptions towards QI initiatives is observed between healthcare professionals [1,5], such as feelings of lack of relevance, time and resources. Since 2019, multiple Flemish hospitals announced to leave organisation-wide external accreditation [1]. Nevertheless, the commitment of professionals to QI is indispensable to ensure long-term success [6]. Without sustainable commitment to QI, gained quality results can deteriorate over time. Hospitals currently face the challenge to establish a sustainable quality management system (QMS) that re-invigorates healthcare professionals for quality.

Recently, the definition of healthcare quality has evolved to a multidimensional one with explicit attention to the contributions of healthcare professionals [7]. It includes the globally accepted technical dimensions of quality; core values that refer to partnership, co-production, respect, dignity and empathy; person-centredness and kinship in healthcare and, in addition, catalysts such as leadership, resilience and transparency [7]. Going back to the roots of quality management (QM), as developed by quality pioneers [8–11], the ultimate goal is to reach sustainability. In this study, sustainability of a QMS has been defined as the ability to continue evidence-based practices and successes in the management system (institutionalization) [12–15], to incorporate quality into the daily workflow of professionals and their behaviour (key stakeholders) [15,16] and to maintain outcomes over time (benefits) [12,14,15,17]. Few studies identified success factors for sustainable QMS, which are related to leadership and management [18–20], involvement of patients, professionals and the community [21,22], continuous improvement and innovations [23], employee empowerment and satisfaction [24,25] and teamwork [19]. However, most studies focused on drivers for sustainability of one QI intervention or program, often implemented in one single care department [26] rather than on the sustainability of a QMS on hospital level [27]. This issue highlights an ongoing knowledge gap between the developed models and experiences in real-world practice settings. To establish a sustainable QMS in hospitals, it is essential to understand theoretical and practical factors [26]. Although, research found that the performance of healthcare organisations is correlated with management practices [28,29], Little attention is paid to the experiences of healthcare quality managers (HQM) on how to enable a sustainable QMS after a decade of commitment to QI [30–32]. In the current quality paradigm, sustainability remains one of the least understood issues in hospitals' QMS [19,33].

To address this literature gap, the aim of this research is to explore and identify enablers towards a sustainable QMS in hospitals by examining the current experiences of HQMs.

Methods

Context

In Flanders, Belgium, the government introduced a 'Quality of care triad' in 2009 [34], consisting of voluntary participation in organisation-wide external accreditation, mandatory governmental inspections and voluntary public reporting of quality indicators. Currently, there are 52 hospitals in Flanders. If hospitals opted for external accreditation, they were exempt from systemic governmental quality control. Nowadays, all Flemish hospitals obtained at least one accreditation by either the USA-based JCI or the Dutch Qualicor Europe. Since 2014, the government has been executing yearly inspections on specific patient care trajectories. Today, over 90% of the Flemish hospitals voluntarily report quality indicators publicly [1].

Study design and Sample recruitment

A qualitative design with a grounded theory approach was used to explore and identify enablers for a sustainable QMS [35]. Theoretical insights were derived inductively from semi-structured interviews with HQMs. A HQM leads the overall implementation, integration and coordination of the hospital's quality management program [36]. Based on both, demographics of the manager and hospital setting, the supervisors of this study and the head of the Quality Commission within the umbrella hospital association, selected HQMs purposively. In this way, a heterogeneous sample of participants with a wide range of quality experiences and from different contexts was obtained. Managers that met the inclusion criterion were invited for the interview by email. In this email the purpose of the study and interview focus was explained. The voluntary nature of their participation was emphasised.

Data collection

Semi-structured in-depth interviews both in person and by video call using Skype© or Zoom© were conducted with 23 HQMs employed in 20 hospitals, or 38% of all Flemish hospitals. Three interviews were duo-interviews (one interviewer with 2 participants at the same time, which were both HQMs in the same hospital). The interviews were performed by one female researcher (Initials first author) between June and October 2020. She received intensive guidance from an expert in qualitative research methods and in managing hospital quality (Initials second author). As a theoretical foundation, a topic list and interview guide were developed based on sensitizing concepts for

sustainable QMS, which were described in the co-creation roadmap towards sustainable quality of care [37]. Subsequently, a pilot interview was conducted with a participant who has been working as a HQM in a Flemish hospital for 6 years. To ensure relevance and clarity of the interview guide [38], the interviewer (FC) tested each step of the interview guide, while an observer (KVH) took notes of the interview process and non-verbal communication. At the end of the interview, the participant shared her experiences of the interview and suggestions for adaptations. Based on this pilot interview, the interview guide (Supplemental Material 1) was adapted and finalised in collaboration with our research team. Each interview started with the question to describe the hospitals' QMS, to finally zoom in on their experiences of a sustainable QMS and ended with a concluding question on the currently missing sustainable elements. By following the principles of the Qualitative Analysis Guide of Leuven (QUAGOL), the interview guide was continuously adapted during the study in response to data analysis [39]. By asking open-ended questions, participants were invited to share their experiences. The mean duration of the interviews was 83 minutes. All interviews were audio or video recorded and transcribed verbatim. Since new data repeated the experiences in previous data, there was consensus during monthly peer debriefings with all authors that both theoretical and data saturation was reached after 20 interviews.

Data analysis

Data analysis was guided by QUAGOL [39]. This systematic and comprehensive guide for researchers draws on the constant comparative method of Corbin and Strauss's grounded theory approach and the interdisciplinary team approach [35]. The step-by-step method of QUAGOL enabled us to inductively and gradually develop and refine insights into enablers of sustainable QMSs. Data collection and data analysis were conducted simultaneously. All interviews were read multiple times to inductively identify and understand the experiences. Descriptive, theoretical and reflective field notes were taken during each interview [40]. Descriptive notes included observational information about the context and non-verbal actions of the participants. Theoretical notes included all topics expressed by participants. Both descriptive and theoretical notes were used as starting point for the inductive analysis. Reflective notes focused on methodological reflections of the interviewer herself to increase the quality of subsequent interviews. Three researchers (FC, EMC and JB) independently coded the interview transcripts. In the first step, paper and pencil were used to develop a list of meaningful enablers. In the second step, the NVivo 12 software program was used to ensure open coding by identifying and clarifying themes based on the managers' own words and the systematic, repeatable analysis of these concepts. At each step of the QUAGOL guide, the research team met to increase the level of abstraction of codes and to discuss preliminary results. This cyclical approach, i.e. the iterative process and research team discussions, enabled us to achieve coherence in the meaning and

interpretation of enablers. In the last phase, these enablers were integrated into a conceptual framework in response to the research question. Finally, a description of enablers for a sustainable QMS took place on a conceptual level. This description was finally discussed and validated with all authors.

Methodological quality

To enhance the methodological quality of this research, space triangulation was used [38]. We included managers employed in hospitals across eleven regional hospital networks in Flanders, Belgium. No relationship was established between interviewer and participants before the study started. Peer review was conducted at regular intervals (n=8) with an expert in qualitative research (EMC) and senior HQMs (DDR and KVH). These peer reviews supported critical self-reflection and discussions in team about enablers to manage quality sustainably. The research team consisted of eight researchers with experience in qualitative research, each with a different academic and clinical background: six health services researchers (three women and two men, with nursing, medical or allied health professional background, all with PhD degree and experience in healthcare quality) and three junior researchers (two women and one man with nursing, medical and pharmaceutical background). The consolidated criteria for reporting qualitative research were used in this research (Supplemental Material 2).

Ethics

Consent was obtained from participants after providing detailed information. They could withdraw from the study at any time without further explanation. Permission for audio or video recording was asked before the start of the interview. Numbering participants and hospitals secured their anonymity. Only the research team had access to interview recordings and transcripts. The research protocol was approved in 2019 by the Doctoral Committee of KU Leuven University and is in accordance with scientific guidelines.

Results

The final sample consisted of 23 HQMs employed in 20 hospitals (Table 9.1).

Table 9.1 Characteristics of participants (n = 23) and hospitals (n = 20).

Characteristics of Participants	Frequency (n = 23)
Gender	
Male	8
Female	15
Educational background (highest level of education)	
Master's degree	17
Doctoral degree	6
Experience in Healthcare Quality (years)	
<5	8
5 – 10	10
11 – 15	5
Characteristics of Hospitals	**Frequency (n = 20)**
Type of organisation	
General hospital	15
General hospital with university character	1
University hospital	4
Licensed beds	
<400	6
>400 - <800	7
>800 - <1200	5
>1200	2
Organisation-wide external accreditation	
JCI	10
Qualicor Europe	10

Analysing transcribed interviews resulted in an empirically grounded understanding of enablers towards a sustainable QMS. The results revealed two major categories: (1) quality in the organisation's DNA and (2) quality in the professional's DNA (Figure 9.1). Both categories influence each other and are described in detail below. Participant quotations are selected and presented to ensure transparency of results (Supplemental Material 3).
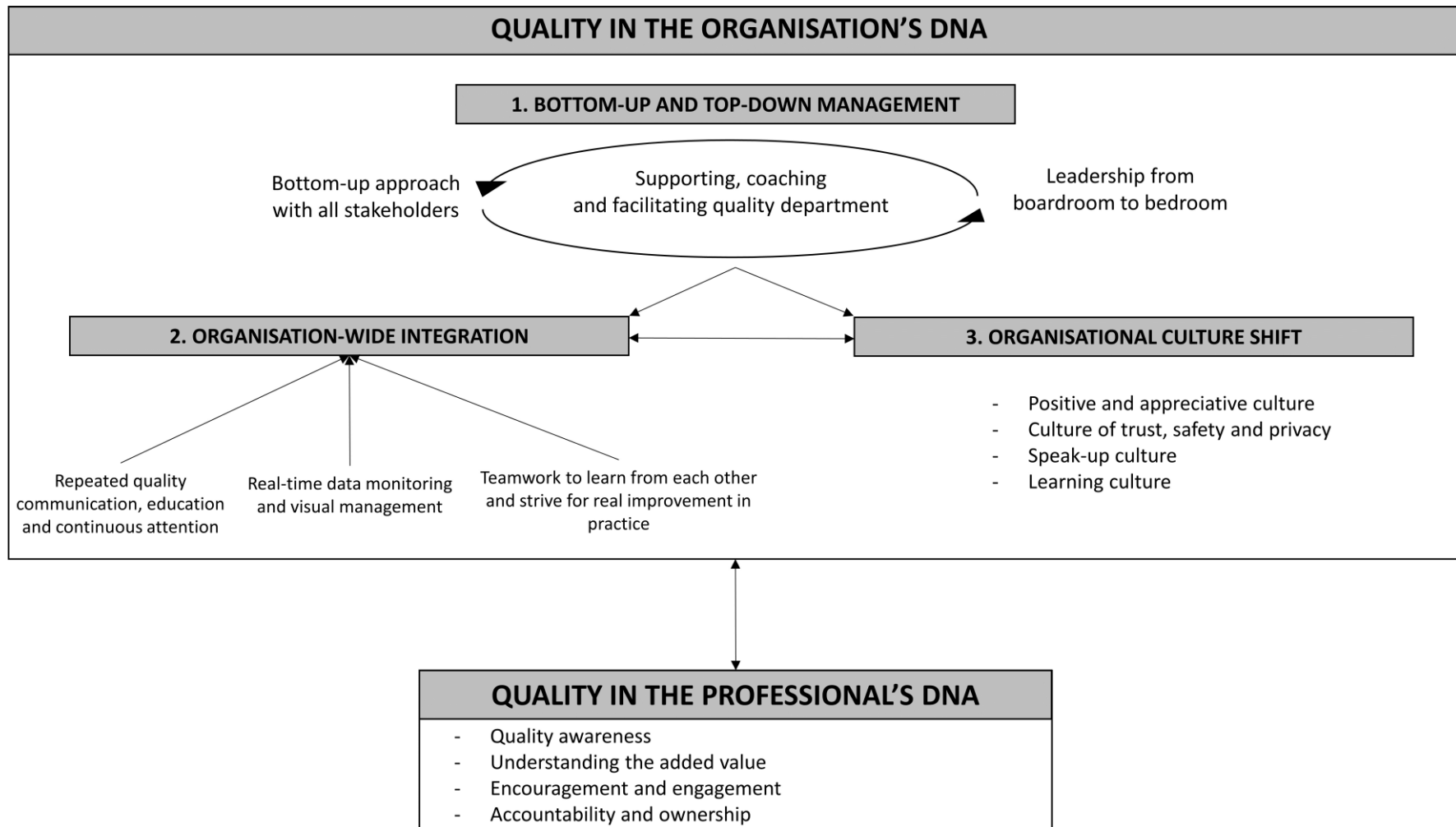
QUALITY IN THE ORGANISATION'S DNA

1. BOTTOM-UP AND TOP-DOWN MANAGEMENT

Bottom-up approach
with all stakeholders

Supporting, coaching
and facilitating quality department

Leadership from
boardroom to bedroom

2. ORGANISATION-WIDE INTEGRATION

3. ORGANISATIONAL CULTURE SHIFT

- Positive and appreciative culture
- Culture of trust, safety and privacy
- Speak-up culture
- Learning culture

Repeated quality
communication, education
and continuous attention

Real-time data monitoring
and visual management

Teamwork to learn from each other
and strive for real improvement in
practice

QUALITY IN THE PROFESSIONAL'S DNA

- Quality awareness
- Understanding the added value
- Encouragement and engagement
- Accountability and ownership

Figure 9.1. Enablers of a sustainable quality management system.

1. *Quality in the Organisation's DNA*

The first category expressed by the managers is quality incorporated in the organisation's DNA, such as the integration of quality in the mission, vision and strategy. This category is facilitated by: (1) bottom-up and top-down management, (2) the organisation-wide integration of quality and (3) an organisational culture shift.

1.1 Bottom-up and top-down management.

HQMs argued the success of the combination of two management styles, a bottom-up and top-down approach, to create a broad support base and wide acceptance for quality in an organisation. The organisation's quality department was a catalyst for the combination of these two management styles.

A bottom-up approach was experienced as important by HQMs because of the involvement of and dialogue with all stakeholders to include their voices in the future quality direction, to create shared understandings and to increase support among all professionals. The term 'stakeholders' refers to patients with experiential expertise and to healthcare professionals with practical and medical expertise. By discussing the relevance and feasibility of new quality initiatives and by responding to problems stakeholders indicated, not only the support for future implementations increased but also the ownership and leadership.

In a top-down approach, leadership for quality was taken throughout the entire organisation. Quality leaders' daily attention to improve healthcare quality, enhanced a continuous quality culture in the organisation and inspires others to improve. Particularly, hospital directors and board members sent a strong signal to professionals by visibly propagating and continuously supporting QI from boardroom to bedroom. Besides, they influenced sustainability by taking quality into account with every decision and by creating time, budget and space for professionals to improve quality.

The organisation's quality department was experienced as a catalyst for the combination of a bottom-up and top-down management approach through supporting, coaching and facilitating techniques. The ultimate strength of a quality department is to build the bridge between all organisation levels and to be continuously available as the point of contact for quality. The department supports professionals by working together with them to improve their services and by assisting the implementation of QI initiatives they indicated. The members of quality departments are coaches who dare to think out-of-the-box while teaching professionals to systematically use quality methods in practice. Additionally, they facilitate quality integration in the organisation by translating quality theories into practice in order for stakeholders to really understand and speak the same quality language.

"Because our structures ensure interaction between management and workforce, they find their way to our quality department quickly, it works very strongly. They say they really appreciate us visiting them. When they need us they call us with questions like 'what is your view on this quality issue and how can we act upon it?' " (Participant 20)

1.2 The organisation-wide integration

HQMs argued to embed quality organisation-wide, i.e. into the daily working routine of both clinicians and non-clinicians. Critical factors to integrate quality organisation-wide were: (1) repeated quality communication, theoretical and practical quality education for healthcare professionals and continuous attention to quality throughout the organisation; (2) real-time data monitoring and visual management, such as learning boards where data trends of process and outcome indicators are automatically displayed in real-time and easy-to-read manner with benchmarking as a motivator to change; and (3) teamwork within and between hospitals to learn from each other by sharing best practices and by striving for real improvement in practice, such as checking the data for improvement, evaluating it and adapting the improvement strategy on it.

"By repeatedly explaining that tracing quality is a learning moment, we accelerated that culture change. People are now asking for more tracers and do not perceive it as something threatening. We also imitated a television program in healthcare quality theme, where someone was making jury jokes. We always try to bring some humour in it so that it is pleasant and people see the added value." (Participant 1)

1.3. Organisational culture

HQMs experienced that the bottom-up and top-down management approach and the organisation-wide integration of quality, activated an organisational culture shift that supports a sustainable QMS. This culture shift included: (1) a positive and appreciative culture; (2) a culture of trust, safety and privacy; (3) a speak-up culture and (4) a learning culture. First, the positive culture encompasses communicating about and building on positive quality experiences or successes in practice. Moreover, this culture focuses on celebrating quick wins and appreciating professional's efforts to keep them motivated and committed to quality. According to the principle 'leading by example', managers suggested that the appreciative culture can be initiated by hospital leaders themselves. Second, essential to an organisational culture shift is ensuring trust, safety and privacy in order to make professionals feel comfortable to report quality issues and to learn from each other. HQMs suggested to let professionals feel that 'blaming' or 'punishing' people is not the focus of the QMS. This could be

facilitated by focusing on the process instead of on the person during solution-oriented, constructive quality meetings. Third, the speak-up culture is considered important to strengthen improvements in practice. This culture can be reinforced by motivating professionals to give feedback to each other and by diminishing the fear to discuss mistakes or quality issues. To further strengthen this culture, HQMs recommended to start improvements based on issues reported by professionals themselves so they feel the usefulness of improving quality in their services. Lastly, a learning culture is needed to create a sustainable QMS. On the one hand, by having a culture focusing on continuous learning rather than on seeking blame, quality is experienced less as a personal threat to professionals. On the other hand, by QI perceiving as a learning moment, the distribution of time spent to monitor and improve quality is more balanced.

> *"With the start of safety rounds, people were shaking on their legs while thinking 'oh no, they (the quality department) are coming to control care'. Nowadays, when we arrive at their ward, we make a chat talk with them, and recently they came spontaneously to us. They are even curious to their quality data. It is the attitude of how you check them. If something is not in order, we start a conversation with them about 'Which are the problems? How can we learn from it?' " (Participant 17)*

2. Quality in the Professional's DNA

The second category identified by the HQMs is embedding quality into professional's DNA. All HQMs were very clear on the broad support base and intrinsic motivation of professionals that is necessary to create a sustainable QMS. To use the words of one manager: "*They need to breath quality*". To embed quality into healthcare professionals' DNA, it is crucial that they are aware that quality is useful and meaningful. They need to understand the added value of improving quality. A supporting factor is continuously communicating and explaining the reasons behind 'why' we do things in a certain way rather than on the 'how'. Moreover, the encouragement and engagement of professionals to improve the quality of their own services is essential. To gain this encouragement and engagement from all stakeholders, managers suggested to let them feel with every QI initiative: 'What is in it for me?'. Another supporting factor in relation to professionals is their accountability and ownership for continuous QI. Managers indicated that these individual characteristics can be enhanced by letting them think about possible improvement projects, by teaching them methods to implement these projects and by reinforcing them to initiate improvement actions themselves.

> *"There used to be one quality employee telling professionals what to do. Today, we focus on quality at all levels in the hospital, so that everyone considers quality as something important*

and for which they are responsible. For example, we discussed quality aspects with the team, and then they said 'we had never looked at it like that before, you're right'. By doing so, we have seen that quality thinking in the hospital expanded from one person to another. That makes it easier to work continuously on quality in the organisation." (Participant 15)

Discussion

Main findings

This study builds on the existing conceptual and theoretical foundation with insights into how HQMs experience sustainable QM in hospitals. To sustainably integrate quality into the daily workflow of professionals, HQMs defined two main categories: quality in the organisation's DNA and quality in the professional's DNA. The framework represents a holistic approach to embed quality on all organisational levels [27,29]. As Feigenbaum described, quality should be a management philosophy and strategy that intrinsically lives in every individual of the organisation [10]. Our study emphasises a good interaction between a bottom-up approach and leadership for quality, facilitated by the organisation's quality department. These findings support previous research in co-creating an overall quality framework together with all stakeholders to regain commitment, especially after leaving hospital-wide external accreditation, without appearing as imposed or bureaucratic [3,6,20,22]. To ensure commitment, quality focus groups can be established to discuss face-to-face quality priorities [23,41]. In literature, quality assurance is described as periodic checks to ensure services are meeting the needs of stakeholders [2]. Furthermore, our study identifies different strategies to incorporate quality into the daily workflow. As suggested by Ament [31], organisations need to invest in communication strategies to make quality attractive again in a meaningful way, of which the narrative part to connect interests and values was emphasised by HQMs in New Zealand [19]. Instead of continuous monitoring of process improvements [9], a better balance between process and outcome indicators during feedback loops is desirable to support and sustain performances over time [29]. This draws on Juran's trilogy of quality planning, control and improvement [8]. Different from other research [2], innovation characteristics were in our study not defined as enabling by the managers. To strengthen the focus of collaborative learning that connects implementation processes at micro level to management processes at meso level [30], a quality community based on mutual learning across hospitals can be initiated. The empirical work by Giacomelli demonstrated that management training encouraged professionals to consider performance indicators as an important component, led to the systematically use of information in decision-making and increased the interaction with top management [42]. Moreover, our results show that the sustainability of a QMS depends on the culture

shift an organisation can let grow over time. Hospitals need to get rid of the perception that quality is 'imposed' on them. Instead, staff should experience an open culture with trust and support to create own QI initiatives that takes professionals' own values into account [30]. In accordance with principles of safety-II and just culture [43], organisations should transform the perceived culture of judging and blaming into a safe one where professionals dare to speak-up. This environment, where professionals have emotional freedom to think and act themselves, can enhance resilience and job satisfaction. The latter are needed to respond to the continuously evolving context without experiencing change fatigue [4].

The emphasis on professionals' wellbeing and resilience shifts the management focus from patient-centred care to patient- and professional-centred care [7]. Other research highlight job satisfaction as an enabling factor for sustainability in critical care practices [24]. In our results, the role of professionals in quality evolves from adhering international accreditation standards to taking ownership and accountability. Deming referred to professionals' expertise as 'Subject Matter Knowledge', while the quality department supports the increase in capability for improvement with 'Profound Knowledge' [9,36]. Moreover, previous studies described the success of employee empowerment [5] and engagement [25,29], which is extended in our results with encouragement. However, to trigger employee autonomy, adequate training programs can be initiated by hospitals or policymakers [42]. A training program, which is also available for managers to teach them strategies to promote change [44], can make significant changes in professional attitudes and learn them basic values of quality [19,42,45].

Although staff turn-over, budget cuts and major crises were not the focus during the interviews with HQMs, hospitals reviewing and critically reflecting with stakeholders on the usefulness of implemented QI initiatives, can lead to reducing costs if inefficient processes are redesigned [10]. As emphasised by managers and clinicians from the UK, there is a need for more value and quality for the same amount of money [32]. Improving inefficiencies based on quality issues reported by the staff themselves can remove perceived barriers to change processes.

The most important limitation of this study concerns the purposive sampling strategy, which may have resulted in selection bias, so that relevant experiences from other HQMs may have been missed. Nevertheless, interviewed HQMs are employed in a heterogeneous sample of hospitals. Their willingness to share experiences has had a positive effect on the interview quality and the information-rich data allowed to reach saturation after 20 interviews. The credibility and validity of our results were enhanced by investigator, data and space triangulation. Member checking, also known as respondent validation, was performed by immediately validating our understanding of topics discussed during the

interviews. Furthermore, data coding and interpretation were conducted separately by at least two researchers and intensively discussed during peer review moments. The continuous and systematic stimulation of reflexivity, in accordance with the guidelines described by QUAGOL, supported the researchers to inductively derive enablers based on managers' experiences.

Implications

The findings can guide quality departments and hospital management to regain healthcare professionals' commitment to quality and to establish structures for a sustainable QMS in their organisation. Furthermore, the results can stimulate hospitals to reflect on their current QMS and can contribute to the development of a new Flemish QM model. Although this research is limited to managers' experiences from hospitals, future research could focus on experiences in other care organisations to understand the transferability of the results. Multicentre, mixed-method designs would be interesting to objectively relate the implementation of the enablers to structure, process and outcome indicators concerning patients and professionals.

Conclusion

This research identified enablers for sustainable quality management in hospitals from the perspective of HQMs. Quality becoming a part of the organisation's DNA and a part of the professional's DNA are expressed as the two major categories and subsequently described. Managers put emphasis on fundamentals associated with the organisational, cultural and individual level. The results can guide hospitals towards a sustainable QMS that is supported by all stakeholders throughout the organisation. By focusing on the fundamentals expressed by HQMs, professionals' commitment to quality can be regained and outcomes of both internal and external stakeholders can be positively influenced. Moreover, this study reveals the need for more clarification about sustainability factors experienced by other stakeholders, the transferability of the results to other contexts and the impact of enablers within a larger study design.

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Supplemental Material

Supplemental Material 1: Interview guide

Supplemental Material 2: Consolidated criteria for reporting qualitative studies

Supplemental Material 3: Enablers with supporting quotes

Supplemental Material 1: Interview guide

Starting the interview:

- To start the interview, can you describe the quality management system in your hospital?

- Can you describe how your quality management system evolved over the years?

- From your point of view, what has been successful in achieving the current level of quality in healthcare?

Exploration of main themes:

Main theme 1: Quality planning and design

Main questions:

- Which are the main goals for quality in your organisation?

- When and how did you build these goals?

- Whose opinions did you take into account? Who was involved and why?

- Which are the barriers and facilitators to achieve the quality ambition in your organisation?

Exploration of aspects:

- Which are the main enablers for making this quality vision (or organisational vision) to life in your hospital?

- What is the alignment between the hospital-wide vision and goals and the specific ones for quality?

- How do you build a bottom-up quality policy? How do you create ownership for quality?

- What is the relationship between the hospital-wide vision and your quality management system?

- How is quality embodied in the hospital-wide vision? To what extent do you align quality with this?

Main theme 2: Quality control

Main questions:

- How is the monitoring and feedback system organised in your quality management system?

- Where, how and when are trends in indicators discussed?

- With who do you discuss trends in quality indicators?

- How are the legal and technical requirements organised in your quality management system?

Exploration of aspects:

- How do they engage with it?

- How did the monitoring and feedback system evolve over the years?

- Which are the success factors to make the professionals use the indicators in practice?

- What enables to incorporate indicators into their daily workflow?

- How do you track trends in quality?

Main theme 3: Quality improvement

Main questions:

- When something needs to improve in the organisation, which steps do you take?

- If the organisation aims to improve quality, or a specific indicator, who is involved?

- How will the team know if they are on the right track with a quality project?

Exploration of aspects:

- Once an improvement project has started, what are the next step?

- Once the improvement goals is reached, what happens next?

- Can you explain how quality improvement is embedded in your quality management system?

- How become professionals aware of quality improvement projects in the organisation?

Main theme 4: Quality leadership

Main questions:

- What does quality leadership mean in your organisation?

- What do you expect from a quality leader?

- Can you give an example of a good quality leader? Why is this a real quality leader?

- How is the board and governance of the organisation involved in quality?

Exploration of aspects:

- In what way do you try to convey quality from 'boardroom to bedroom'?

- How is the cooperation between the quality department and the management department?

- What are the success factors for creating leadership for quality?

- Who are the essential leaders for quality in your organisation?

Main theme 5: Quality culture

Main question:

- Can you describe the quality culture in your organisation?

- Has the culture changed over years? If yes, how did you manage this culture change?

- Which culture aspects are essential to incorporate quality sustainable into the daily workflow of professionals?

Exploration of aspects:

- How are you trying to improve the quality culture in the hospital?

- In what ways do you try to motivate professionals to participate daily in quality?

- How do you create ownership for quality?

- What can you tell about the psychological safety (or speak-up culture) in the hospital?

- What do you need to deeply embed quality improvement in this hospital?

Main theme 6: Quality context in the organisation

Main question:

- How are the quality processes in your quality management system organised?

- Can you describe your quality team? Who takes on which role in your team?

- How do you inform and train professionals to improve quality in the organisation?

- Where (on which organisational levels) and when do you discuss quality?

Exploration of aspects:

- What is the meaning of 'standards for quality' in your organisation?

- To what extent does benchmarking with other hospitals/between disciplines take place?

- What role does quality play in professionals' yearly job evaluation?

- Do quality projects always take the same approach? Which are the differences and what are the consequences?

Finishing the interview:

- What are you missing in your current quality system that should be part of a future, sustainable quality management system?

Supplemental Material 2: Consolidated criteria for reporting qualitative studies

Supplementary Table 9.1 Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in healthcare*. 2007. Volume 19, Number 6: pp. 349 – 357.

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	6
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	8
3. Occupation	What was their occupation at the time of the study?	8
4. Gender	Was the researcher male or female?	6, 8
5. Experience and training	What experience or training did the researcher have?	8
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	7
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	8
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	6
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	5
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	5
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	5
12. Sample size	How many participants were in the study?	6
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A

Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	5, 7, 8
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	N/A
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	6
20. Field notes	Were field notes made during and/or after the interview or focus group?	7
21. Duration	What was the duration of the inter views or focus group?	6
22. Data saturation	Was data saturation discussed?	6
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	7
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	7
27. Software	What software, if applicable, was used to manage the data?	7
28. Participant checking	Did participants provide feedback on the findings?	N/A
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	9-15
30. Data and findings consistent	Was there consistency between the data presented and the findings?	9-15
31. Clarity of major themes	Were major themes clearly presented in the findings?	9-15
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	9-15

Supplemental Material 3: Enablers with supporting quotes

Supplementary Table 9.2 Fundamental elements with supporting quotes.

Fundamental elements	Quotes
Quality in the Organisation's DNA	
	"What typifies our hospital is that we are actually - and you often see this in the mission statement - customer-oriented, patient-oriented. That really is a starting point in all the decisions we take. We think from the customer's point of view, from the patient's point of view, from the patient's voice, which is central to our entire strategy." (Participant 3)
1. Bottom-up and top-down management	
	"When a department told that an incident repeated several times, we told them: 'We can handle this together'. We really worked bottom-up with a problem that lives in the group. We also work top down, which is necessary because you have to put some pressure on: 'We expect you to set up improvement projects to raise the healthcare quality to a higher level'." (Participant 11)
	"The department is responsible for its own incidents, through a decentralised reporting committee that they have set up themselves. We really want that on the local department level. They need to be the driving force and owner of it." (Participant 2)
	"It is about the leadership showed at the quality steering group. Board members making themselves available on a weekly basis to enter into a dialogue with their organisation about delivering healthcare quality, is a very powerful signal to the organisation. Show the organisation how important you perceive it, that the culture of continuous improvement and constant striving for excellent care is constantly present. (Participant 20)
	"It is the attitude of how you look at a local safety round. The quality department is not trying to control, but we try to help them. We always end up giving advice and never end up saying: 'You are not in line with the guidelines'. That is part of what makes them feel that they can do it." (Participant 17)
2. Organisation-wide integration	
	"I think the culture has changed enormously. In the beginning quality was one of those people sitting behind their desk and thinking about what we were going to improve and implement. Nowadays, we try to get that "quality thinking" at all organisational levels. Everyone in the organisation perceives quality as something they are responsible for." (Participant 15)
	"It is sustainable because we have objective data available that is benchmarked within and between departments. A dashboard helped to

	map and visualise data. By using the dashboard, we can work with all organisational department." (Participant 4) *"It is important that quality champions meet regularly and provides own content. We have to work in a uniform way with uniform tools and learn from each other. When people already tried things out they can share best practices to pollinate each other."* (Participant 7)
3. Organisational culture shift	
	" (…) change that culture, positively highlight certain improvements, but perhaps also positively highlight incidents that happened. It is all about the positive side, such as communicating in a positive way." (Participant 18) *"We emphasised an open culture and the idea that you do not report an incident to point your finger at someone, but to raise a problem in order to find a solution. Our attitude is very open and ask what exactly happened. We focus on 'how can we avoid that from happening again with another patient' with minor and major incidents."* (Participant 19) *"Quality should not be perceived as something negative. People should dare to say: 'Oh well, that is not going well here' or 'I don't know'. We need the mindset of a culture of addressing people in terms of quality and safety."* (Participant 9) *"We did have to go through steps to get an open culture and one of addressing people. Sometimes we hear professionals mentioning: 'I noticed someone that should be addressed'. Giving feedback is often only expected in the hierarchical line. Employees do not address each other yet. We need that culture change."* (Participant 12) *"If an incident is reported, we advise the reporter to discuss it with colleagues. Our attitude is as neutral as possible and we outline the situation. When all stakeholders meet, we clearly mention that it is not our intention to accuse. We want to learn from the system and processes and what we can do to prevent the incident from happening again."* (Participant 8)
Quality in the Professional's DNA	
	"If quality does not come from doctors and nurses, then it is a theoretical story. They have to see and feel that by systematically working on quality, it will lead to a safer environment for both patients and professionals. This is our continuous goal. As long as you do not achieve it with professionals, working on quality will be experienced as ballast, as something that you have to do extra and that comes across as bureaucratic. The challenge is to let them feel, notice and identify that initiatives are improving what they are really interested in." (Participant 16) *"When starting something new, you have to convince people of the usefulness and you have to take them by the hand to name it together. At a certain point in time, and I think that is the power of quality, it is perceived as useful for both the organisation and their people. Your staff*

	will feel that and they will do it themselves because it is useful for the care. That is the art of a good quality policy, to ensure that it is meaningful to both your staff and your patients. So that it actually takes on a life of its own and people can take over and do it themselves." (Participant 10)
	"To create a sustainable quality management system, you especially need 'ownership'. That is something we are striving for. But it often goes wrong with the ownership and accountability, such as taking that responsibility: 'That is YOUR part'." (Participant 8)
	"What really works in our quality management system? Having the sense of urgency, that time everyone was present, the nurses and physicians, and the noses were in the same direction, that facilitated further improvement in the quality of care." (Participant 3)
	"If you have an informal leader who partially believes in it, you have to talk them into it and try to get them on board with the quality story, explain the quality systems so that they can convince their supporters, and we are also fortunate that in the new Medical Council, a lot of young doctors are included, who REALLY do believe in quality. (…) For this reason, we are able to have discussions about quality during the Medical council meetings. " (Participant 14)
	"In our hospital, each indicator has an owner, supported by the committee for quality and safety. Additionally, it is essential that for each indicator the results and the related goals are described. Each owner is asked to formulate actions to improve the results, and a tool ensures the follow-up of those actions. Importantly, this system keeps the mill running and the ownership lies as close as possible to the professionals themselves. For example, the head of neurology is owner for the door-to-needle time and a dietician is owner for malnutrition indicators. (…) This is important for a sustainable quality management system because these kind of owners have grip on the outcome of the indicator." (Participant 13)

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Chapter 10

A co-creation roadmap towards sustainable quality of care:

A multi-method study

A co-creation roadmap towards sustainable quality of care: A multi-method study

Abstract

Objective: Hospitals demonstrated increased efforts into quality improvement over the past years. Their growing commitment to quality combined with a heterogeneity in perceptions among healthcare stakeholders cause concerns on the sustainable incorporation of quality into the daily workflow. Questions are raised on the drivers for a sustainable hospital quality policy. We aimed to identify drivers and incorporate them into a new, unique roadmap towards sustainable quality of care in hospitals.

Design: A multi-method design guided by an eight-phase approach to develop a conceptual framework consists of multiple, iterative phases of data collection, synthesis and validation. Starting with a narrative review followed by a qualitative in-depth analysis and including feedback of national and international healthcare stakeholders.

Setting: Hospitals.

Results: The narrative review included 59 relevant papers focusing on quality improvement and the sustainability of these improved quality results. By integrating, synthesising and resynthesizing concepts during thematic and content analysis, the narrative review evolved to an integrated, co-creation roadmap. The Flanders Quality Model (FlaQuM) is presented as a driver diagram that features six primary drivers for a sustainable quality policy: (1) Quality Design and Planning, (2) Quality Control, (3) Quality Improvement, (4) Quality Leadership, (5) Quality Culture and (6) Quality Context. Six primary drivers are described in 19 building blocks (secondary drivers) and 104 evidence-based action fields.

Conclusion: The framework suggests that a manageable number of drivers, building blocks and action fields may support the sustainable incorporation of quality into the daily workflow. Therefore, FlaQuM can serve as a useful roadmap for future sustainable quality policies in hospitals and for future empirical and theoretical work in sustainable quality management.

Introduction

Twenty years ago, the US Institute of Medicine defined healthcare quality and called for system changes to build a safer healthcare system [1]. During the past decade, important quality insights are offered into the complex work of healthcare as a dynamic entity constantly transforming to meet the needs of people for better health [2,3]. Lachman and colleagues reflected about the relevance of IOM's 20-year-old definition of quality and proposed a revised, multidimensional quality model including new domains, such as kinship, ecology and transparency. This model reflects the global change of healthcare quality management [4].

Healthcare organisations worldwide have been initiating quality improvements and building a foundation for quality by applying many theories, methodologies and interventions [5,6]. In Flanders, Belgium, accreditation, public reporting and governmental inspection have been the main pillars for the development of hospital's quality management system [7]. However, a recent review has shown that the current evidence about the impact of these pillars on patient processes and outcomes is scarce [8]. Moreover, hospitals' increasing commitment to quality resulted in a heterogeneity in perceptions and attitudes towards quality initiatives among healthcare stakeholders [9,10]. In the past year already ten Flemish hospitals announced their intention to leave hospital-wide accreditation [11], as many Danish and Dutch hospitals did some years ago [12,13]. A growing "quality fatigue" is imminent in hospitals [14,15]. Questions are rising about the sustainability of current initiatives [16,17]. National and international hospital associations are looking for a future, sustainable quality management system [18,19]. Once hospitals have taken the first steps to improve quality, it is important but challenging to sustain the gained quality results and ultimately achieve quality improvement as an integral part of the organisation culture [20–22].

However, evidence in the area of sustaining quality into the daily workflow of healthcare professionals is still lacking [22,23]. First, there is no universal definition, conceptual consistency nor operational clarity for measuring sustainability [22,24–26]. In literature only more general descriptions are found [23,24,27]. Second, most implementation studies do not report the success factors or essential activities for obtaining sustainability [27,28]. Few studies explored influencing activities, which are mainly related to infrastructures [24–26,29], human elements [24,25,29,30] organisational and environmental support [24,25,29] and improvement initiatives [24–26,29,30]. Third, to the best of our knowledge, sustainability is only investigated as a minor part of the implementation process and not as a main pillar for quality management until now [22]. These three elements make it difficult to define broad key themes, hereinafter referred to as 'drivers', contributing to sustainable healthcare quality and to introduce them into real-world practice settings [24,26]. Despite the current evidence [23–

25,29,30], it remains unclear how to translate these results into a meaningful roadmap to incorporate quality into the daily workflow and culture from bedroom to boardroom.

In conclusion, drivers for a sustainable hospital quality management system are essential in hospitals, but the lack of existing evidence show a real literature gap. The purpose of this study is to identify and describe different drivers to incorporate quality sustainably into the daily workflow. Furthermore, we aim to integrate these drivers into an evidence-based framework and roadmap for hospitals towards sustainable healthcare quality.

Methods

Study design

A multi-method design was used, based on Jabareen's eight-phase approach to develop an integrative framework [31]. This eight-phase approach have been used extensively in medical and health services research [32–36] and involves both a narrative review of literature and qualitative research. Our multi-method design contains 1) an in-depth analysis of a wide range of articles and reports and 2) seven group discussions with different healthcare stakeholders until consensus was reached.

Data collection and analysis

In the first phase our objective was to identify drivers to incorporate quality sustainably into the daily workflow. Therefore, a narrative review was performed. Papers were retrieved in three ways (Supplemental Material 1). First, we searched in MEDLINE and Google Scholar search engine for review articles published from January 2010 to October 2020. This date range was chosen in order to review recent advances and updated information in this particular field and to improve the efficiency and accuracy of the search. The main key words and MeSH terms were related to 'framework', 'sustainability' and 'healthcare'. Second, we searched, based on advice of experts from the International Society for Quality in Health Care, online for internationally recognised (research) institutes in healthcare quality and included grey literature, like (white) papers or reports, published on their websites. These were included in the narrative review if relevant to the study. Third, (inter)national experts in healthcare quality policy recommended literature to complement the search results. All research articles and grey literature reports were purposively screened for selection criteria (Table 10.1) by one author (FC) and reviewed by two other authors (DS, KV). The reference lists of included papers were examined for potentially relevant literature not captured in the original search.

Table 10.1 Selection criteria.

Inclusion criteria:	- Peer-reviewed journal articles (secondary research: literature reviews) and grey literature reports
	- Written in English or Dutch
	- Published between January 2010 and October 2020
	- Healthcare settings including hospitals, healthcare organisations and community health
	- Full text available via our institutions' subscriptions or freely available on the Internet
Exclusion criteria:	- Written in languages other than English or Dutch
	- Other settings than the healthcare setting
	- If not relevant to the hospital context
	- Full text not available

In the second phase, extensive reading and categorising of the selected data for relevant concepts to be included in the framework involved a qualitative, in-depth thematic analysis with the NVivo12 software program. Thematic analysis in this framework development refers to the process of identifying and collating meaningful sections of the document text, such as describing the possible contribution of concepts to sustainable healthcare quality. Each article or report was screened for concepts by one author (FC) and discussed with two other authors (DS, KV). Based on these concepts, the first codes were constructed in NVivo12, which were adapted and restructured during the next phases according to new insights by rereading the literature.

During the third phase, content analysis was used to examine how patterns of concepts within and between documents emerge as broad key themes representing sustainable healthcare quality. With NVivo12 the most frequented terms were clustered – combining related terms such as 'staff commitment and attitudes', 'empowerment' or 'engagement' – independently by the research team into these broad key themes, hereinafter referred to as 'drivers'. Furthermore, by using the constant comparison method and thus extensive reading and rereading the literature more themes emerged and refined insights were created into the meaning of these drivers. The preliminary results were discussed at regular intervals by the research team.

In the fourth phase, primary drivers were refined by constructing key secondary drivers, hereinafter referred to as 'building blocks'. The primary drivers and building blocks are categorised and organised according to their features as described in the included literature. By discussions within the research team, any discrepancies in categorisation were resolved and assessed in terms of underlying assumptions, interdependencies and relationships between concepts. This process was repeated by the researchers on a regular basis, individually and as a team, to increase the level of integration of

drivers and building blocks. Moreover, the actionability of concepts for hospitals are kept in mind by developing action fields derived from the literature. A first visual representation was developed iteratively in a driver diagram with four columns. This easy-to-read visual display was chosen because it allows to add or eliminate drivers and building blocks identified during the validation phase [37].

Drivers and building blocks the research team has agreed on having similarities or big differences are aggregated or separated into new ones in the fifth phase.

During the sixth phase, the findings from phase 1 – 5 are synthesized into an integrated framework. As highlighted by Jabareen this phase is *"iterative and includes repetitive synthesis and resynthesis until the researcher recognises a general theoretical framework that makes sense"* [31]. Each building block and the incorporation into a graphical designed roadmap was discussed in detail with the research team.

To validate the content of the conceptual framework in the seventh phase, the graphical designed roadmap is presented to a Flemish healthcare stakeholder group (n=33). This purposive stakeholder group is reflected by its disciplinary breadth with expert representation across a range of health areas: board members of hospitals (n=12), policymakers (n=6), representatives of patient associations (n=3), representatives from the hospital umbrella organisation (n=4) and scientists from different universities with experience in healthcare quality (n=8). By combining stakeholders' varying expertise into the further development of the roadmap, the graphical design is further refined to clearly display the relation and characteristics of the drivers, building blocks and action fields.

In the eighth phase, the roadmap is presented to hospital board members, quality steering groups and to various healthcare disciplines and clinicians in one small regional hospital and one large academic medical centre in Flanders, Belgium. The theoretical roadmap is rethought according to new insights and feedback from healthcare stakeholders working in a real-world setting.

Results

1. Building the quality roadmap

The results of the eight-phase development approach are visualised in Figure 10.1. A total of 59 papers (28 research articles and 31 grey literature reports) fulfilled the selection criteria (i.e. describing a conceptual framework or model or mentioning concepts related to quality improvement and its sustainability) in the narrative review (Supplemental Material 2). During the thematic analysis of the included papers, 593 relevant concepts were captured. In the third and fourth phase, these concepts were clustered into primary drivers and building blocks and visualised as a driver diagram (Figure 10.2).

This concept-mapping process included scientists from our research team with different experiences in healthcare (nurses, pharmacist, physicians, and experts in methodology and data). A driver diagram was constructed with the first column including primary drivers (n=6); the second including building blocks related to primary drivers (n=18); the third including change ideas in the form of evidence-based action fields per building block (n=100); and the fourth presenting the references (n = 59) for each action field (Supplemental Material 3). Next, we integrated the drivers and building blocks. Finally, the results of all meetings with our research team, including the graphical design of the driver diagram as a roadmap) were discussed during a consensus meeting of this sixth phase. Thereafter, the roadmap was presented in the two last phases to a healthcare stakeholder group (n=33) and hospitals board members and clinicians from one small regional hospital and one large academic medical centre. Based on their recommendations, the roadmap was rethought by adding a nineteenth building block 'Legal and technical requirements for inspections, audits and labels' in primary driver 'Quality Control'. By doing so, we created a hospital-wide roadmap, focusing on both care departments and technical departments. Furthermore, this new building block is made actionable by formulating four action fields.
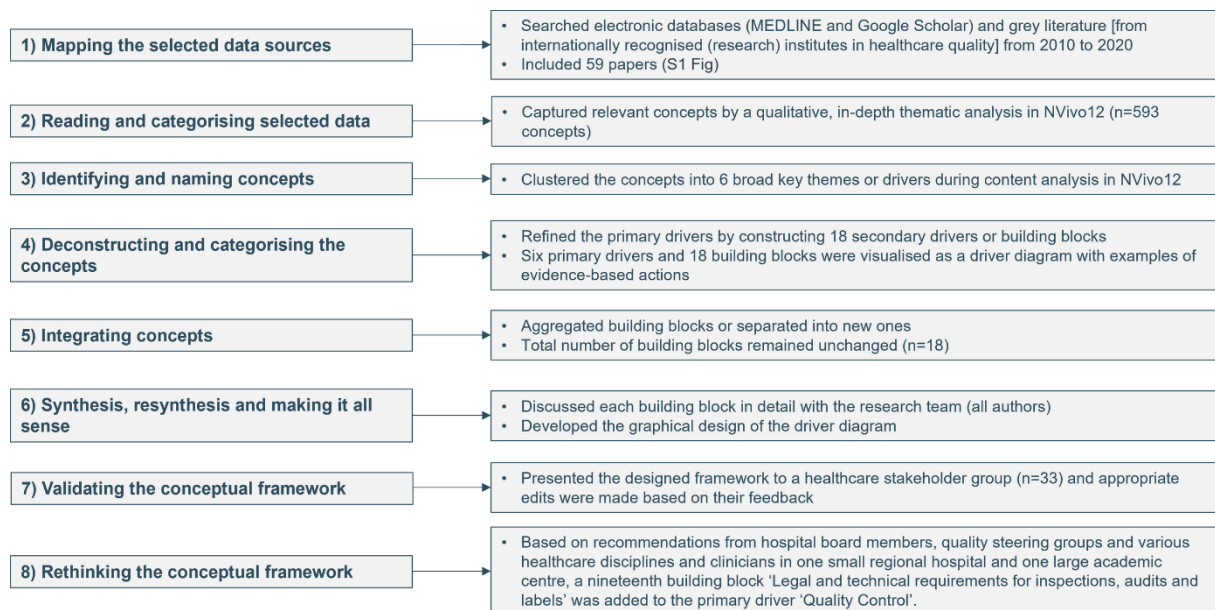
Figure 10.1 Eight-phase framework development approach.
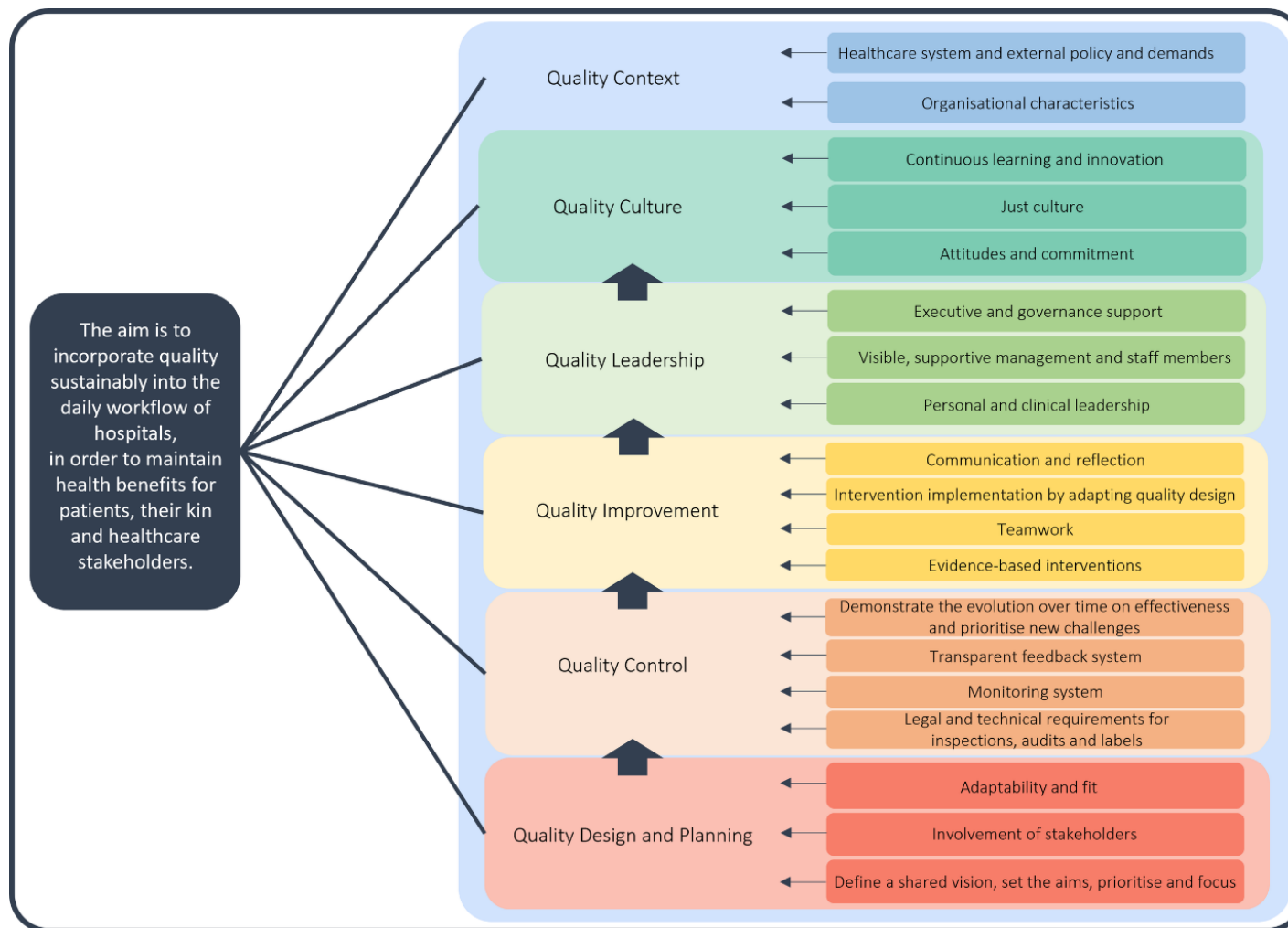
Figure 10.2 Integrated Co-Creation Roadmap Towards Sustainable Quality of Care. Each colour represents a different driver. Each driver is linked to at least two building blocks. It is recommended to read this roadmap from the bottom to the top, starting with 'Quality Design and Planning'. 'Quality Context' is visualised as an overarching driver.

2. Drivers, building blocks and evidence-based action fields

The final result of the framework development approach is visualised in a driver diagram (Figure 10.2). This framework includes six main drivers at the core of the diagram: (1) Quality Design and Planning, (2) Quality Control, (3) Quality Improvement, (4) Quality Leadership, (5) Quality Culture and (6) Quality Context. The order between the drivers is visualised as a roadmap, starting with the drivers 'Quality Design and Planning', 'Quality Control' and 'Quality Improvement'. The next driver is 'Quality Culture'. To reach this culture throughout the organisation, 'Quality Leadership' at every hospital level is needed. The roadmap ends with taking the 'Quality Context' of the real-world setting into account. The drivers are feeding into each other and related to 19 building blocks. These are described in detail below. To make building blocks actionable for organisations, 104 evidence-based action fields are formulated (Supplemental Material 3).

2.1 Driver 1: Quality Design and Planning

The first driver contains three building blocks: (1) 'Define a shared vision, set the aims, prioritise and focus', (2) 'Involvement of stakeholders' and (3) 'Adaptability and fit'. The first building block is the starting point of the co-creation roadmap. In this building block, the focus should be on creating a shared vision from a multidimensional perspective reflecting in everything the organisation does [4]. To define the shared vision, organisations need to create a 'people'-matter mindset through involving stakeholders from the inception towards sustainability. By involving stakeholders, their perspectives, experiences, interests and needs are understood and competing demands are made transparent. Additionally, it is important that the shared vision and aims are not only adapted in the language, culture and structure of the organisation but also fits with internal and external demands and priorities.

2.2 Driver 2: Quality Control

With keeping in mind the shared vision and aims established in driver one, the second driver focuses on controlling the quality of organisations. This driver consists of four building blocks: (1) 'Legal and technical requirements for inspections, audits and labels', (2) 'Monitoring system', (3) 'Transparent feedback system' and (4) 'Demonstrate the evolution over time on effectiveness and prioritise new challenges'. Legal and technical requirements and an up-to-date overview of these requirements are the basis to drive quality control in healthcare organisations. Within the monitoring system, a mix between different kind of indicators and a balance between soft and hard metrics are the focus. This system needs to ensure benchmarking, focus on variation and longitudinal follow-up of quality. Results from the monitoring system will be transparent to all internal and external stakeholders through implementing a real-time feedback system. Thus, the level-of-detail for data (aggregated or individual

data) is defined and the target audience understands the data flow. By focusing on trends, the evolution over time on effectiveness will be demonstrated and new quality challenges will be prioritised.

2.3 Driver 3: Quality Improvement

After planning for quality and further defining quality measures, the focus should be on how to improve quality in order to reach benefits for patients, their kin and healthcare stakeholders. The driver 'Quality Improvement' consists of four building blocks: (1) 'Evidence-based interventions', (2) 'Teamwork', (3) 'Intervention adaptation by adapting quality design' and (4) 'Communication and reflection'. To improve findings of the monitoring system, evidence-based interventions can be developed by combining research, practice and experiences of patients, kin and staff. Important during this intervention development is to focus on identifying symptoms and causes of poor quality within current organisation processes. Evidence-based interventions need to be implemented by means of multidisciplinary teamwork, including team members with different skills, experiences, knowledge and viewpoints. Given the complexity of healthcare work processes, these teams can further adapt the quality design by intervention implementation with respect to the science of human factors engineering. The why, the content and the change methodology of the new design should be clearly communicated to involved stakeholders. They need to reflect about this new design to understand the relation between the intervention, the implementation method and the outcomes for patients, their kin and providers.

2.4 Driver 4: Quality Leadership

In order to achieve successful implementation and sustainability of the first three drivers, leadership in quality is needed. This quality leadership is defined on three different organisational levels, which are described with three building blocks: (1) 'Personal and clinical leadership', (2) 'Visible, supportive management and staff members' and (3) 'Executive and governance support'. Every healthcare provider ensures to work as a purposeful, committed, inspirational and critical leader who tries to understand for example the needs of patients, their kin and colleagues. In practice, they participate to codesign quality initiatives and actively support the organisational goals, the monitoring and feedback system and the implementation of quality initiatives. Ongoing support for these clinical and personal leaders through the management and staff members is ensured by focusing on 'a systems view' and showing dignity and respect to all stakeholders. Executives and boards further ensure that quality is the strategic centre of everything the organisation does. Like all staff, they demonstrate active contribution, involvement and commitment to quality design and planning, quality control and quality improvement.

2.5 Driver 5: Quality Culture

Leadership can create and reinforce the organisational culture in quality, which forms the fifth driver 'Quality Culture'. Three building blocks are incorporated in this driver: (1) 'Attitudes and commitment', (2) 'Just culture' and (3) 'Continuous learning and innovation'. Probably the most common aphorism related to managing people or organisations is that "culture eats strategy for breakfast". In view of this, we assume that everybody lives the core values of quality (e.g. partnership and coproduction, dignity and respect, holistic care, kindness with compassion). Everybody needs to be motivated, engaged, ready for change and beliefs in the quality design and planning, quality control and quality improvement. Moreover, this means that all staff take ownership and show accountability for their relations with every patient, their kin, colleagues and the organisation. Balancing between accountability and support at every organisational level should be supportive for 'a just culture', defined as treating individuals fairly and justly "when things go wrong". It is important that all patients, kin and staff experience this blame free environment with trust and inclusion, to create a continuous learning culture. A learning system embeds the ability to continuously learn from errors/near misses as well from positive outcomes. This can be the basis for an embedded quality and improvement culture where all staff get the opportunity to learn, from safety-I to safety-II.

2.6 Driver 6: Quality Context

The last driver, 'Quality Context', is an overarching driver, that has an influence on the other five drivers. This driver contains two building blocks: (1) 'Organisational characteristics' and (2) 'Healthcare system and external policy and demands'. First, available financial and technical resources, an unambiguous structure from boardroom to bedroom, a competency framework, a capacity and building system and collaboration with external partners are examples of organisational characteristics that supports in the sustainability of healthcare quality. Second, the legislation, ethical and governmental commitment, ensuring financial incentives, the supporting role of external governmental and non-governmental bodies and the external societal demands are healthcare systems' characteristics and external policy and demands. Healthcare organisations cannot change these external characteristics of the system themselves.

Discussion

This article describes the development of a Flanders Quality Model (FlaQuM) as a new roadmap towards a holistic, integrated approach to sustainable quality management. By reconciling integrative research including a qualitative in-depth analysis of our narrative review and input from international and national healthcare experts, we built a roadmap including six drivers, 19 building blocks and 104 evidence-based actions supporting sustainable quality management in hospitals. The development of the framework was non-sequential and iterative in nature, by moving between data collection and analysis, evolving in an eight-phase approach. The qualitative method of data collection created the opportunity for the Flemish healthcare stakeholder group to include additional items that were not addressed in the narrative review. This integrative research with a mixed-methods design fostered to integrate quality concepts into one roadmap, while putting attention to the complexity of sustainability and its holistic approach. These strong empirical foundations underpinning the co-creation roadmap enhance the theoretical validity and clinical relevance, with several possible evidence-based actions derived from our included literature. Quality models which are co-created with stakeholders and are able to sustain in the workflow are more likely to deliver health benefits for patients and healthcare stakeholders [38,39]. Furthermore, by letting quality grow from bottom-up, organisations can regain their diminished commitment to quality which was due to the imposed and bureaucratic feeling of accreditation systems [40]. By focusing on involving and creating value for all stakeholders, from boardroom to bedroom and from healthcare stakeholders to patients, there is the opportunity for patients to take an active role in healthcare quality [41,42]. The roadmap shows hospitals the way to a sustainable healthcare quality through a step-by-step approach focusing on the organisation's priorities and how this can be built up in the organisation's context. In terms of sustainability, all primary drivers are equally important, but we note that most attention at the start of sustainability may go to the first three primary drivers. These three drivers are similar to traditional concepts derived from Juran's Trilogy [43]. Hospitals starting the roadmap with the driver 'Quality Design and Planning', can keep in mind the multidimensional quality model reflected by Lachman and colleagues [4]. The six drivers all feature prominently in existing literature of quality management systems, for example white papers and reports from 15 internationally recognised (research) institutes in quality and safety, for example the Agency for Healthcare Research and Quality [44], the World Health Organisation [45] and the Organisation for Economic Co-operation and Development are included in the literature review [46]. Current research provides only a partial picture of quality management, for example research about a single driver or building blocks [47–50]. This roadmap is, to the best of our knowledge, uniquely poised to promote sustainable quality incorporation into the daily workflow as a holistic, integrated approach for hospital quality management. The benefit of the

roadmap is that organisations can start at any position on the roadmap and any moment in time. This can happen, for example, by defining priorities for next year.

Strengths and limitations of the study

This study is strengthened by its wide scope achieved by means of the narrative review that explored publications, grey literature in the wider context of healthcare and other key references by applying a snowball [51]. This reflects the broad field of quality models and management systems in place. To derive drivers, building blocks and action fields towards sustainable healthcare quality from literature, a multi-method was guided by Jabareen's integrative research approach, which has proven its methodological value to obtain content validity in previous healthcare research [32–36]. By including feedback from multidisciplinary healthcare stakeholders, including clinicians, managers, policymakers and patient representatives, to refine the framework, its clinical and managerial relevance across disciplines is ensured [52]. While the roadmap is presented by the simple visualisation of a driver diagram, it encapsulates considerable complexity and requires substantial effort to implement the features into practice [34]. To support this implementation in a pragmatic and tangible way for hospitals, the roadmap is refined with 104 evidence-based action fields.

Despite these strengths, there are important limitations that need to be highlighted. First, we used narrative review methods instead of a systematic search to collect literature. This is a recognisable methodological limitation; some papers may have been overlooked. However, we attempted to address this potential limitation by consulting international experts in healthcare quality. The purpose was to collect concepts that have been used to sustainable quality and the conceptually grounded method described by Jabareen better aligned with that purpose. Second, the roadmap should be further analysed to understand the international, organisational and cultural differences. However, by including peer-reviewed papers and reports from international institutes in healthcare quality, this roadmap could support all type of hospitals experiencing similar challenges with respect to their specific context.

Practice implications and future research

This co-creation framework provides a theoretical roadmap to improve and sustain healthcare quality**.** Hospitals searching for the next level of quality management can use this evidence-based framework as a roadmap to translate their vision on quality into daily practice. Testing the implementation and utility of the roadmap in real-world practice settings is a next research priority. We will conduct pilot projects to test, implement and further develop the roadmap and to relate sustainable outcomes such as benefits for patients and healthcare professionals. The first experiences of the roadmap implementation in two pilot projects are positive. Clinicians indicate that reflecting with all

stakeholders about quality encourages them to take more ownership. According to new insights and feedback from pilot projects, the roadmap will be revised and further validated. While several exciting opportunities exist for the application and extension of the co-creation roadmap, further international research is needed to fully understand its relevance, transferability and reach in the global context.

Conclusion

In this paper we propose FlaQuM, a new, unique co-creation roadmap towards sustainable healthcare quality to guide researchers, policymakers, hospital managers and clinicians in the sustainability landscape. This co-creation model, of which the content validity is based on the triangulation of multiple forms of evidence like a narrative review and input from international and national experts, clinicians and hospital managers, suggests that a manageable number of six drivers, 19 building blocks and 104 evidence-based action fields may drive the sustainable incorporation of quality into the daily workflow. By focusing on co-creating quality with patients and all relevant stakeholders, we aim to regain commitment, ownership and engagement to quality as growing concerns about sustainability of current hospital quality policies raised. Therefore, FlaQuM can serve as a roadmap to support future sustainable quality policies in hospitals. Future mixed-methods studies will help to further refine and validate the roadmap and to examine the accuracy, applicability, transferability and impact on sustainability. This ongoing approach will support the continuous search towards excellence in quality.

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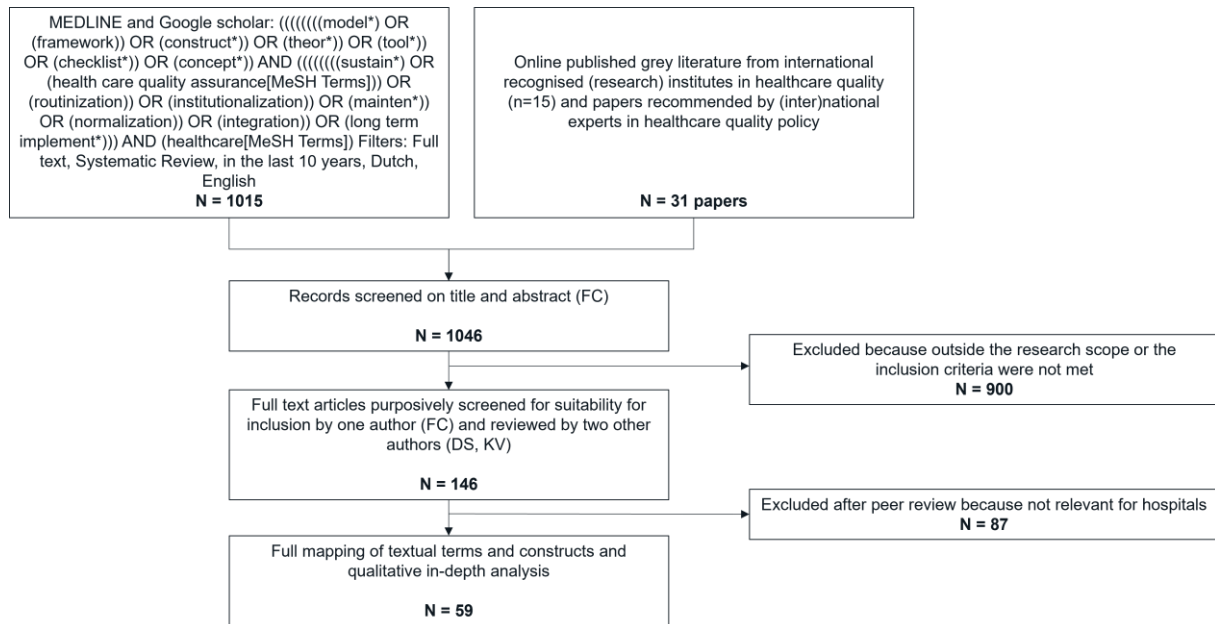
Supplemental Material

Supplemental Material 1: Documents collected for document analysis

Supplemental Material 2: Summary of included papers

Supplemental Material 3: Drivers, building blocks and evidence-based action fields

Supplemental Material 1: Documents collected for document analysis

Supplementary Figure 10.1 Documents collected for document analysis.

Supplemental Material 2: Summary of included papers

Supplementary Table 10.1 Summary of included papers.

	Author	Year	Country	Design	Setting	Objectives	Type of report [Research Article / Grey literature report (Internationally recognised institute in healthcare quality)]
1	Kabcenell *et al.*	2010	USA and Europe	Observational study in healthcare organisations (n=13) from the US and Europe	Healthcare organisations	To learn if and how healthcare organisations could make dramatic improvements in performance across the organisation, resulting in a considerably more efficient and effective healthcare system.	Grey literature report (Institute for Healthcare Improvement)
2	Kaplan *et al.*	2010	USA	Systematic review (n=47 included articles)	Healthcare organisations and system	1) To identify the contextual factors associated with QI success; 2) To categorise, summarise, and synthesise these factors based on their common characteristics and the level of the healthcare system in which they operate; 3) To understand the current stage of development of this field of research.	Research Article

3	Maher *et al.*	2010	UK	A co-production approach with front line teams, improvement experts, senior administrative and clinical leaders from within the NHS and people with specific expertise in the subject area from academia and other industries (number of contributors is not available)	Healthcare setting	To support healthcare leaders to implement and sustain effective improvement strategies leading to increased quality and patient experiences at lower cost.	Grey literature report (NHS Institute for Innovation and Improvement)
4	Balik *et al.*	2011	USA	An in-depth review of the research, studied exemplar organisations, and interviewed experts in the field (number of included articles, exemplar organisations or experts is not available)	Hospitals	To identify the primary and secondary drivers of exceptional patient and family inpatient hospital experience (defined as care that is patient-centred, safe, effective, timely, efficient, and equitable), as measured by the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey's "willingness to recommend" the hospital.	Grey literature report (Institute for Healthcare Improvement)
5	O'Leary *et al.*	2012	USA	Literature review (Number of included articles is not available)	Hospitals	To summarise the current understanding of teamwork, describe interventions designed to improve	Research Article

						teamwork, and make practical recommendations for hospitals to assess and improve teamwork-related performance.	
6	Cunningham *et al.*	2012	Australia	Systematic review (n=26 included articles)	Healthcare setting	To conduct a systematic review of studies of professionals' network structures, identifying factors associated with network effectiveness and sustainability, particularly in relation to quality of care and patient safety.	Research Article
7	Lawton *et al.*	2012	UK	Systematic review (n=95 included articles)	Hospitals	To develop a 'contributory factors framework' from a synthesis of empirical work which summarises factors contributing to patient safety incidents in hospital settings.	Research Article
8	Meyer *et al.*	2012	USA	Expert opinion of the authors (n=10)	Healthcare setting	To provide guidance for a new, more practical quality measurement policy.	Research Article
9	Wiltsey Stirman *et al.*	2012	USA	Systematic review (n=125 included articles)	Healthcare setting	To review the methods that have been used, the types of outcomes that have been measured and reported, findings from studies that reported long-term implementation outcomes, and factors that have been identified as potential influences on the sustained	Research Article

						use of new practices, programs, or interventions	
10	Healthcare Improvement Scotland	2013	Scotland	A project in partnership with NHS Tayside (Experts were consulted, a literature search and interviews with key informants; number of experts, articles or interviews is not available)	Healthcare organisations	To gain an insight into how ongoing improvement could be embedded into clinical culture to improve the quality of healthcare delivery.	Grey literature report (Healthcare Improvement Scotland)
11	Healthcare Improvement Scotland	2013	Scotland	No comprehensive review of the literature, but the combination of existing resources (secondary studies) in an accessible and practical way (Number of included articles is not available).	Healthcare organisations	1) To increase the understanding of the key issues around spread and sustainability; 2) To signpost readers to existing valuable resources on these topics; 3) To assist quality improvement practitioners in the process of planning for spread and sustainability of improvement and its implementation; 4) To advise supporting organisations on initiatives that could facilitate spread and sustainability of	Grey literature report (Healthcare Improvement Scotland)

						improvements at a national level.	
12	Lega *et al.*	2013	Italy	Systematic review (n=37 included articles)	Healthcare system and organisations	To present and discuss the streams of knowledge regarding how management can influence the quality and sustainability of health systems and organizations.	Research Article
13	Swensen *et al.*	2013	USA	Based on the results of a 90-Day Innovation Project on leadership, conducted five expert interviews, and convened an expert leaders meeting of 12 recognized organizational leaders	Healthcare organisations	To present three interdependent dimensions of leadership: new mental models, High-Impact Leadership Behaviors, and the IHI High-Impact Leadership Framework.	Grey literature report (Institute for Healthcare Improvement)
14	Groene *et al.*	2014	Europe (Czech Republic, France, Germany, Poland, Portugal, Spain and Turkey)	Based on state-of-the art research and synthesises the results of the DUQuE Project and other large-scale. empirical studies, systematic reviews, and expert knowledge (number of included articles, empirical studies	Hospitals	To provide an up-dated framework to assess quality and safety improvement in hospitals.	Grey literature report ['Deepening our Understanding of Quality Improvement in Europe (DUQuE)' collaboration]

				and experts is not available)			
15	Jeffcott *et al.*	2014	Scotland	Literature review and with face-to-face meetings with subject matter experts (number of included articles and experts is not available	Healthcare setting	To develop an accessible resource to help healthcare practitioners understand the key factors that impact on the successful spread and sustainability of improvement.	Grey literature report [Healthcare Improvement Scotland (on behalf of NHS Scotland Quality Improvement Hub)]
16	Minnier *et al.*	2014	USA	Based on experiences of the authors in healthcare organisations, such as the University of Pittsburgh Medical Center (number of observed organisations is not available)	Healthcare organisations	To develop an educational program that helps selected staff develop the knowledge and tools required to plan and implement a quality improvement project that will yield lasting results.	Grey literature report (Agency for Healthcare Research and Quality)
17	Agency for Healthcare Research and Quality	2015	USA	Based on the CUSP patient safety model and the experience of the more than 2,000 hospitals that have participated in the CLABSI and CAUTI prevention projects from 2008 through 2015	Hospitals	Not specified.	Grey literature report (Agency for Healthcare Research and Quality)

18	Ament *et al.*	2015	The Netherlands	Systematic review (n=14 included articles)	Healthcare setting	1) To evaluate the state of the art in sustainability research; 2) To evaluate the outcomes of professionals' adherence to guideline recommendations in medical practice.	Research Article
19	de Silva *et al.*	2015	UK	A rapid collation of empirical research n=73 articles about the NHS were analysed, as well as more than 100 studies from other countries as a comparison)	Hospitals and the healthcare system	To compile published research about the key barriers to improvement in the NHS.	Grey literature report (The Health Foundation)
20	Hollnagel *et al.*	2015	Denmark, USA and Australia	Based on expert experiences and based on models used in other settings than the healthcare setting (Number of experts and models are not available)	Healthcare system	To explain the key differences between, and implications of, the two ways of thinking about safety (Safety-I and Safety-II).	Grey literature report (The Resilient Health Care Net)
21	Johnson *et al.*	2015	UK	Systematic review (n=67 included articles)	Healthcare setting	To establish the characteristics of successful behaviour change interventions in healthcare.	Research Article
22	Marimuthu *et al.*	2016	Malaysia	Systematic review (number of included	Healthcare setting	To focus on three main conceptual aspects – dimensions of sustainability	Research Article

				articles not available)		practices in healthcare, drivers of sustainable practices within the industry and strategies to implement sustainability effectively in healthcare.	
23	Murray	2015	Australia	Literature review (n=33 included articles)	Hospitals	To explore how community representation in hospital governance is achieved.	Research Article
24	Health Service Executive	2017	Ireland	The Framework is informed by international models and evidence as well as local improvement experience and learning (numbers of models, included articles and case studies not available)	Healthcare organisations	To develop a framework that fluences and guides our thinking, planning and delivery of care in our services	Grey literature report (Health Service Executive)
25	Scoville *et al.*	2016	USA	Literature review and interviews with leading organisations (number of interviews is not available)	Healthcare organisations	To present a framework that healthcare organisations can use to sustain improvements in the safety, effectiveness, and efficiency of patient care.	Grey literature report (Institute for Healthcare Improvement)
26	Willis *et al.*	2016	Canada	Literature review (n=68 included articles)	Healthcare organisations	1) To discuss the guiding principles by which organisational culture change may be sustained	Research Article

						in healthcare organisations; 2) To discuss the mechanisms by which these principles may operate; 3) To discuss the contextual factors that influence the likelihood of these principles being effective.	
27	Agency for Healthcare Research and Quality	2017	USA and Canada	Observational study of the Agency for Healthcare Research and Quality (AHRQ) Safety Program for Ambulatory Surgery (in the United States, organisations included Intermountain Healthcare, Virginia Mason Hospital & Medical Center, and ThedaCare; international leaders included Saskatoon Health Region in Saskatchewan Province, Canada).	Healthcare organisations	Not specified.	Grey literature report (Agency for Healthcare Research and Quality)

28	Frankel *et al.*	2017	USA	A group of subject-matter experts at the Institute for Healthcare Improvement (IHI) and Safe & Reliable Healthcare (SRH) that collaborated over 15 years to develop this framework (number of experts is not available)	Healthcare system and organisations	To develop and lay out a practical framework for how any healthcare organisation or system can continuously and reliably improve patient safety.	Grey literature report (Institute for Healthcare Improvement)
29	Gabutti *et al.*	2017	Italy	Systematic review (n=42 included articles)	Hospitals	To make stock of what is known in the field of hospital organisation about how hospitals are changing, as well as of how such change may be implemented effectively through managerial tools.	Research Article
30	Jabbal	2017	England	Based on a roundtable event (n=13), semi-structured interviews with senior NHS leaders (n=5) and stakeholders involved in quality improvement initiatives (n=2), and a literature review (number of included	Healthcare system and organisations	To capture the narratives and practical lessons from leaders of organisations that are already engaged with quality improvement as a routine way of working.	Grey literature report (The King's Fund)

				articles is not available).			
31	Alderwick *et al.*	2017	England	Based on existing literature and examples from within the NHS of where quality has been improved and describing how this was done (number of included articles are not available)	Healthcare system and organisations	Not specified.	Grey literature report (The King's Fund and The Health Foundation)
32	Perlo *et al.*	2017	USA	Based on scans of the current published literature on engagement, satisfaction, and burnout; more than 30 expert interviews based on the literature scan, including interviews with patients and exemplar organizations both within and outside of healthcare; site visits; and, finally, learning from 11 health and healthcare systems working to improve joy in work as they	Healthcare organisations	1) To serve as a guide for healthcare organisations to engage in a participative process where leaders ask colleagues at all levels of the organization, "What matters to you?" — enabling them to better understand the barriers to joy in work; 2) To co-create meaningful, high-leverage strategies to address these issues.	Grey literature report (Institute for Healthcare Improvement)

				participated in a two-month prototype program testing steps, refining the framework, and identifying ideas for improvement			
33	Scoville *et al.*	2017	USA	A pilot test of key sustainability practices in two ambulatory surgery centers in a project sponsored by AHRQ in collaboration with the Health Research & Educational Trust (HRET)	Healthcare organisations	Not specified.	Grey literature report (Institute for Healthcare Improvement)
34	Breyer *et al.*	2019	Brazil	Systematic review (n=35 included articles)	Hospitals	To identify and describe hospital quality indicators, classifying them according to Donabedian's structure, process and outcome model and in specific domains (quality, safety, infection and mortality) in two care divisions: inpatient and emergency services.	Research Article
35	Geerligs *et al.*	2018	Australia	Systematic review (n=43 included articles)	Hospitals	To identify and explore relationships between these barriers and facilitators to highlight key domains that need to be addressed by	Research Article

						researchers and clinicians seeking to implement hospital-based, patient-focused interventions.	
36	Hilton *et al.*	2018	USA	Based on existing research, methods, and examples, and with a focus on Everett Rogers' early adopters and early majority categories (number of included articles, methods and examples is not available)	Healthcare organisations	To present a framework and set of methods for the psychology of change — five interrelated domains of practice that organizations can use to advance and sustain improvement.	Grey literature report (Institute for Healthcare Improvement)
37	Lennox *et al.*	2018	UK	Systematic review (n=62 included articles)	Healthcare setting	1) To identify what approaches are available to assess and influence sustainability in healthcare; 2) To describe the different perspectives, applications and constructs within these approaches to guide their future use.	Research Article
38	Mortimer *et al.*	2018	UK	Expert opinion of the authors and a case study	Healthcare system	1) To identify stages in the quality improvement process at which sustainability is usefully considered and make specific suggestions for its inclusion;	Research Article (Centre for Sustainable Healthcare)

						2) To set out a simple approach for incorporating sustainability into mainstream quality improvement methodologies.	
39	Shelton *et al.*	2018	USA	Literature review (number of included articles is not available)	Public health and the healthcare setting	To understand what factors and processes influence the sustainability of interventions and how to plan proactively for the continuation of evidence-based interventions.	Research Article
40	Slade *et al.*	2018	Australia	A rapid review (n=16 included articles/frameworks)	Health system	To evaluate frameworks for embedding research into routine allied health practice, as the basis for high quality, safe, efficient and consumer-focused care.	Research Article
41	Daley Ullem *et al.*	2018	USA	IHI Lucian Leape Institute's research scan, evaluation of governance education in quality, and more than 50 interviews with governance experts, health system leaders, and trustees	Healthcare organisations	To reduce variation in and clarify trustee responsibilities for quality oversight, and also serve as practical tools for trustees and the health system leaders who support them to govern quality in a way that will deliver better care to patients and communities	Grey literature report (Institute for Healthcare Improvement)
42	Di Vincenzo	2018	Italy	Observational study in 35 hospitals organisations	Hospitals	To study the dynamics of networking behaviours of hospital organisations.	Research Article

43	World Health Organization Service Delivery and Safety Department	2018	Switzerland	Existing WHO tools and resources on quality improvement are collated	Healthcare system and organisations	To support implementation of quality improvement approaches to make health services more effective, safe and people-centred.	Grey literature report (World Health Organization)
44	Côté-Boileau *et al.*	2019	Canada	A scoping review (n=24 included articles)	Healthcare system	1) To consolidate the evidence on the 3S of healthcare innovation to better understand how they work; 2) To consolidate the mechanisms and contextual conditions that enable complex health systems and organisations to increase uptake of innovations.	Research Article
45	Hailemariam *et al.*	2019	USA	Systematic review (n=26 included articles)	Public health community-based organisations	To summarise the existing evidence supporting discrete sustainment strategies for public health EBIs and facilitating and hindering factors of sustainment.	Research Article
46	MacLeod	2019	Ireland	Expert opinion of the author	Healthcare organisations	Not specified.	Grey literature report (International Society for Quality in Health care)
47	Busse *et al.*	2019	Denmark	Available evidence on different quality strategies is summarised and recommendations	Healthcare system	1) To provide an overall conceptual framework for understanding and applying strategies aimed	Grey literature report (World Health Organization, The Organisation for

				for their implementation are provided (number of included articles is not available)		at improving quality of care; 2) To help policymakers to understand concepts of quality and to support them to evaluate single strategies and combinations of strategies.	Economic Co-operation and Development, The European Observatory on Health Systems and Policies supports)
48	Patient Safety Learning	2019	UK	Not specified	Healthcare organisations	To describe the actions needed to make the patient-safe future a reality	Grey literature report (Patient Safety Learning)
49	Plessers *et al.*	2019	Belgium	Literature and expert opinion (number of included articles and experts is not available)	Healthcare system and organisations	1) To define the concept of quality indicator; 2) To describe how they can be developed in a systematic, evidence-based way.	Grey literature report [Vlaams Instituut voor Kwaliteit van Zorg (Flemish Institute for Quality of Care)]
50	Braithwaite *et al.*	2020	Australia	Systematic review (n=92 included articles)	Healthcare system and organisations	To describe theoretical frameworks, definitions and measures of sustainability, as applied in published evaluations of healthcare improvement programmes and interventions.	Research Article
51	Canadian Patient Safety Institute	2020	Canada	Based on different models, theories and frameworks (number of models, theories and	Healthcare organisations	To support teams across all healthcare sectors in using a Knowledge Translation and Quality Improvement integrated approach to	Grey literature report (Canadian Patient Safety Institute)

				frameworks not available)		change that will impact patient safety outcomes.	
52	Cowie *et al.*	2020	Scotland	Systematic review (n=32 included articles)	Hospitals	To identify, appraise and synthesise the barriers and facilitators that influenced the delivery of sustained healthcare interventions in a hospital-based setting.	Research Article
53	Gandhi *et al.*	2020	USA	Expert opinion and case studies (Number of experts and case studies not available)	Healthcare system and organisations	Not specified.	Research Article
54	Lachman *et al.*	2020	Ireland	Expert opinion of the authors	Healthcare system and organisations	To revise the basic quality framework and to redefine quality with the advantage of the experience gained over the past 20 years.	Research Article
55	MacLeod	2020	Ireland	Expert opinion of the author	Healthcare organisations	Not specified.	Grey literature report (International Society for Quality in Health care)
56	National Steering Committee for Patient Safety	2020	USA	The recommendations are built on the substantial body of experience, evidence, and lessons learned that the NSC has gathered (n=27 organisations)	Healthcare organisations	To illuminate the collective insights of the 27 organisations represented on the National Steering Committee for Patient Safety (NSC), united in their efforts to achieve safer care and reduce harm to patients and those who care for them	Grey literature report (Institute for Healthcare Improvement)

57	O'Donovan *et al.*	2020	Ireland	Systematic review (n=36 included articles)	Healthcare organisations	To identify enablers of psychological safety within the literature in order to produce a comprehensive list of factors that enable psychological safety specific to healthcare teams.	Research Article
58	Shah	2020	UK	Expert opinion of the author	Healthcare system and organisations	1) To explore the difference between quality improvement and a quality management system, by defining quality improvement; 2) To describe how to best use quality improvement alongside control, assurance, and planning as part of a more holistic management system focus on quality.	Research Article
59	Healthcare Improvement Scotland	2018	Scotland	Literature review, expert interviews (n=22) and discussions with a wide range of stakeholders across Scotland through a mixture of focus groups (n=18 focus groups) and individual meetings (n=32 individuals)	Healthcare system	To describe the key components and functions of a national quality management system that is tailored and relevant to Healthcare Improvement Scotland and its key national partners.	Grey literature report (Healthcare Improvement Scotland)

Supplementary Table 10.2 References for included papers.

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Supplemental Material 3: Drivers, building blocks and evidence-based action fields

Supplementary Table 10.3 Drivers, building blocks and evidence-based action fields.

Six drivers	19 building blocks	Evidence-based action fields (not exhaustive)
1. Quality Design and Planning	1.1 Define a shared vision, set the aims, prioritise and focus	- A shared vision on quality is defined from a multidimensional perspective and this vision is reflected in everything the organisation does, including technical dimensions and core values [4, 25, 26, 30, 31, 33, 37, 48, 54, 58]. - Patients, their kin as well as providers are central in the (established) aims [4, 24, 25, 28-30, 32, 53, 54, 56]. - Quality is prioritised as a key strategic goal of the organisation [30, 38, 48, 53]. - Resources to sustain quality are allocated [26, 35, 37, 38, 45, 51]. - The focus is on progress by small steps, giant leaps forward are not expected [26, 30, 31, 46].
	1.2 Involvement of stakeholders	- The organisation has a 'people matter'-mindset: buy-in of all stakeholders at all levels is ensured to codesign the quality vision and aims [1, 14, 15, 25, 23, 30-32, 36, 37, 40, 47, 53, 55]. - The stakeholders for the whole quality management model are mapped from the inception towards sustainability [3, 17, 26, 35, 44-46, 51, 59]. - Their perspectives, experiences, interests and needs are understood to create value for all stakeholders [16, 25, 30, 32, 35, 39, 44, 52, 53, 59]. - Competing demands and interests are made transparent [22, 25, 31, 33, 58]. - Competing demands are negotiated and navigated to gain genuine agreement on value creation [9, 15, 28, 30, 37, 44].
	1.3 Adaptability and fit	- The quality vision and aims fit with internal and external demands and priorities [11, 25, 26, 37]. - The vision and aims are adapted in the language, culture and structure of the organisation [3, 9, 16, 19, 25, 35, 37, 52]. - Adaptability and fit are balanced by identifying and understanding local barriers [3, 11, 17, 21, 39, 44, 45, 51, 52]. - The known change methods and models are identified in the organisation so innovations can be adapted and adopted smoothly [10, 15, 25, 28, 30, 46, 48, 51, 52, 58].
2. Quality control	2.1 Legal and technical requirements and audits	- An up-to-date overview of legal requirements for audit or inspection of clinical services, supporting departments and technical facilities is available [7, 14, 35, 40, 44, 47, 48, 52, 56, 58]. - An up-to-date overview of the specifications for voluntary audits and labels is available [7, 14, 25, 30, 35, 47, 52, 58]. - There is a coordinating body and contact person per clinical/technical/organisational department for the quality control and follow-up [26, 35, 48]. - The internal and external reporting lines (e.g. annual reports) and deadlines are defined as well as planned based on the standards for both legal requirements as well as voluntary label achievements [8, 14, 28].

	2.2 Monitoring system	- Indicators and indicator specific targets are defined based on the vision and aims of the organisation [15, 25, 26, 31, 51]. - A mix between structure, process, outcome and balancing indicators and a balance between soft and hard metrics are the focus [26, 30, 37, 44, 46, 48, 51, 52, 58]. - For each indicator the monitoring system (automated controls or controls by the workforce) and the level of data collection (data on individual or aggregated level) is defined [2, 8, 11, 31, 34, 49]. - The monitoring system to ensure benchmarking, focus on variation and longitudinal follow-up is defined [3, 25, 28, 48]. - Investments are made in the required human, IT and financial resources for a quality monitoring system [2, 8, 9, 14, 17, 22, 24, 30]. - There is an open and clear communication to motivate staff to take on challenges and to feel safe about reporting quality issues [15, 25, 28, 35, 48]. - The quality monitoring system is an ongoing process [21, 25, 43, 50, 52, 56].
	2.3 Transparent feedback system	- The monitored measurements are communicated real-time, with continuous feedback loops, benchmarked where possible, longitudinal monitoring and variation within and between organisations is made transparent [9, 14, 21, 30-32, 37, 44, 47, 50]. - The target audience understands the data source, the data collection method, the data analysis and the visualisation of the data to enhance the credibility and ownership [15, 31, 53]. - The level of detail of the data (aggregated or individual) with the target audience made transparent (individual patients and their kin, individual providers, teams, departments, management, board, partner organisations, patient advocacy groups, government or society) is defined [11, 13, 27, 28, 53]. - Visual management is applied with actionable data or run charts on learning boards so the target audience is able to use and interact with real-time data to drive improvement [15, 17, 27, 25, 28, 33, 43, 53, 58]. - Feedback on positive outcomes and achievements is included in the feedback system [17, 20, 32, 36, 52, 53].
	2.4 Demonstrate the evolution over time on effectiveness and prioritise new challenges	- The quality monitoring system is able to focus on trends [3, 9, 16, 28, 37, 52, 58]. - The link between the monitored data and the improvement intervention is clear [3, 15, 31, 37, 45, 48, 51, 52]. - An overview of quality improvement indicators and initiatives and follow-up of quality improvement projects is accurate and available for all staff [1, 8, 28, 33, 49, 56]. - Quality initiatives are prioritised based on trends of the monitoring system, the advice of internal and external inspections or evidence [21, 24, 25, 28, 40, 51]. - The value of the improvement projects (cost/benefit) is made transparent [8, 13, 15, 22, 32, 38, 58].
3. Quality Improvement	3.1 Evidence based interventions	- An intervention is developed based on the findings of the quality monitoring system [24, 34, 39, 49]. - The intervention is defined based on the analysis of the current process, by identifying the characteristics and causes of poor quality [15, 25, 30, 31, 48].

		- The content of the (bundled) intervention is based on the latest evidence and knowledge is created by combining research, practice and the experiences of patients, their kin and staff [3, 4, 9, 14-16, 18, 19, 21, 24, 28, 35, 40, 45, 48, 51, 52, 58]. - All staff members have access to and knowledge of the latest evidence [15, 17, 35, 40, 46, 48].
	3.2 Teamwork	- All quality improvement projects are performed by multidisciplinary teams and individuals with different skills, experiences, knowledge and viewpoints [2, 5, 17, 35, 52]. - Teams work on their relationship by enhancing shared goals, shared knowledge and mutual respect and communicate frequent, timely, accurate and problem-solving [7, 5, 26-28, 31, 33, 35, 37, 46, 51, 55, 58]. - Collaboration between and within teams occurs within a higher teamwork climate: a focus exists on positive, trusting relationships, psychological safety and familiarity [5, 26, 32, 44, 55, 57]. - Management support activities to enhance joy in work [30, 32, 45]. - Teams continuously improve their collaboration and implementation strategies by reflecting back and planning forward [25, 28, 32, 44].
	3.3 Intervention implementation by adapting quality design	- An overall consistent approach is defined for quality improvement, implementation and sustainability [24, 25, 30-33]. - State of the art implementation methods and strategies are chosen with respect to micro, meso and macro culture and context. [2, 9, 11, 14, 26, 51]. - The content of the intervention and the implementation methods are discussed with the involved teams to enhance the sustainability of current improvement and future new designs [32, 35, 43, 51]. - Redesign is performed with respect to human factors (and systems engineering) [1, 7, 15, 28, 36, 48]. - Processes and procedures are only standardized where possible and necessary [7, 14, 25, 28, 33, 54, 58]. - Processes and procedures are translated and integrated so they encompass the chosen change and methods used so teams understand the 'what, why and how' of the new design [7, 14, 25, 28, 33, 54, 58].
	3.4 Communication and reflection	- There is clear communication about the why of the redesign, the content of the new design and the change methodology [11, 15, 30, 35, 39, 44, 46]. - Staff is motivated to critically reflect on the redesign and new design process [16, 20, 28, 33, 36, 52, 58]. - The team reflects together to understand the relation between the intervention, the implementation method and the outcomes for patients, their kin and providers [28, 44, 51]. - Successful change projects and positive trends in indicators are celebrated and communicated organisation-wide, to patients and their kin and to the community [3, 4, 17, 26, 30, 32, 35, 36, 48, 53, 58]. - New knowledge about quality improvement, implementation and sustainability is shared by team members themselves across different teams and partner organisations, In doing so, the leadership role of individual team members is strengthened. [11, 15, 26, 28, 31, 48, 52, 53, 58].
4. Quality Leadership	4.1 Personal and clinical leadership	- Every healthcare provider is a clinical leader: he is purposeful, committed, understands the needs of patients, their kin and colleagues, participates in codesign initiatives, inspires and thinks critically [1, 2, 5, 9, 15, 25, 26, 28, 31, 32, 36, 47, 48, 53, 59].

		- Clinical leaders actively support the organisational goals (quality design, quality control, quality improvement) and facilitate all team members to contribute their views, expertise, and ideas [3, 5, 10, 13, 15-17, 21, 25, 26, 32, 36, 57, 58]. - Leaders show integrity and lead by example in actions and language [4, 10, 13, 15, 32, 55, 57]. - Leaders create a healthy environment for staff, patients and their kin with psychological and physical safety, trust, value alignment and respect for everyone [15, 22, 28, 32, 48, 53, 55-57]. - Clinical leaders feel safe to share their expertise and experiences with all other staff members from bedroom to boardroom [12, 22, 32]. - Leadership development is supported by the management [12, 13, 24, 25].
	4.2 Visible, supportive management and staff members	- Management is visible and accessible to the frontline teams so that managers understand the complex operational challenges, bottlenecks and barriers in order to improve those in practice [13, 15, 16, 25, 27, 30, 48, 52]. - Ongoing support is ensured by motivating frontline teams and enabling them to engage in quality and to continue to improve and learn [9, 12, 16, 24- 28, 30, 31, 35]. - Managers take 'a systems view': they coach, facilitate, coordinate and actively participate in projects with staff in order to build staff capacity and expertise for quality [14, 25, 30, 32, 33, 38, 48, 53]. - Strong quality champions advocate, adapt and embed the use and importance of quality into their daily routine [2, 13, 15- 17, 21, 35, 48, 51, 52, 57]. - Management and staff members are aware of the new evidence or change methods on quality design, quality control and quality improvement and share their own knowledge with external partners [14, 15, 28, 32, 36, 40, 45]. - Management show dignity, respect and their appreciation for the commitment of all stakeholders [4, 17, 30, 32, 58].
	4.3 Executive and governance support	- Executives and boards ensure that quality is a strategic priority in the organisation that informs every action and is the centre of all we do [1, 4, 13, 23, 24, 30-33, 45, 48, 53, 56, 58]. - Within the board are specific board members have expertise and experience in quality [12, 24, 28, 30, 31, 41, 58]. - Executives and boards set quality on the policy agenda to discuss quality indicators as well as individual stories during meetings [1, 14, 31, 36, 48, 53]. - Executives support, encourage and enable engagement of management, staff and patients and their kin in quality design, quality control and quality improvement [1, 3, 30, 31, 53, 58]. - Executives are visible and accessible to the entire organisation from boardroom to bedroom [24, 30, 32, 47, 57]. - Involvement and commitment to quality improvement is demonstrated by the executives and boards [1, 14, 25, 30, 31, 41, 43-46, 48, 58]. - Board members actively contribute to the quality management structure and the communication lines are clear [30, 31, 33, 48, 57].
5. Quality Culture	5.1 Attitudes and commitment	- Everybody lives up to the core values of quality: dignity and respect, partnership and co-production, holistic care and kindness with compassion [3, 4, 14, 30, 32, 36, 48, 54, 56].

		- All staff, patients and their kin are motivated, engaged, ready for change and believe in the aims of the quality design, the quality control and the quality improvement of the organisation [1, 9, 14-17, 24, 26, 30, 32, 35-37, 51-53, 55, 56]. - When there are quality problems or patient safety incidents, all staff approach each other respectfully [28, 32, 48, 57]. - All staff take ownership and accountability for the relation with every patient and their kin, every colleague and the organisation [27, 28, 35, 43, 48, 52, 57, 58]. - Everybody participates in celebrating successes which are internally and externally communicated [17, 30, 32, 53]. - Everybody is aware that healthcare is a complex and high-risk environment where individual actions and organisational systems act together [17, 28, 48].
	5.2 Just Culture	- A just culture is supported by balancing between accountability and support at every level of the organisation [10, 27, 28, 57, 53]. - Initiatives to enhance psychological safety of patients, their kin and providers are supported throughout the organisation, both within and between all departments, professions and stakeholders [28, 32, 48, 53, 56, 57]. - All staff, patients and their kin experience a blame free environment with trust, inclusion, dignity and respect [10, 25, 30, 32, 48, 53, 56, 57]. - Individuals are encouraged and feel safe to report errors or near misses and all type of quality concerns and seek solutions to problems without fear, negative consequences or obstacles for learning [7, 17, 28, 32, 35, 48, 57].
	5.3 Continuous learning and innovation	- This organisation is a learning organisation with an embedded quality culture and the 'science of improvement' [17, 43, 46, 48, 51, 53, 57, 58]. - The safety-I and safety-II principles are used throughout the organisation and known to all stakeholders [1, 20, 48, 53]. - All staff get the opportunity to learn from positive and negative outcomes [1, 17, 28, 53, 57]. - All staff are engaged in problem solving and feel safe to suggest improvement actions, projects and movements [28, 39, 48]. - Quality innovations are performed proactively rather than reactively [28, 32, 48, 53, 54, 56]. - The generated knowledge from innovation is shared with internal and external partners [8, 48, 56, 58]. - While continuously learning and innovating, all internal and external bottlenecks, challenges and opportunities are explored [1, 3, 28, 48].
6. Quality Context	6.1 Organisational characteristics	- There are financial resources available to facilitate quality design, quality control, quality improvement, quality leadership and quality culture [2, 16, 17, 35, 37, 40, 45, 52]. - There is an unambiguous structure of quality from bedroom to boardroom, with defined roles, job descriptions and communication requirements [3, 7, 10, 14, 23, 25, 26, 30, 33, 35, 40, 43, 46, 48, 52]. - The organisation invests in appropriate staff levels and protected time to enhance and sustain quality. A competency framework is available to track and ensure that all staff are qualified to perform their work and be accountable [14, 25, 30, 35, 40, 48, 52].

		- A capacity and capability building system is in place with training and education for all staff to monitor the organisational readiness for change [1, 7, 9, 15-17, 23, 30, 31, 35, 37-39, 45, 47, 48, 51-53, 58]. - The appropriate technical resources for quality control, quality improvement and quality sustainability are in place [7, 19, 29, 52, 58]. - Individuals, teams and departments work in a standardised and uniform way across the organisation [25, 27, 28, 33, 48]. - The organisation collaborates with external partners with respect to their policy, system and culture [6, 13, 30, 31, 34, 40, 42, 52].
	6.2 Healthcare system and external policy and demands	- The legislation, ethical and governmental policies are clear and support the organisations' internal and cross boundary collaborations on quality [2, 30, 35, 40, 44, 48, 52]. - The healthcare system provides financial incentives to improve and sustain quality [7, 9, 26, 47]. - The role of external governmental and non-governmental bodies in quality design, quality control and quality improvement are transparent and unambiguous [14, 47, 56]. - A synergy exists between the timeframe and local quality improvement approach on the one hand and the national approach to measure and monitor performance on the other hand [14, 23, 28, 30, 34, 44]. - The quality vision and aims, timing and methods used by external partners are in line with the organisation specific quality design, quality control and quality improvement [14, 26, 30, 35, 39, 44]. - External societal demands are in line with the internal vision on the multidimensional perspective of quality [22, 23, 29, 30, 32, 38, 53, 56].

References: See 'Supplementary Table 10.2. Summary of included papers.'

A multi-phase, multi-centre development and validation of two maturity tools assessing the implementation of the FlaQuM co-creation roadmap

A multi-phase, multi-centre development and validation of two maturity tools assessing the implementation of the FlaQuM co-creation roadmap

Abstract

Background: As part of the new Flanders Quality Model (FlaQuM) towards sustainable quality management systems, a co-creation roadmap with six primary drivers and 19 building blocks that guides healthcare organisations has been developed. Currently, no assessment tool is available to monitor hospitals' quality management systems implementation according to this co-creation roadmap. Therefore, we aimed to measure the maturity of the implementation of the FlaQuM co-creation roadmap in hospitals.

Methods: A three-phase approach in co-design with 19 hospitals started with defining the scope, followed by establishing content validity through a literature review, involvement of content experts (n=47), 20 focus groups with content experts (n=79) and a Delphi round with healthcare quality managers (n=19) to test the content validity index (CVI). Construct validity was assessed by confirmatory factor analyses and convergent validity by Spearman's ρ correlation coefficients.

Results: Based on 17 included existing maturity instruments and sub-components of content experts, two maturity tools were developed according to the implementation of the FlaQuM co-creation roadmap: 1) a maturity matrix with 52 sub-components and 2) a co-creation scan with 19 statements. The overall scale-CVI varied between 93.3% and 90.0% in terms of relevance and clarity, respectively. In a sample of 119 healthcare professionals, factor analyses revealed a 6-factor structure and 16 (84.2%) of the 19 hypothesis for testing convergent validity between both maturity tools were statistically significant.

Conclusion: Measuring the implementation of the FlaQuM co-creation roadmap and monitoring its maturity over time should be feasible by using these comprehensive maturity tools in hospitals. Results of both tools should be able to describe the current state of hospitals' implementation of the co-creation roadmap as basis for strategic improvement plans and next steps.

Introduction

Quality management systems (QMS), i.e. complex systems of all organisational components that focus on quality structures and processes, have been implemented worldwide in hospitals to deliver high-quality services and improve patient outcomes [1]. The way hospitals have been organising their QMS varies widely, e.g. by implementing a plethora of quality initiatives [2]. Today, a traditional evaluation method of a QMS has been external accreditation, which assesses a pre-determined set of standards by cross-sectional measurements [3]. This method has been described as bureaucratic [4], time-consuming [5] and expensive [6], while their impact on patient outcomes is doubtful [7]. Despite the worldwide implementation of external evaluations, the sustainability of a hospitals' QMS remains a significant challenge. Currently, a new quality era has been introduced in which the capability of a QMS is being built in co-production with patients, kin and professionals [8] and includes interpersonal and behavioural quality attributes [9]. This evolution fortifies the need for new self-evaluation approaches of hospitals' QMS that monitor a measure of progress or "the maturity" in terms of growth and sustainability over time and that balance the technical quality aspects and core values [10].

A growing body of evidence shows that maturity tools, which are founded in industrial engineering and information technology, enable an effective evaluation of QMS [11], improve the quality of care [11] and promote (inter)organisational learning [12]. Research on the maturity of QMS did not find an association between the development stage of a QMS and the implementation of patient level safety themes at the process level [13], but showed a positive association between the QMS maturity and patient outcomes [14]. Mettler defined maturity as "to which extent a specific process is explicitly defined, managed, measured, controlled, and effective" [15]. Blondiau et al. stated that hospital specific maturity instruments present "a staged representation of an actual state in relation to a potentially achievable goal state and a description of steps required to achieve this objective" [16]. In other words, it is a capability framework that consists of a sequence of maturity levels for a class of processes in one or more domains, and an evolutionary path for these processes [17]. In terms of a lack of pragmatism and theoretical foundation in maturity tools [11], there is a need for new, validated tools that reflect multiple components of hospitals' QMS and their dynamic nature [10].

Recently, a new Flanders Quality Model (FlaQuM) was developed, which focuses on building a sustainable QMS in hospitals with three pillars: 1) "thinking" based on a multidimensional quality model [9]; 2) "doing" by implementing a co-creation roadmap [8] and 3) "learning" in inter-hospital collaboratives. The co-creation roadmap of pillar 2 guides healthcare organisations with six primary drivers, 19 building blocks and 104 evidence-based action fields [8]. Today, no assessment tool is available to monitor hospitals' implementation of the co-creation roadmap and to set management

priorities [17]. Existing evaluations do not provide enough details of the anticipated, desired or typical evolutionary grow path, nor do they include people- or culture-oriented quality aspects or contextual structures that support accountability and engage staff in improvement work [18]. In response to these needs, we aimed to measure the maturity of the implementation of the FlaQuM co-creation roadmap in hospitals.

Methods

Design

A mixed-methods design, based on de Bruin's methodology to develop and validate maturity instruments [19], was used in co-design with 19 Flemish (Belgian) hospitals. The included hospital encompass 16 acute-care hospitals, two rehabilitation hospitals and one psychiatric hospital. All hospitals are members of the FlaQuM-Living lab. A three-phase approach was adopted by using quantitative and qualitative methods in order to build a maturity assessment instrument that measures the implementation of the FlaQuM co-creation roadmap in hospitals (Figure 11.1).

PHASE 1: SCOPE

1.0 Defining the scope and target group
- Input provided on the actual scope of measuring the co-creation roadmap implementation and the target group via the FlaQuM-Consortium consisting of 19 hospitals (January 2022).
- Result: scope = descriptive, prescriptive and comparative measurement; target group = employees with an organisation-wide view on the hospitals' quality management system according to the co-creation roadmap.

PHASE 2: CONTENT VALIDITY

2.1 Review
- Defined domains and domain components: narrative review resulted in a co-creation roadmap with six primary drivers (domains) and 19 building blocks (domain components).
- Defined domain sub-components: literature search via Pubmed and Google Scholar (academic literature) and the Google search engine (grey literature) to existing maturity instruments → result: included 17 existing maturity instruments with 481 sub-components (Additional file 1).

2.2 Content experts
- Prepared domain sub-components: 47 content experts (from 19 hospitals) with specific domain expertise created maturing sub-components for the primary drivers and building bocks of the co-creation roadmap, except for driver 'Quality context'.
- Result: 301 sub-components were proposed by the content experts.

2.3 Concept mapping
- In-depth, thematic analysis of existing maturity instruments (scientific knowledge) and content experts' preparations (professional knowledge).
- Result: first version of a maturity instrument with 107 sub-components to measure the co-creation roadmap implementation.

2.4 Co-design focus groups
- Adapted, refined and validated the maturity instrument by content experts (n=79) via an iterative cyclical process of co-design focus groups (n=20, four groups for each primary driver, except for primary driver 'Context') with a mean duration of 1h52 minutes (January - April 2022). Development sub-components for primary driver 'Context' via peer review discussions (n=3).

2.5 Concept mapping
- Captured concepts from verbatim transcripts by a qualitative, in-depth thematic analysis (n = 51 sub-components).
- Result: second version of the maturity instrument consisting of two tools: 1) a maturity matrix with six primary drivers, 19 building blocks and 51 sub-components and 2) a co-creation scan with six primary drivers, 19 building blocks translated into 19 statements.

Iterative, cyclical process

2.6 Content validity index
- Conducted a one-round Delphi technique with healthcare quality managers (n=19), followed by a consensus meeting to validate the two maturity tools.
- Result: In terms of relevance, agreement among experts on 49 (96.1%) sub-components and in terms of clarity on 47 (92.2%) sub-components (Additional file 2). Third version of the two maturity tools: 1) a maturity matrix with six primary drivers, 19 building blocks and 52 sub-components and 2) a co-creation scan with six primary drivers, 19 building blocks translated into 19 statements (Additional file 3).

PHASE 3: TEST

3.1 Pilot study
- Dissemination of third version of the two maturity tools, i.e. the maturity matrix and co-creation scan, in a multi-centre pilot study of 19 hospitals (August - September 2022).
- Result: 119 professionals completed the maturity matrix and co-creation scan.

3.2 Defining psychometric properties
- Construct validity: CFA with MLR (maturity matrix with ordinal data) and single group CFA (co-creation scan with interval data).
- Convergent validity: Pearson's correlation coefficient between scores on the maturity matrix and co-creation scan.
- Result: fit indices for both instruments supported the 6-factor structure and 16 (84.2%) correlation coefficients between the maturity matrix and co-creation scan were statistically significant.

Figure 11.1 Three-phase development approach.

After defining the scope and target group in the first phase, a comprehensive literature search with the following keywords was used: 'maturity' AND 'healthcare' AND 'tools' OR 'model' OR 'instrument' OR 'matrix'. Both peer-reviewed research articles and grey literature reports from this literature review were screened on selection criteria in the second phase: 1) designed or applied in healthcare organisations, 2) organisation-wide purpose and 3) related to healthcare quality or QMS (Figure 11.1: 2.1 Review and Supplemental Material 1). Simultaneously, content experts prepared maturing sub-components based on their tacit knowledge in real-world practice settings [20] (Figure 11.1: 2.2 Content experts). By means of a concept mapping, the first version of a maturity instrument was developed (Figure 11.1: 2.3 Concept mapping). This version was adapted, refined and validated during

focus groups, which were moderated by two research team members (Figure 11.1: 2.4 Co-design focus groups). Concepts from verbatim transcripts of focus groups were inventoried, clustered and visually represented during each primary driver's next focus group (Figure 11.1: 2.5 Concept mapping). The cyclical approach, i.e. the iterative process of focus groups, concept mapping and research team discussions until saturation was reached, enabled to gradually develop insights into sub-components and to develop the second version of a maturity instrument. To assess the content validity index (CVI) of this second version, i.e. measuring the degree to which an instrument has an appropriate sample of sub-components for the primary drivers and building blocks being measured [21], the Delphi-technique with a mix of 'middle managers', i.e. staff members and supervisors, and 'managers and boards', hereinafter referred to as healthcare quality managers (HQM), was used (Figure 11.1: 2.6 Content validity index). These HQM lead the overall implementation, integration and coordination of their hospital's QMS. Thereafter, this third version of a maturity assessment instrument consisted of two tools: 1) the maturity matrix and 2) co-creation scan. In the third phase, a pilot study of 19 hospitals was used to assess psychometric properties of the two maturity tools in terms of construct validity and convergent validity (Figure 11.1: 3.1 Pilot study and 3.2 Defining psychometric properties).

Statistical analyses

To define the CVI, the HQM of the FlaQuM-Consortium were asked to score individual sub-components on a 4-point Likert-scale of relevance (score from "1" [not relevant] to "4" [very relevant]) and clarity (score from "1" [not clear] to "4" [very clear]). If a score of 1 or 2 was given, the HQM had to elaborate on why they opted for this score. For each sub-component, the item-CVI (I-CVI) was computed as the number of HQM giving a rating 3 or 4, divided by the total number of HQM, of which a percentage of 78 is considered as the cut-off point for the level of consensus [21]. The scale-CVI (S-CVI) is computed by averaging the I-CVI, of which 90% is suggested as excellent. During the FlaQuM-Consortium with the HQM, the sub-components with a I-CVI lower than 78% were discussed until consensus was reached and the second tool, i.e. the co-creation scan with 19 statements, one for each building bock, was tested and refined. Descriptive analyses of sociodemographic data delineated frequencies across type of participants in the Delphi and respondents of the two maturity tools and their characteristics (age, years of experience in current function and in healthcare sector). To define the tools' construct validity, i.e. determining the construct-relevant dimensionality of the maturity matrix and the co-creation, confirmatory factor analysis (CFA) was used [21]. Model fit of the maturity matrix was assessed by the robust maximum likelihood (MLR), because of the ordinal nature of the data [22], and of the co-creation scan by single-group CFA. Model fit evaluation of both tools was based on internationally recognized cut-off criteria of the Comparative Fit Index (CFI), the Tucker–Lewis index

(TLI) [23], the Root Mean Square Error of Approximation (RMSEA) [24] and the Standardized Root Mean Squared Residual (SRMR) [25]. Next, convergent validity, i.e. to examine if the two instruments capture a corresponding construct [21], was assessed by determining the degree of Spearman's ρ correlation between the maturity matrix and co-creation scan. Coefficients exceeding r=0.3 were considered as meaningful [26]. Mplus version 7.1 was used to estimate factor analytic models. SAS software, Version 9.4 of the SAS System for Windows, was used for descriptive analyses and to analyse correlations. Significance for all analyses in this study was determined at an alpha-level of *P*<0.05 (two-tailed).

Results

Phase 1: Scope

The FlaQuM-Consortium defined that measuring the implementation of the FlaQuM co-creation roadmap should be descriptive, i.e. to gain a deeper understanding of the 'as-is' position of the QMS; prescriptive, i.e. to determine the desired 'to-be' position; and comparative, i.e. to enable benchmarking between hospitals' QMS. The target group is defined as employees with an organisation-wide view on the QMS.

Phase 2: Content validity

In total, 19 HQM participated in the Delphi and 119 respondents completed the maturity matrix and co-creation scan (Table 11.1).

Table 11.1 Characteristics of participants in the Delphi and respondents of the maturity matrix and co-creation scan.

	Delphi (n=19)	Maturity matrix and co-creation scan (n=119)
Type of respondent, *N (%)*		
Management and boards	12 (63.2%)	56 (47.1%)
Middle management (Staff members and supervisors)	7 (36.8%)	41 (34.5%)
Physicians	/	7 (5.9%)
Nurses / Midwives	/	3 (2.5%)
Other professionals with direct patient contact	/	1 (0.8%)
Unknown	/	11 (9.2%)
Experience in their current function		
Average years	6.7	7.0

	Delphi (n=19)	Maturity matrix and co-creation scan (n=119)
Experience in healthcare sector		
Average years	16.6	20.8
Age (years), *N (%)*		
18-30	1 (5.3%)	9 (7.6%)
31-40	7 (36.8%)	23 (19.3%)
41-50	5 (26.3%)	37 (31.1%)
51-65	6 (31.6%)	49 (41.2%)
Unknown	/	1 (0.8%)

The second version of the maturity matrix, consisting of six primary drivers, 19 building blocks and 51 sub-components, was scored by HQM during the Delphi round (Supplemental Material 2). In terms of relevance, sufficient agreement (I-CVI) was found on 49 sub-components, insufficient agreement was related to sub-components '10.3 Discussed method of implementation initiatives in the (sub)organisations (primary driver Quality Improvement) and '18.3 Collaborations with external partners' (primary driver Quality context). In terms of clarity, sufficient agreement was found on 47 sub-components, insufficient agreement was related to sub-components '2.1 Involving stakeholders in quality mission and vision' (primary driver Quality design and planning), '9.2 Bottom-up interventions in the (sub)organisations' (primary driver Quality improvement), '18.4 Concrete job descriptions for functions and roles' (primary driver Quality context) and '19.2 Adjustment of quality policy to policy-making bodies and other external professional partners' (primary driver Quality context). The S-CVI for the primary drivers varied from 88.4% to 98.1% and from 85.0% to 93.7% in terms of relevance and clarity, respectively (Table 11.2). The overall S-CVI of the maturity matrix was 93.3% for relevance scores and 90.0% for clarity scores. Based on the feedback of HQM, one sub-component '18.5 Clear quality structure with defined responsibilities and authorities' (primary driver Quality context) was added. The final version of the maturity matrix distinguishes 52 sub-components, 1 to 5 per building block of the FlaQuM co-creation roadmap, which mature over 5 stages, hereinafter called FlaQuM levels (Table 11.3). Each sub-component includes a specific rating scale of an ordinal nature that describes in detail how they should be installed in a hospital's QMS. Higher levels build on the requirements of lower levels. A maturity level can only be reached if all sub-components related to that specific building block are reached. If a sub-component have not yet been accomplished in the organisation, the organisation can score this sub-component as 'Not FlaQuM Level'.

Table 11.2 Scale-Content Validity Index of the maturity matrix.

Primary drivers	S-CVI in terms of relevance	S-CVI in terms of clarity
Quality design and planning	98.1%	92.1%
Quality control	94.7%	93.7%
Quality improvement	88.4%	87.9%
Quality leadership	95.9%	92.4%
Quality culture	91.7%	86.5%
Quality context	91.0%	85.0%
Overall S-CVI	93.3%	90.0%

Table 11.3 Description of the maturity matrix and co-creation scan.

	Maturity matrix	Co-creation scan
Scope	Long-form, very detailed assessment of the hospital's QMS according to the co-creation roadmap. Descriptive, prescriptive and comparative scope.	Short-form, reflecting respondent's overall agreement of actual implementation of that building block.
Structure	Six primary drivers 19 building blocks 52 sub-components (1 to 5 per building block)	Six primary drivers 19 building blocks 19 statements (1 per building block)
Scale	Sub-components are scored on a maturity scale of 6 FlaQuM Levels, including 'Not FlaQuM Level': - Not FlaQuM Level: The sub-component have not yet been accomplished in the organisation. - FlaQuM Level: The sub-component takes place organisation-wide - FlaQuM Level+1: The sub-component takes place in some sub-organisations - FlaQuM Level+2: The sub-component takes place in the majority of the sub-organisations - FlaQuM Level+3: The sub-component takes place in all sub-organisations - FlaQuM Level+4: The sub-component takes place through involvement of external partners or international experts	Statements are scored on a 11-point Likert-type scale from score 0 to 10: - Score "0" (strongly disagree) - Score "10" (strongly agree).

Besides the CVI of the maturity matrix, the co-creation scan was adapted based on feedback of HQM in terms of wording clarity, e.g. statement "1. In this organisation, everyone thinks about quality in the same direction and is focused on it" was redesigned to "1. Everyone thinks in the same direction about quality and this is the focus" (Supplemental Material 3). Finally, the co-creation scan contains 19 statements, i.e. one statement for each building block of the co-creation scan, which were rated on a 11-point Likert-type scale reflecting respondent's level of disagreement or agreement (Table 11.3).

Phase 3: Psychometric properties

For the construct validity of the maturity matrix, the fit indices (CFI=0.901; TLI=0.876; RMSEA=0.069, 90% CI [0.049-0.085]; SRMR=0.058) of the MLR confirmed a 6-factor structure. For the co-creation scan, the same structure was confirmed by the analysed fit indices (CFI=0.901; TLI=0.876; RMSEA=0.083, 90% CI [0.067-0.100]). In terms of convergent validity, 11 out of the 19 correlation coefficients (57.9%) between the maturity matrix and the co-creation exceeded the 0.3 criterion (Table 11.4). Sixteen correlation coefficients (84.2%) were statistically significant.

Table 11.4 Relationships between the maturity matrix and co-creation scan.

Primary drivers	Building blocks	Spearman's ρ	P-value
Quality Design and Planning	1. Define a shared vision, set the aims, priorities and focus	0.291	0.001
	2. Involvement of stakeholders	0.286	0.002
	3. Adaptability and fit	0.397	<.001
Quality Control	4. Legal and technical requirements for inspections, audits and labels	0.368	<.001
	5. Monitoring system	0.341	<.001
	6. Transparent feedback systems	0.328	<.001
	7. Demonstrate the evolution over time on effectiveness and priorities new challenges	0.446	<.001
Quality Improvement	8. Evidence-based intervention	0.259	0.004
	9. Teamwork	0.321	<.001
	10. Intervention implementation by adapting quality design	0.108	0.241
	11. Communication and reflection	0.357	<.001
Quality Leadership	12. Personal and clinical leadership	0.163	0.076
	13. Visible, supportive management and staff members	0.351	<.001
	14. Executive and governance support	0.446	<.001
Quality Culture	15. Attitudes and commitment	0.382	<.001
	16. Just culture	0.253	0.005
	17. Continuous learning and innovation	0.325	<.001
Quality Context	18. Organisational characteristics	0.299	0.001
	19. Healthcare system and external policy and demands	0.165	0.073

Discussion

This study described the development and validation of two maturity tools to measure the FlaQuM co-creation roadmap implementation in hospitals. Since Groene et al. underlined the need for high-quality studies that adequately assess the QMS implementation in hospitals [10], we used a three-phase co-design development methodology based on experiences of de Bruin et al. to develop a theoretically sound measurement instrument [19]. To narrow the gap between research and end-users, a co-design methodology has been vaunted as crucial for success in improving healthcare services [27]. The development of maturity tools according to the implementation of the FlaQuM co-creation roadmap was iterative and cyclical in nature, by moving between data collection and analysis, evolving into a maturity matrix with a focus-area approach, i.e. a variable number of maturity levels for each sub-component to support differences in granularity, and a co-creation scan with a fixed-level approach, i.e. a fixed amount of maturity scores on the 11-point Likert-type scale for every statement, as suggested by Batenburg et al. [28]. Addressing rigour of the maturity matrix, the Delphi study showed that 49 out of 51 sub-components of the maturity matrix were considered relevant by HQM in the field. Moreover, the findings regarding the internal 6-factor structure of the maturity matrix and co-creation scan provided initial support for the tools. Regarding convergent validity, more than 50% of correlation coefficients between the maturity matrix and co-creation scan revealed potential overlapping between the concepts being measured and sixteen were found to be significant. This result is in line with the development of a similar maturity instrument focusing on integrated care, called the SCIROCCO tool, validated by Grooten et al. [29]. Nevertheless, the low number of statistical significant correlations, suggests that the tools should not be used interchangeably. Since there is no gold standard tool available to measure QMS maturity based on the FlaQuM co-creation roadmap from a holistic quality perspective, the co-creation scan developed in this study was the most appropriate comparative tool.

Interpretation within the context of the wider literature

Pillar 1 of FlaQuM ("thinking") focuses on measuring experiences of the multidimensional quality definition from a multistakeholder perspective [9]. These experiences can be used to build a shared quality vision and to define related aims in hospitals' QMS. Defining a shared vision, setting the aims, prioritising and focusing your QMS is the first building block of the FlaQuM co-creation roadmap, which is part of pillar 2 of FlaQuM ("doing"). This roadmap is presented by the simple visualisation of a driver diagram but encapsulates considerable complexity in practice by involving all stakeholders, including patients and kin as well as healthcare professionals and hospital leaders [8]. The complexity of the development, implementation and sustainability of QMS in a dynamic and multidisciplinary setting

such as hospitals makes measuring the FlaQuM co-creation roadmap implementation a difficult exercise [8]. However, the maturity tools are considered concise and comprehensive consisting of a manageable number of 52 sub-components and 19 statements. Both tools can be applied as a self-assessment method in hospitals and thereby uncover gaps and areas for improvement in the FlaQuM co-creation roadmap implementation. By integrating sub-components focused on quality processes, structures, people and culture aspects of quality, we distinguish these holistic maturity tools from other existing measurement instruments. When considering the implications for practice, the maturity matrix at the organisational level offers insight into both the current maturity of hospitals' implementation of the FlaQuM co-creation roadmap, i.e. the 'as-is' position with uncovered gaps, and the knowledge needed to guide further development towards sustainability, i.e. the desired 'to-be' position. On each maturity level, sub-components have been described in an actionable way that enable hospital management to identify what needs to be in place and what has to be done to move to the next level. By doing so, the maturity matrix allows healthcare leaders at both the policy and hospital level to identify areas on which to focus and to develop a strategic plan concerning sub-components associated with this level. Batenburg et al. highlighted the flexibility of this approach by emphasising that hospitals can use the model in an evolutionary or revolutionary way, i.e. through small steps, e.g. from the second level to the third level, or by radical fundamental changes in which one or two maturity levels are skipped [28]. Furthermore, we recommend hospitals aiming to assess the maturity of the co-creation roadmap at departmental level to implement the co-creation scan. We expect this short 19-item instrument to be easier to complete by healthcare professionals on departments and require a smaller time investment from them compared to completing the maturity matrix.

Implications for policy, practice and research

By applying a tailored approach, where hospitals can determine themselves which of the paths suits best for every single primary driver or building block, a simple graphical depiction showing hospitals' maturity level, their strengths and weaknesses and a logical progression in maturity should be developed. Ideally, the FlaQuM co-creation roadmap assessment would become a routine indicator collected by hospitals alongside periodically collected indicators in hospitals [14]. During inter-hospital collaboratives as part of pillar 3 of FlaQuM ("learning"), benchmarking reports presenting between-hospital variation in maturity, could foster knowledge sharing on management activities and lessons learned to speed up the grow in maturity. Nevertheless, to achieve this great maturity and overall organisational performance, previous research demonstrated that strong and effective leadership is needed from the beginning of the QMS maturity trajectory [30].

Future research should focus on strong empirical research concerning the benefits of implementing maturity tools in terms of maturity improvemen, improved patients outcomes such as, hospital mortality rates, readmission rates and patient safety indicators, as well as improved experiences of patients, kin and healthcare professionals. These benefits can be explored via longitudinal studies in different contexts by using a mixed-methods design [11]. Additionally, associations between hospitals' maturity level, clinical and experience outcomes and quality processes can be analysed [13,14]. To strengthen the content validity, on-site, peer review visits could be organised to assess if hospitals' self-reported maturity is reliable. Moreover, between-hospital variation of maturity levels would be interesting to define national quality management priorities.

Strengths and limitations

The main strength of the maturity instrument development is the use of sub-components and statements based on theoretical and practical evidence in co-creation with the end-user [19,27]. To enhance study quality, space triangulation was used by including 19 hospitals of the FlaQuM-Consortium in our co-design methodology [21]. This recruitment strategy cannot rule out selection bias, however, experts and HQM provided their nuanced opinions garnered from their expertise. The sample size of the testing phase was modest, so construct and convergent validity results should be interpreted cautiously and retesting with a larger sample size is preferable. Despite the limited sample and its focus on the Belgian context, this study provided important, detailed information that contributes to the knowledge base and could be explored in further research.

Conclusion

In a multi-phase, multi-centre study, two maturity tools are co-developed and validated to assess the implementation of the FlaQuM co-creation roadmap in hospitals. These promising and unique tools, i.e. 1) a maturity matrix with 52 sub-components maturing over 5 FlaQuM levels and 2) a co-creation scan with 19 statements, are developed by including theoretical and practical evidence. For both tools, the construct validity tests revealed a 6-factor structure and correlations between the tools supported the convergent validity. In a practical sense, the results of the tools should be able to describe the current state of hospitals' implementation of the co-creation roadmap and can be used to develop strategic plans to improve maturity and to show progression in maturity over time. Future research should be conducted in larger samples of individuals to enhance the validity of the tools and focus on benefits for patients, processes and structures.

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Supplemental Material

Supplemental Material 1: Existing maturity instruments

Supplemental Material 2: Content Validity Index

Supplemental Material 3: Maturity matrix and co-creation scan

Supplemental Material 1: Existing maturity instruments

Supplementary Table 11.1 Existing maturity instruments.

	Author	Year	Setting	Type of report [Research Article / Grey literature report (Internationally recognised institute in healthcare quality)]	Name maturity instrument	Domains	Amount of maturity levels or scoring system
1	Crosby	1979	Organisations, but applied in hospitals, e.g., in the NHS	Book	Quality Management Maturity Grid	1. Management understanding and attitude 2. Quality organisation status 3. Problem handling 4. Cost of quality as percentage of sales 5. Quality improvement actions 6. Summation of company quality posture	5 Maturity levels: 1. Uncertainty 2. Awakening 3. Enlightenment 4. Wisdom 5. Certainty
2	Wagner *et al.*	1999	Provider organisations of six health care fields: primary health care, care for the disabled, mental healthcare, care for the elderly, hospital care and welfare care	Research Article	The survey instrument (No specific name)	1. Quality assurance'-documents 2. Patient involvement 3. Process control based on standards 4. Human Resources Management 5. Quality improvement'-documents	5 Stages: - Stage 0: orientation and awareness - Stage 1: preparation stage - Stage 2: Implementation stage - Stage 3: Establishment (experimentation and integration into normal business operations)
3	Gemmel *et al.*	2008	Hospital settings (Applied in one large European	Research Article	Hospital Process Orientation (HPO) Tool	1. Process View 2. Process Job 3. Process Management and Measurement	Scoring system: 5-point Likert-type scale (agree to disagree)

			university hospital)				5 Stages: Details about the stages is not available in the article
4	Lombart s *et al.*	2008	Hospital settings (A total of 389 hospitals participated)	Research Article	Quality improvement maturity index	1. Policy, planning, documents (20 items) 2. Leadership (36 items) 3. Structure (19 items) 4. General QI activities (8 items) 5. Specific QI activities (20 items) 6. Patient involvement (6 items) 7. Accountability (4 items)	Scoring system: - 1 = Yes, this activity takes place systematically in most departments (>50%) - 2 = Yes, this activity takes place in most departments (>50%) - 3 = Yes, this activity takes place in some departments (<50%) - 4 = No, this activity does not take place Scores transposed to maturity levels: Individual items were coded on a four-point scale ranging from 1 (most mature) to 4 (least mature).
5	Fleming *et al.*	2008	Healthcare organisations	Research Article	Patient Safety Culture Improvement Tool (PSCIT)	1. Patient Safety Leadership 2. Risk analysis 3. Workload management 4. Sharing and learning 5. Resource management	5 Maturity levels: Each level of maturity is scored from 0 to 4 3 levels of implementation: 1. Low (i.e., implemented in less than a third of the organization/target group) 2. Medium (i.e., implemented in less than two thirds of the organization/target group) 3. High (i.e., implemented in over two thirds of the organization/target group) and inserting L, M or H in the box that corresponds to this level.

6	Law *et al.*	2010	Hospital settings (a pilot project conducted at Hamilton Health Sciences (HHS))	Research Article	Manchester Patient Safety Culture Assessment Tool (MaPSCAT)	1. Commitment to overall continuous improvement 2. Priority given to safety 3. System errors and individual responsibility 4. Recording incidents and best practice 5. Evaluating incidents and best practice 6. Learning and effecting change 7. Communication about safety issues 8. Personnel management and safety issues 9. Staff education and training 10. Teamwork	5 Maturity Levels: 1. Pathological ("Why waste our time on safety?") 2. Reactive ("We do something when we have an incident") 3. Bureaucratic ("We have systems in place to manage safety") 4. Proactive ("We are always on alert for risks") 5. Generative ("Risk management is an integral part of everything we do")
7	Maher *et al.*	2010	Healthcare setting	Grey literature report (NHS Institute for Innovation and Improvement)	Sustainability Model and Guide	1. Process (Benefits beyond helping patients, Credibility of the benefits, Adaptability of improved process, Effectiveness of the system to monitor progress) 2. Staff (Staff involvement and training to sustain the process, Staff behaviours toward sustaining the change, Senior leadership engagement and support, Clinical leadership engagement and support) 3. Organisation (Fit with organisational strategic aims and culture, Infrastructure for sustainability)	Score system: Score a to d (each subconstruct has a statement for the core a, b, c or d) Preliminary evidence suggests a score of 55 or higher offers reason for optimism. Scores lower than this suggests that you need to take some action to increase the likelihood that your improvement initiative will be sustainable.
8	Gearin *et al.*	2013	Public Health Organisations and Systems	Research Article	QI Maturity Tool	1. Organizational culture 2. Capacity/Competency 3. Practice 4. Alignment/spread	Scoring system: 5-point Likert-type scale (strongly agree=5, agree=4, neutral=3, disagree=2, strongly disagree or don't know=1).
9	Wagner *et al.*	2014	Hospital settings (188 hospitals in 7 countries)	Research Article	DUQuE instrument: the Quality Management	1. Quality policy documents 2. Quality monitoring by the board 3. Training of professional 4. Formal protocols for infection control	Scoring system: 4-point Likert-type scale (categories ranging from 'Not available' to 'Fully

					Systems Index (QMSI)	5. Formal protocols for medication and patient handling 6. Analysing performance of care processes 7. Analysing performance of professional 8. Analysing feedback of patient experiences 9. Evaluating results	implemented' and from 'Disagree' to' Agree).
10	Cleven *et al.*	2014	Hospital settings (129 participating Swiss Hospitals)	Research Article	Capability maturity model	1. Culture 2. Strategy 3. Structure 4. Practices 5. IT	5 Maturity levels (stages): - Stage 1: Encouragement of process orientation - Stage 2: Case-by-case handling - Stage 3: Defined processes - Stage 4: Occasional corrective action - Stage 5: Closed loop improvement
11	Batenburg *et al.*	2014	Hospital settings (the model was tested and evaluated by interviewing senior hospital managers, representing 12.4% of the total Dutch hospital bed capacity)	Research Article	GRC maturity model	1. Governance: authority 2. Governance: structure 3. Governance: accountability 4. Governance: control of professionals 5. Governance: incident reporting 6. Risk management: authority 7. Risk management: structure 8. Risk management: analysis 9. Risk management: scope 10. Risk management: indicators 11. Compliance: authority 12. Compliance: structure 13. Compliance: controls 14. Compliance: awareness	5 Maturity Levels: 1. Forming 2. Developing 3. Normalized 4. Established 5. Optimized
12	Institute for Healthcare Improvement	2014	Hospital settings	Grey literature report (Institute for Healthcare Improvement)	IHI Improvement Capability Self-Assessment Tool	1. Leadership for Improvement 2. Results 3. Resources 4. Workforce and Human Resources 5. Data Infrastructure and Management 6. Improvement Knowledge and Competence	5 Maturity Levels: 1. Just beginning 2. Developing 3. Making progress 4. Significant impact 5. Exemplary

13	Tayebeh *et al.*	2015	Hospital settings	Research Article	The standard 10014 designed questionnaire was used	1. Customer focus 2. Leadership 3. Employee involvement 4. Process approach 5. System approach to management 6. Continuous improvement 7. Realistic approach to decision-making 8. communication with suppliers based on mutual interests	Scoring system: 5-point Likert-type scale (very high = 5, and very low = 1) 3 Maturity levels: Three different levels of the organizational maturity: 1. Low 2. Medium 3. High
14	Tarhan *et al.*	2015		Conference Proceedings		1. Organizational Process Management 2. Organization Business Management 3. Domain Work Management 4. Domain Work Performance 5. Organizational support	Scoring system: 4-point Likert-type scale: 1. Not achieved (N: 0 to 15 % achievement) 2. Partially achieved (P: 16 to 50 % achievement) 3. Largely achieved (L: 51 to 85 % achievement) 4. Fully achieved (F: 86 to 100 % achievement) 5 Maturity Levels: 1. Level 1: The initial level 2. Level 2: Managed 3. Level 3: Standardized 4. Level: 4 Predictable 5. Level 5: Innovating
15	Ramadan *et al.*	2016	Healthcare organisations (a pilot study was conducted in two hospitals)	Research Article	Healthcare quality maturity assessment model	1. Top management 2. People 3. Operation 4. Quality focus 5. Culture 6. Accreditation & excellence frameworks	Scoring systems: 5-point Likert-type scale: 1. Rare or not implemented (0-20%) 2. Low implementation (20-40%) 3. Fair implementation (40-60%) 4. High Implementation (60-80%) 5. Very high implementation (80-100%)

							5 Maturity Levels: 1. Chaotic organization 2. Primitive organization 3. Structured organization 4. Mature organization Proficient organization
16	Horvat *et al.*	2017	Healthcare organisations (a survey of opinion of 189 managers working in 70 Serbian health organization at the secondary and tertiary levels)	Research Article	The ISO standard 900442 (the established model in quality management)	1. Managing (managing for the sustained success of an organization) 2. Strategy and policy 3. Resource management 4. Process management 5. Monitoring, measurement, analysis, and review 6. Improvement, innovation, and learning	Scoring system: 5-point Likert-type scale ranging from 1 to 5: 1. 1 = The lowest level of maturity 2. 5 = The highest level of maturity
17	National Steering Committee for Patient Safety	2020	Healthcare organisations (27 organisations represented on the National Steering Committee for Patient Safety (NSC))	Grey literature report (Institute for Healthcare Improvement)	Self-Assessment Tool: A National Action Plan to Advance Patient Safety	1. Culture, Leadership, and Governance 1. Patient and Family 2. Engagement 3. Workforce Safety 4. Learning System	4 Maturity levels: 1. Just beginning 2. Making progress 3. Significant impact 4. Exemplary Performance

Supplemental Material 2: Item Content Validity Index

Supplementary Table 11.2 Item Content Validity Index.

Primary drivers	Building blocks	Sub-components	I-CVI in terms of relevance	I-CVI in terms of clarity
Quality Design and Planning	1. Define a shared vision, set the aims, priorities and focus	1.1 Quality in (sub)organisations' mission and vision 1.2 Shared quality mission and vision of the (sub)organisations 1.3 Resources for the implementation of the quality policy	19/19 (100%) 19/19 (100%) 19/19 (100%)	18/19 (94.7%) 18/19 (94.7%) 17/19 (89.5%)
	2. Involvement of stakeholders	2.1 Involving stakeholders in quality mission and vision	18/19 (94.7%)	14/19 (73.7%)
	3. Adaptability and fit	3.1 Gap-analysis in quality 3.2 Barriers and facilitators 3.3 Overall action plan and methods 3.4 Communication to stakeholders	19/19 (100%) 18/19 (94.7%) 19/19 (100%) 18/19 (94.7%)	18/19 (94.7%) 17/18*(94.4%) 19/19 (100%) 18/19 (94.7%)
Quality Control	4. Legal and technical requirements for inspections, audits and labels	4.1 Up-to-date overview 4.2 Coordinating body and responsible contact persons 4.3 Methods to monitor compliance with requirements	18/19 (94.7%) 18/19 (94.7%) 17/19 (89.5%)	19/19 (100%) 18/19 (94.7%) 17/19 (89.5%)
	5. Monitoring system	5.1 Relevant, validated and reliable quality data 5.2 Monitoring system 5.3 Responsibility for validity and reliability of quality data	19/19 (100%) 19/19 (100%) 18/19 (94.7%)	18/19 (94.7%) 17/19 (89.5%) 17/19 (89.5%)
	6. Transparent feedback systems	6.1 Feedback system monitored periodically and systematically 6.2 Communication of quality data 6.3 Benchmarking	18/19 (94.7%) 18/19 (94.7%) 17/19 (89.5%)	18/19 (94.7%) 19/19 (100%) 18/19 (94.7%)
	7. Demonstrate the evolution over time on effectiveness and priorities new challenges	7.1 Monitoring evolutions in quality data at (sub)organisational level	18/19 (94.7%)	17/19 (89.5%)
Quality Improvement	8. Evidence-based intervention	8.1 Rationale and method for setting up an improvement intervention 8.2 Access to all protocols, procedures and scientific evidence	18/19 (94.7%)	15/19 (79.0%)

			18/19 (94.7%)	16/19 (84.2%)
	9. Teamwork	9.1 Improvement interventions by a multidisciplinary team in the (sub)organisations	15/19 (79.0%)	16/19 (84.2%)
		9.2 Bottom-up interventions in the (sub)organisations	15/19 (79.0%)	14/19 (73.7%)
	10. Intervention implementation by adapting quality design	10.1 Specific expertise on change, implementation methods and embedment in the (sub)organisations	19/19 (1000%)	16/19 (84.2%)
		10.2 Implementation techniques and improvement methodologies	17/19 (89.5%)	16/19 (84.2%)
		10.3 Discussed method of implementation initiatives in the (sub)organisations	13/19 (68.4%)	18/19 (94.7%)
	11. Communication and reflection	11.1 Communication about the objectives, ambition level, content of the intervention, people involved and how the change will be achieved prior to implementation	19/19 (100%)	19/19 (100%)
		11.2 Examples of reflection with stakeholders	19/19 (100%)	19/19 (100%)
		11.3 Sharing experiences with stakeholders	15/19 (79.0%)	18/19 (94.7%)
Quality Leadership	12. Personal and clinical leadership	12.1 Informal and formal leaders (quality ambassadors) with respect to the quality policy in the (sub)organisations	16/19 (84.2%)	16/19 (84.2%)
	13. Visible, supportive management and staff members	13.1 Exemplary behaviour of leaders	19/19 (100%)	18/19 (94.7%)
		13.2 Exemplary behaviour of staff members	18/19 (94.7%)	17/19 (89.5%)
		13.3 Leaders and staff members work together transparently	17/19 (89.5%)	17/19 (89.5%)
		13.4 Examples of how staff members and leaders facilitate an accessible and psychologically safe work environment	18/19 (94.7%)	16/19 (84.2%)
	14. Executive and governance support	14.1 The executives propagate which quality ambition is pursued and the expected quality values in stakeholders' behaviour	19/19 (100%)	18/19 (94.7%)
		14.2 Active participation in quality meetings	19/19 (100%)	19/19 (100%)
		14.3 Quality on the agenda of executive and board meetings	19/19 (100%)	19/19 (100%)
		14.4 Executives (and boards) with expertise and experience	19/19 (100%)	18/19 (94.7%)
Quality Culture	15. Attitudes and commitment	15.1 Quality dialogues in the (sub)organisations	19/19 (100%)	16/19 (84.2%)
		15.2 (Sub)organisations show ownership and entrepreneurship, tackle challenges and celebrate their successes together	15/19 (79.0%)	16/19 (84.2%)
	16. Just culture	16.1 Measuring psychological safety	18/19 (94.7%)	17/19 (89.5%)
			18/19 (94.7%)	15/19 (79.0%)

		16.2 Communication about compliments, (near)incidents and quality problems	19/19 (100%)	19/19 (100%)
		16.3 Policy about psychological support		
	17. Continuous learning and innovation	17.1 Internal reflection moments on the quality delivered to learn from positive and negative outcomes, incidents and experiences	17/19 (89.5%)	15/19 (79.0%)
		17.2 Reflection moments with patients, kin and external partners	16/19 (84.2%)	17/19 (89.5%)
Quality Context	18. Organisational characteristics	18.1 Objective view on challenges (e.g., financial resources, human resources, geographical location, IT, organogram and organisational structure)	17/19 (89.5%)	17/19 (89.5%)
		18.2 Necessary resources (financial, human resources and infrastructure) for their QMS	19/19 (100%)	17/19 (89.5%)
		18.3 Collaborations with external partners	14/19 (73.7%)	17/19 (89.5%)
		18.4 Concrete job descriptions for functions and roles	18/19 (94.7%)	14/19 (73.7%)
		18.5 Clear quality structure with defined responsibilities and authorities	(Sub-component 18.5 is defined based on the feedback during the Delphi)	(Sub-component 18.5 is defined based on the feedback during the Delphi)
	19. Healthcare system and external policy and demands	19.1 Alignment of quality policy with legislation, ethical policies and the healthcare system	18/19 (94.7%)	17/19 (89.5%)
		19.2 Adjustment of quality policy to policy-making bodies and other external professional partners	17/19 (89.5%)	14/19 (73.7%)
		19.3 (Sub)organisations monitor changes in the social and healthcare field	18/19 (94.7%)	17/19 (89.5%)

*Note: missing value.

Supplemental Material 3: Structure of the maturity matrix and co-creation scan

Supplementary Table 11.3 Structure of the maturity matrix and co-creation scan.

Primary drivers	Building blocks	Sub-components of the Maturity Matrix	Statements of the co-creation scan
Quality Design and Planning	20. Define a shared vision, set the aims, priorities and focus	1.4 Quality in (sub)organisations' mission and vision 1.5 Shared quality mission and vision of the (sub)organisations 1.6 Resources for the implementation of the quality policy	1. Everyone thinks in the same direction about quality and this is the focus.
	21. Involvement of stakeholders	2.1 Involving stakeholders in quality mission and vision	2. All stakeholders (internal and external stakeholders as well as patients and relatives) are involved in the development, formulation, planning and elaboration of the quality vision and objectives.
	22. Adaptability and fit	3.1 Gap-analysis in quality 3.2 Barriers and facilitators 3.3 Overall action plan and methods 3.4 Communication to stakeholders	3. The difference between the AS-IS and TO-BE situation in this organisation has been determined and a plan is in place that takes into account obstacles and facilitators to move towards this quality ambition.
Quality Control	23. Legal and technical requirements for inspections, audits and labels	4.1 Up-to-date overview 4.2 Coordinating body and responsible contact persons 4.3 Methods to monitor compliance with requirements	4. A list of requirements and contacts for mandatory and voluntary inspections, audits and certificates and a system for active follow-up have been established.
	24. Monitoring system	5.1 Relevant, validated and reliable quality data 5.2 Monitoring system 5.3 Responsibility for validity and reliability of quality data	5. A valid and reliable system is in place to continuously monitor quality data.
	25. Transparent feedback systems	6.1 Feedback system monitored periodically and systematically 6.2 Communication of quality data 6.3 Benchmarking	6. Feedback is communicated on quality data in a continuous and clear manner.

	26. Demonstrate the evolution over time on effectiveness and priorities new challenges	7.1 Monitoring evolutions and priorities in quality data at (sub)organisational level	7. Challenges and priorities were determined based on quality data.
Quality Improvement	27. Evidence-based intervention	8.1 Rationale and method for setting up an improvement intervention 8.2 Access to all protocols, procedures and scientific evidence	8. Improvement interventions are initiated that are based on relevant scientific research or practical experience.
	28. Teamwork	9.1 Improvement interventions by a multidisciplinary team in the (sub)organisations 9.2 Bottom-up interventions in the (sub)organisations	9. Improvement initiatives are drafted, implemented and monitored from multidisciplinary teamwork across sub-organisations.
	29. Intervention implementation by adapting quality design	10.1 Specific expertise on change, implementation methods and embedment in the (sub)organisations 10.2 Implementation techniques and improvement methodologies 10.3 Discussed method of implementation initiatives in the (sub)organisations	10. Improvement interventions are consistently planned, implemented and anchored and the necessary expertise on these is in place.
	30. Communication and reflection	11.1 Communication about the objectives, ambition level, content of the intervention, people involved and how the change will be achieved prior to implementation 11.2 Examples of reflection with stakeholders 11.3 Sharing experiences with stakeholders	11. There is communication and reflection with involved stakeholders on the why, what and how of improvement interventions. Experiences on improvement interventions are shared with internal as well as (inter)national stakeholders.
Quality Leadership	31. Personal and clinical leadership	12.1 Informal and formal leaders (quality ambassadors) with respect to the quality policy in the (sub)organisations	12. All internal stakeholders participate in the quality policy, work on their personal growth, inspire others and behave as a quality ambassador.
	32. Visible, supportive management and staff members	13.1 Exemplary behaviour of leaders 13.2 Exemplary behaviour of staff members 13.3 Leaders and staff members work together transparently	13. Managers and staff members have a visible and accessible presence in the workplace.

		13.4 Examples of how staff members and leaders facilitate an accessible and psychologically safe work environment	
	33. Executive and governance support	14.1 The executives propagate which quality ambition is pursued and the expected quality values in stakeholders' behaviour 14.2 Active participation in quality meetings 14.3 Quality on the agenda of executive and board meetings 14.4 Executives (and boards) with expertise and experience	14. Management and board members actively participate in quality initiatives and make 'quality' an integral part of organisational strategy.
Quality Culture	34. Attitudes and commitment	15.1 Quality dialogues in the (sub)organisations 15.2 (Sub)organisations show ownership and entrepreneurship, tackle challenges and celebrate their successes together	15. All internal stakeholders, patients and relatives continuously interact with each other with dignity, respect, empathy, kindness and in partnership from a holistic vision.
	35. Just culture	16.1 Measuring psychological safety 16.2 Communication about compliments, (near)incidents and quality problems 16.3 Policy about psychological support	16. There is open communication with internal stakeholders, patients and relatives about things that are going very well as well as less well. Involved stakeholders are supported, but also made aware of their responsibilities and behave accordingly.
	36. Continuous learning and innovation	17.1 Internal reflection moments on the quality delivered to learn from positive and negative outcomes, incidents and experiences 17.2 Reflection moments with patients, kin and external partners	17. Continuous learning and innovation are encouraged, thereby further improving and embedding the culture of quality.
Quality Context	37. Organisational characteristics	18.1 Objective view on challenges (e.g., financial resources, human resources, geographical location, IT, organogram and organisational structure) 18.2 Necessary resources (financial, human resources and infrastructure) for their QMS 18.3 Collaborations with external partners	18. The basic conditions are present in this organisation to make the quality policy a reality (e.g. financial resources, human resources, geographical location, ICT, organisation chart and structure, competence frameworks and cooperation with external partners).

		18.4 Clear quality structure with defined responsibilities and authorities	
		18.5 Concrete job descriptions for functions and roles	
	38. Healthcare system and external policy and demands	19.1 Alignment of quality policy with legislation, ethical policies and the healthcare system 19.2 Adjustment of quality policy to policy-making bodies and other external professional partners 19.3 (Sub)organisations monitor changes in the social and healthcare field	19. Its policies are aligned with external expectations and challenges posed by external bodies (e.g. governments, inspection, other healthcare institutions or other external professional partners).

How to co-create a quality management system: A mixed-method action case study in a regional hospital

How to co-create a quality management system: A mixed-method action case study in a regional hospital

Abstract

Background: Despite achieving an external accreditation label in 2018, the Chief Executive Officer of Sint-Trudo hospital, an acute-care hospital in Flanders (Belgium), wondered why quality was not sustainably embedded in professionals' daily practices. Since new quality paradigms focus on a people-matter mindset by involving patients, kin and professionals, a practice gap is observed on what different steps are taken to co-create in quality management systems (QMS). Therefore, we aimed to describe a case study of the co-created QMS in Sint-Trudo hospital.

Methods: A four-year mixed-method action case study comprising semi-structured interviews, focus groups, direct field observation and survey distributions was used. Participatory and insider action research was used for data collection between June 2019 and April 2023.

Results: The co-creation of the QMS took place in eight phases. Development of a co-created QMS started with contracting between the hospital and the research team, exploring perceptions of current QMS, defining challenges and establishing quality projects, followed by steps of stakeholder involvement, quality vision development, QMS maturity assessment, and continuous follow-up. Sharing information and presenting data results in different hospital committees was found time-consuming, but essential for co-creation in quality management.

Conclusions: This study showed how patients, kin, in-hospital and primary care professionals can be successfully involved in quality management and how co-creation has nurtured changes in the QMS. Committed leadership at all hierarchical levels is essential to enhance organisational engagement to co-creation and to ensure resources. Future research should focus on multi-centre designs to understand the impact of co-creation on QMS' sustainability and on structure, process, patient and professional outcomes.

Introduction

Quality management systems (QMS) have proven to be an effective strategy for improving service structures [1], processes [2] and patient outcomes in hospitals [3,4]. A variety of theoretical frameworks have been put forward to develop QMS that induce change organisation-wide. In Flanders, Belgium, the government introduced a 'Quality-Of-Care triad' for hospitals in 2009, consisting of voluntary participation in organisation-wide external accreditation, mandatory governmental inspections and voluntary public reporting of quality indicators. Despite Flemish hospitals' growing commitment to these initiatives, heterogenous perceptions and attitudes regarding quality management is observed among professionals [5]. In the Sint-Trudo hospital, a 310-bed acute-care hospital in Flanders with over 1,000 employees including about 140 physicians, that achieved an accreditation label from the JCI in summer 2018, the hospital's Chief Executive Officer (CEO) wondered why the QMS was not sustainably embedded into the daily workflow of professionals. The CEO contacted the research team at KU Leuven Institute for Healthcare Policy with this question in autumn 2018. Later that year, a research chair at KU Leuven was established to conduct research on the development of a sustainable QMS in an acute-care, regional hospital.

Not only the aforementioned Flemish hospital has this challenge. Internationally, 'quality fatigue' or 'accreditation fatigue' has been observed among healthcare professionals and accreditation labels were experienced as 'imposed' [6], bureaucratic and time consuming [7] and not promoting what really matters to patients and professionals [8]. Consequently, many quality initiatives do not sustainably reach patients, resulting in the delivery of substandard care [9,10]. The debate on how to sustain QMS is more relevant than ever [11]. Key drivers for a sustainable QMS have been summarized in a recently developed co-creation roadmap [12]. Nevertheless, implementing a sustainable QMS poses major challenges in practice, due to e.g. inadequate staff resourcing [13] and interactional and individual barriers [14]. To address these challenges, new quality paradigms have been introduced with a 'people matter'-mindset [15] that puts both *'patients and kin'* and *'professionals'* at the forefront of hospitals' QMS [16,17]. This transformation has led to the emergence of co-production as a fundamental approach in QMS by ensuring buy-in of all stakeholders, i.e. patients, kin, professionals in the hospital and primary care setting [18,19].

While co-creation has been proven to improve patients and professional outcomes [20,21], a significant practice gap exists regarding what, how and when different steps are taken in real-life practice settings to develop a co-created QMS aimed at sustainably and continuously engaging all stakeholders [22]. In hospitals, the unique insights in the development steps actually taken are often not described, except for some adequate descriptions of QMS development in "big organisations" [23–

26]. Peng et al. (2022) pointed out that understanding co-creation as a real-word phenomenon by using different methods simultaneously is a crucial academic and managerial issue [21]. Thus, there is a clear rationale to further evolve the empirical knowledge-base on how to co-develop a QMS with patients, kin and professionals. Therefore, we aimed to describe a case study of the co-created QMS in Sint-Trudo hospital.

Methods

Design

To explore the complex phenomenon of QMS development in its natural, organisational setting, we used a four-year mixed-method action case study [27,28]. Both qualitative data in terms of semi-structured interviews, focus groups, documentary and observational data; and quantitative data in terms of experience surveys are used simultaneously in a multi-step development approach (Table 12.1). Action research is a promising strategy to facilitate learning about what, how and why change is unfolding. Participatory Action Research (PAR) [29] and Insider Action Research (IAR) [30], both consisting of plan, act, observe and reflect activities, was used to develop the co-created QMS with active participation of stakeholders. For this research design, the first author (FC) was present at the hospital two days a week as participatory researcher (PR) and the second first author (AJ) is the hospital's healthcare quality manager (HQM). Data collection occurred between June 2019 and April 2023.

Table 12.1 Description of development steps, methods and results.

Development steps	Methods	Results
Step 0: Contacting and contracting between Sint-Trudo hospital and the research team of the University of Leuven	CEO of the Sint-Trudo hospital contacted the research team (Leuven Institute for Healthcare Policy) to invest a four-year research chair on sustainable quality management in their hospital. This investment allowed a PhD-project to be started and the hospital could benefit from the research conducted in their hospital.	• Decided by the board of directors. The executive committee and medical council were involved. • The participatory researcher (PR) (PhD student) was present at the hospital two days a week to conduct action research and was part of the local quality team.
Step 1: Exploring missing links in the current QMS regarding sustainability	• Interviews with purposively selected professionals (April - December 2020). • Hospital-wide survey, which is developed based on existing surveys in QMS and with a structure according to the six drivers and 18 building blocks of the co-creation roadmap, was distributed to professionals (March - December 2020).	Based on interview results, following themes were found to be important: • Involving patients, kin and professionals to ensure value-creation for patients, kin and professionals. • Investing in quality improvement knowledge and skills of professionals. • Creating a continuously learning culture in the hospital. • Focusing on positive evolutions in quality indicators and celebrating successes. • Expanding the transparent feedback system with indicators that matters to patients, kin and professionals. • Building a shared quality vision and a common goal in quality management in the hospital. Based on survey results concerning quality management, following priorities were identified: Lowest scores: 'Involvement of stakeholders', 'Visible, supportive management', 'Transparent feedback system' and 'Evidence-based interventions'.
Step 2: Defining quality challenges to develop a sustainable QMS	Based on interviews and survey analyses in step 1 (January 2021).	Examples of defined challenges to develop a sustainable QMS: • How can we implement a multidimensional quality definition in the hospitals' shared quality vision? • How can we actively involve patients, kin and professionals in the development of a supported QMS? • How can we incorporate the QMS in our existing structures? • How can we make collecting quality indicators useful, feasible and automatic?

Step 3: Defining quality projects to develop a sustainable QMS	• Interviews with HQM of Flemish hospitals (June - October 2020), whose best practices were used to define quality projects based on challenges in step 2. • An established stakeholder team met at regular intervals to define and prioritise quality projects (May 2021 - February 2022).	Seven quality projects were established by the stakeholder team, i.e. board members, executives, local quality team members, physicians, nurses and research members.
Step 4: Implementing the quality projects	A quality champion was assigned for each quality project being responsible for the PDSA-cycle of that project.	The implementation of the seven quality projects was led by the designated quality champion. Two projects were organisation-wide implemented, five projects on departmental/ward level.
Step 5: Involving patients, kin, in-hospital professionals and primary care professionals	• Hospital-wide survey on experiences of 'Healthcare quality for patients and kin' and 'Healthcare quality for professionals' (July - August 2021). Afterwards, the hospital received a feedback report with descriptive analysis. • Focus groups with patients, kin and primary care professionals (September - October 2021).	Based on survey results, following priorities were identified on: • Part 1 'Healthcare quality for patients and kin': quality domains with the lowest scores were 'Eco-friendly', 'Kin-centred care' and 'Transparency'. • Part 2 'Healthcare quality for professionals': quality domains with the lowest scores were 'Accessible and timely', 'Efficiency' and 'Resilience'. Based on focus groups results, following themes were found to be important: • By patients and kin: healthcare professionals' attitude (respectfully, empathetic, kind), a personal and holistic care approach, approaching the patient as a person and clear, honest communication and comprehensible information. • By primary care professionals: transparency about the admission and discharge policy, accessibility to care services, communication with primary care professionals and approaching the patient as a person.
Step 6: Developing a new quality vision in the organisation	• Co-design with hospital's key stakeholders in quality (based on results of step 5). • Focus group with management and the executive committee (May 2022). • Launched the new quality vision to board of directors, the executive committee, managerial levels, professionals, patients, kin and primary care setting (November 2022).	The new, co-created quality vision is an acronym for the word 'STRONG' [STERK in Dutch]. Furthermore, this quality vision is also incorporated in the organisation-wide vision and aims. Management and executives decided to translate this vision into short sentences, as they are convincing and understandable for all organisational levels.

Step 7: Assessing the maturity of the implementation of a co-creation roadmap	• Two maturity tools, measuring the maturity of the implementation of the co-creation roadmap, completed by professionals (August - September 2022), followed by a consensus meeting with those professionals (September 2022). • Afterwards, the hospital received a feedback report with descriptive analysis.	Based on results of maturity tools, next priorities were identified during the consensus meeting: • Maturity Matrix: the building blocks that did not reach the first maturity level were: 'Intervention implementation by adapting quality design', 'Communication and reflection', 'Executive and governance support', 'Attitudes and commitment' and 'Continuous learning and innovation'. • Co-creation scan: the building blocks with the lowest score: 'Executive and governance support'.
Step 8: Continuous follow-up	Responsibilities for continued implementation and follow-up has been divided among members of the local quality team.	• Decided by the board of directors and executive committee to further support the development of a co-created QMS. • Preparing a re-assessment of the QMS and further development of co-creation strategies, starting from step 1.

Setting

Sint-Trudo hospital is an acute-care, regional hospital in Flanders (Belgium). The focus of this study was the hospital's organisation-wide QMS, that ensures quality services in their five departments. The local quality team consists of 3 full time equivalents (FTE) and meets on a weekly basis. Each official committee, i.e. the board of directors, medical council, management committee, steering committee in quality, nursing and paramedical committee, meets monthly, except for the executive committee which meets weekly.

Data-analysis

For most development steps, data collection and analysis occurred concurrently. The analysis focused on the organisation as whole and not on specific hospital departments or nursing wards. For the qualitative data, participants for semi-structured interviews, focus groups or the established stakeholder team were purposively selected based on their experiences as employee, patient or kin in Sint-Trudo hospital and based on their attitude regarding quality management, such as believers and critics of the current QMS. As a theoretical foundation for interviews and focus groups (step 1 and 5 in Table 12.1), a topic list and interview guide were developed based on sensitizing concepts for a sustainable, co-created QMS [12] and a multidimensional vision on quality [31]. The semi-structured interviews were conducted by the PR. The focus groups were moderated by the HQM and observed by the PR. All interviews and focus groups were audio recorded and transcribed verbatim. Using Glaser and Strauss's constant comparison analysis [32], insights into experiences of the current QMS were gradually developed and refined. Open coding was used to derive themes inductively based on participants' own words and these were deductively compared to an existing roadmap towards sustainable quality of care [12]. The actual coding process was supported by NVivo 12, a software programme for analysing qualitative data.

Ethical considerations

Ethical approval was granted by the appropriate ethics committee (STZH/2019/293). Informed consent was obtained from participants (interviews, focus groups, stakeholder meetings) and from survey respondents.

Results

Development steps in co-creation

An overview of the results of each development step co-created over a four-year period is provided in Table 12.1. For most steps, sharing information and presenting data results in different committees was a time-consuming activity that should not be underestimated, but seems to be key to a co-creation approach (Figure 12.1). The implementation of quality projects (step 4) in the hospital is a continuous process and is still ongoing after the four-year project was completed. How the co-created development steps were implemented in our practice setting as well as the lessons learned for each step are described in detail in Supplemental Material 1.

Figure 12.1 Timeline of the co-created development steps.

Results of development steps 0 to 4

The co-creation process started with a four-year contract between Sint-Trudo hospital and the research team. In the next step, priorities, preferences and needs of the end-users in quality management were derived from interview and survey results completed by professionals (Figure 12.2). For example, survey results showed that the building block 'Involvement of stakeholders', as displayed within Step 2 in Figure 12.2, was scored as having the most room for improvement. This information guided the co-creation process. Based on the qualitative (interview results) and quantitative (survey results) data, quality challenges were defined in co-creation with the hospital's quality management department. To define these challenges, a co-creation roadmap towards sustainable quality of care was used as supporting framework, involving six drivers and 18 building blocks [12]. By using the principles of inter-hospital learning and sharing knowledge between hospitals, strategies to address these challenges were based on best practices of HQM from other Flemish hospitals [33]. The latter resulted in development step 3 in the definition of seven quality projects to be implemented in the hospital.
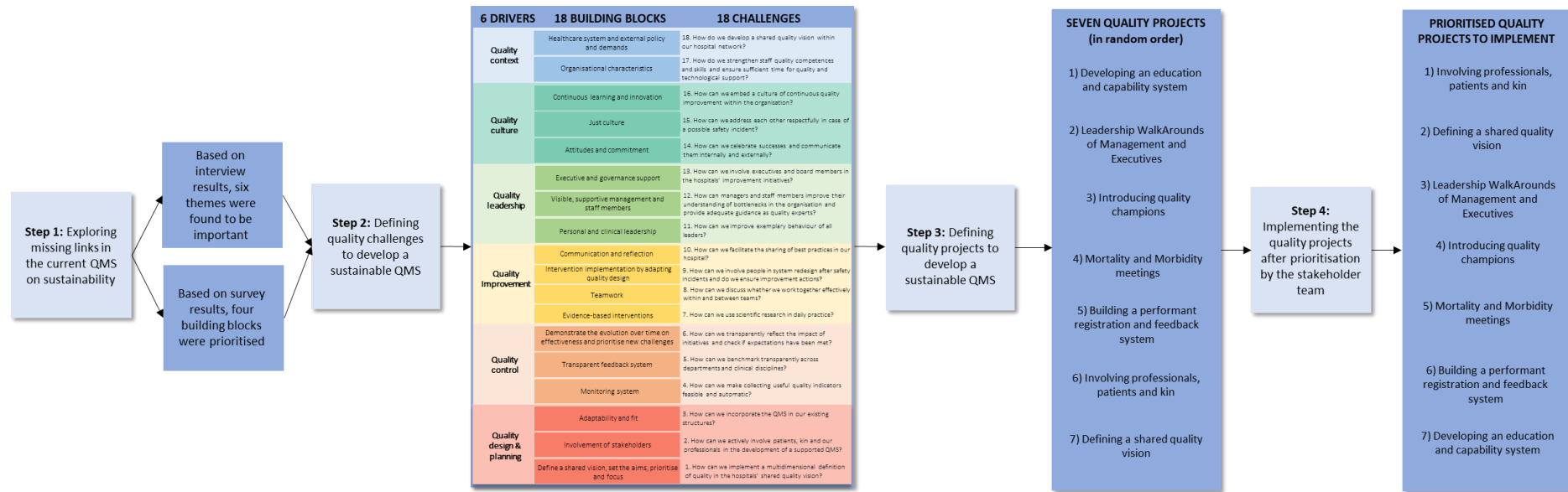
Figure 12.2 Illustration of development steps 1-4.

Results of development steps 5 to 8

To increase involvement of patients, kin and professionals, a cross-sectional, hospital-wide survey, that measures experiences of healthcare quality in two instrument parts (Part 1 'Healthcare quality for patients and kin' and Part 2 'Healthcare quality for professionals), was disseminated. The results if this survey guided quality strategies and defined quality-related priorities as scored by patients, kin and professionals. Next, during two focus groups with patients, kin and primary care professionals, their quality experiences and recommendations in quality management were further elucidated. Subsequently, based on these quantitative (survey results) and qualitative (focus group results) data from a multistakeholder perspective, a new quality vision was created in the hospital. Subsequently, a focus group with managers and the executive committee revealed that this vision should be made understandable and actionable organisation-wide. Therefore, a video was made explaining the new quality vision by in-hospital professionals themselves. The new vision was launched to patients, kin, in-hospital and primary care professionals. To check whether defined quality projects (in co-creation steps 3 and 4) were still in line with current priorities, two maturity tools, i.e. a maturity matrix and co-creation scan, were completed by professionals. The maturity results revealed that the defined quality projects were still accurate and further implementation of these projects was recommended. The further implementation and the continuous follow-up of these projects are ongoing.

Involvement of stakeholders in development steps

The degree of stakeholder involvement in the development steps is described in Table 12.2. 'Decided' refers to the involvement of these stakeholders in the final-decision to take that particular development step. 'Involved' refers to the involvement of stakeholders in the co-creation process of that development step. 'Informed' means that the results of that development step were communicated or made available to these stakeholders. The board of directors made the final-decision in the first developments steps and the last one. For all other steps, the executive committee made the final decisions. The medical council was involved in the first (strategic) steps and informed in other steps. The involvement of the steering committee in quality and the HQM was variable throughout the steps, ranging from involved to informed. The stakeholder team was established based on the results of development steps 1 and 2, and involved in the subsequent steps. Professionals were informed in the first and last step and involved in all other steps. Patients, kin and primary care professionals were involved in one step and informed in the next one.

Table 12.2 Involvement of stakeholders in development steps.

Development steps	Board of directors	Executive committee	Medical council	Steering committee in quality	Healthcare quality manager (HQM)*	Established stakeholder team**	Participatory researcher (PR)	In-hospital Professionals	Patients and kin	Primary care professionals
Step 0: Contacting and contracting	Decided	Involved	Involved	Informed	Informed		/	Informed	/	/
Step 1: Missing links in current QMS	Decided	Involved	Involved	Involved	Involved		/	Involved	/	/
Step 2: Defining quality challenges	Informed	Decided	Informed	Decided	Involved		Involved	Involved	/	/
Step 3: Defining quality projects	Informed	Decided	Informed	Informed	Involved	Involved	Involved	Involved	/	/
Step 4: Implementing the quality projects	Informed	Decided	Informed	Informed	Involved	Involved	Involved	Involved	/	/
Step 5: Involving stakeholders	Informed	Decided	Informed	Informed	Involved	Involved	Involved	Involved	Involved	Involved
Step 6: Developing a new quality vision	Involved	Decided	Informed	Involved	Involved	Involved	Involved	Involved	Informed	Informed
Step 7: Assessing maturity in co-creation roadmap	Informed	Decided	Informed	Involved	Involved	/	Involved	Involved	/	/
Step 8: Follow-up	Decided	Decided	Informed	Informed	Involved	/	Informed	Informed	/	/

*the HQM is part of the local quality team; **introduced in this co-creation approach, from step 3 onwards.

Discussion

In this case study, we described the co-creation of a QMS in an acute-care, regional hospital by involving patients, kin, professionals in the hospital and primary care setting. The development of the QMS started with contracting between the hospital and the research team; exploring perceptions of the current QMS, priorities, preferences and needs of the professionals; defining challenges and establishing quality projects; followed by steps of stakeholder involvement; quality vision development; QMS maturity assessment; and continuous follow-up. The co-creation processes were designed in collaboration with a research team to bridge the gap between evidence and practice in quality management. The PAR and IAR approach demonstrated potential for achieving equitable and diverse stakeholder involvement, establishing a partnership, and recognising the value of patients', kin's and professionals' contributions in quality management. As described by the review of Fusco et al. [34], stakeholder participation is one of the cornerstones of person-centred care. As the nature and extent of this bottom-up quality approach have only been described limitedly before [25,26], our findings, which provided a detailed account of a successful co-creation within an acute-care hospital context, can help expand the knowledge-base. O'Mohany et al. ensured success by focusing on processes during the implementation of a QMS, which is an iterative one of progress, setbacks and the embedding of quality processes in the organisation [23]. In our study, the processes succeeded because it sought to identify, evaluate and meet the needs of professionals, patients and kin, which were identified primarily through formal methods such as surveys, focus groups, interviews and the analyses of data [18,35]. These processes results in quality strategies aligned with both the organisation's DNA and the professional's DNA [36]. The described steps illustrate how much energy, resources and dedication of different stakeholders are needed to effectively co-create in quality management and which mechanisms and degree of stakeholder involvement can be used. This engagement, sharing information and presenting data results in different hospital committees was time-consuming, but essential for co-creation in QMS. The co-creation process in our case study was a dynamic, value-based one that involves a multiplicity of stakeholders on different hierarchical levels [21,35].

Articulating stakeholders' needs and navigating competing priorities have been identified as an important strategic, organisational process during the early stages towards sustainability [15,37]. However, how this strategy may lead to improvement projects that were not described in the few studies pertaining to QMS' sustainability in hospitals [25,26]. As hospitals' QMS do no start from scratch and have been implementing a large number of quality projects in the last decade [5], we started this case study with exploring missing links in their QMS from professionals' perspective, followed by defining quality projects and developing a shared quality vision. This finding exemplifies

how the engagement, perspectives and experiences of end-users can shape a QMS and uncover gaps that might have been overlooked. Looking back at the sequence of co-creation steps, we would recommend hospitals to start their co-created QMS by building a new quality vision. This vision is the foundation for a clear quality policy statement. In accordance with sustainability research [38], it provides a strong coherent framework, which subsequently sets expectations and guides the actions of all stakeholders. The latter is in line with the co-creation roadmap towards sustainable quality of care [12]. Next steps will focus on building an infrastructure for quality monitoring and on making learning and improvement a real part of professionals' daily practices while ensuring leadership in quality and establishing a quality culture.

In this study, organisational leadership provided the impetus for co-creation in practice as well as securing the resources [20,37]. First, the main role of the board of directors was to approve and validate most development steps, as did the executive committee, although they were also actively involved in some crucial steps. Resources allocated for co-creation are substantial and have been so on a sustained basis. As described in previous research [20,25,26], leadership, represented in a range of ways such as informal champion roles, formal leadership positions or management behaviours, is one of the most commonly cited influences across sustainability and organisational culture studies in healthcare. Second, the steering committee in quality, mainly consisting of the executive and management committee, was involved in three steps and informed in all of them. This steering committee could be expanded with professionals, i.e. physicians and nurses, that were part of the established stakeholder team during this research project. By expanding, the hospital has the opportunity to rethink the strategy of this steering committee, such as involving it in all quality steps instead of mainly informing them about the co-creation steps taken and their results. Third, the collaboration between the HQM and PR played a significant role in the co-creation processes, the success of which was due to the drive, energy and complementary expertise of both [25,37]. In line with the concepts of institutionalization [25,39], collaboration between an employee and external researcher supports finding creative solutions to difficult problems, filling skill gaps within the organisation and reassuring the local team that the right processes have been followed to achieve sustainability. Fourth, in-hospital professionals were involved in all steps, except the first and last steps, to ensure the challenges matched their values and needs. Lastly, patients, kin and primary care professionals were successfully involved in two steps, opening the way to structural involvement of these stakeholders, such as in the further implementation of the hospital's quality projects.

Strengths and limitations

A major strength of the current study is its exploratory nature using both quantitative and qualitative data. This facilitated intrinsic motivation to change within the organisation [40], and allowed the researchers to study the "natural course" of the co-creation steps. As this study took place before, during and after the COVID-19 pandemic, it had a profound impact on the co-creation of QMS. It could be that co-creation processes would have been different if the pandemic had not occurred. Nevertheless, the described steps can inspire hospitals and healthcare quality managers seeking to deliver and sustain change based on co-creation principles. It must be acknowledged that while these steps are a starting-point for a sustainable QMS and ensures that the hospital understands quality perceptions from a multistakeholder view, it does not, however, guarantee that the QMS as a whole has evolved on a path towards sustainability. This is perhaps where the co-creation process has, to date, proven successful. Based on the organisation-wide and multi-method approach of this research, we are confident that the available sources allowed us to produce a sufficiently rich and dynamic picture to support conclusions. Co-creating in QMS is not a quick fix or something that can be achieved quickly and sustainability requires considerable attention and continual effort, which should be undertaken as an integrated part of improving overall hospital performance. Nevertheless, this approach wastes less energy and appears to decrease resistance that could have made the QMS stronger and more sustainable. Despite triangulation between multiple sources of data and the diversity of stakeholders involved, we also do not have a clear view on the sustainability of this co-created QMS. Future research should focus on what was sustained as originally intended and how things developed and why. This research can be supported by the methods of Implementation Research Logic Model that facilitates understanding causal pathways, sustainability strategies and outcomes. Although our study provided an in-depth, contextualized illustration of a hospital's co-creation processes four-year-long term, the investigation would have been strengthened in future research by comparisons and benchmarking with other hospitals as 'living labs' and by including the evolution of structure, process, patient and professional outcomes [20,21].

Conclusion

This study is the first to provide an in-depth description of the co-creation of a QMS in an acute-care, regional hospital. Our findings show how patients, kin, in-hospital professionals and primary care professionals can be successfully involved in quality management, which co-creation steps can be undertaken in real-practice settings and how these has nurtured changes in quality management. Sharing data and involving all stakeholders was a time-consuming process that requires human resources but is essential for co-creation in quality management. During the co-creation processes, the persistent, complementary, and shared actions of committed leaders represented in a range of ways, was key to enhance engagement and to ensure resources. Future research should focus on multi-centre designs to understand causal pathways, implementation strategies and the impact on structure, process, patient and professional outcomes.

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Supplemental Material 1: Detailed results of development steps

Supplementary Table 12.1 Description of the co-creation steps in practice and the lessons learned.

Development steps	Co-creation in practice	Lessons learned
Step 0: Contacting and contracting between the Sint-Trudo hospital and the research team, i.e. Leuven Institute for healthcare policy	• Decided by the board of directors, executives and medical council. • PhD student was present at the hospital two days a week to conduct action research and was part of the local quality team.	/
Step 1: Exploring missing links in the current QMS regarding sustainability	• In collaboration with the executives, local quality team and the research team. • Presented to board and managerial levels (January – September 2021).	1) Focusing on including all hierarchical levels (different perceptions of the QMS on different levels was observed) and starting a discussion about future quality management with those professional levels. 2) Including professionals employed in both the care department and facility department, to ensure that organisation-wide experiences are involved in the development of an organisation-wide QMS. 3) Using a survey that is based on a theoretical model towards sustainability, i.e. the co-creation roadmap in this case study, with different drivers and building blocks as main structure for defining missing links in the current QMS.
Step 2: Defining quality challenges to develop a sustainable QMS (based on results of step 1)	• In collaboration with the local quality team and steering committee in quality. • Presented to board and managerial levels (January – September 2021).	1) The combination of quantitative and qualitative data gives extraordinary, in-depth insights into the challenges regarding the current QMS. 2) Challenges could be refined by presenting them to committees at all hierarchical levels and confirmed by leaders during strategic meetings.
Step 3: Defining quality projects to develop a sustainable QMS (based on results of step 1 and 2)	• Stakeholder team: board members, executives, local quality team members, physicians, nurses and research members. • Presented to board and managerial levels (June 2021 – February 2022).	1) Interviews with managers from other hospitals provided information-rich data, whose results supported the definition of quality projects based on their best practices. Nevertheless, conducting and analysing interviews is time-consuming. We recommend other hospitals to participate in inter-hospital learning collaboratives where organisational case studies and best practices can be shared.

		2) Setting up an infrastructure, i.e. the stakeholder team, that spanned the interorganisational levels to ensure the adoption of new quality projects and to spread expected behaviours. Additionally, this team served as a platform to link policy and practice. 3) Employees of facility department and human resource department were not included in this stakeholder team to define and prioritize projects. Including them would strengthen the support for the quality projects from an organisation-wide perspective. 4) Patients, kin and primary care professionals were not included in the stakeholder team. Including them would strengthen the support for the quality projects from a care receiver as well as a transmural perspective. For example, the focus groups could be conducted with patients, kin and primary care professionals to include their perspective on project content and prioritization. 5) Defining multifaceted quality projects, that focused on more than one driver or building block of the used theoretical model, makes quality management more amenable.
Step 4: Implementing the quality projects	• In collaboration with the local quality team and steering committee in quality.	1) Setting priorities in projects by stakeholders who ensure feasibility and can spread the message organisation-wide. 2) Introducing quality champions that lead the implementation of the project, take accountability and share progress and new challenges. Nevertheless, a team of champions for each project would foster the sustainable implementation of the project and support the distribution of projects throughout departments and nursing wards.
Step 5: Involving patients, kin, in-hospital professionals and primary care professionals	• In collaboration with the executives, stakeholder team and local quality team. • Presented to board and managerial levels (September 2021 – January 2022).	1) Focusing on three stakeholder groups (patients/kin, professionals and primary care) from the inception of the QMS, i.e. as the first step of the implementation. 2) Involving patients and kin in quality management can be endorsed by using tablets and by an individual approach such as explaining the goal of the survey. 3) A focus group can be used to foster an in-depth discussion about the respondents' experiences of healthcare quality. Nevertheless, this focus group did not zoom in on survey results. The latter would give more meaning to those results.

		4) As the covid-19 pandemic was still going one during that study period, the hospital executives decided to not conduct focus groups with employees. Focus groups with employees of the hospitals would gain a greater understanding of their experiences. 5) Involving board members or executives during the focus groups, would increase their awareness about the experiences of stakeholders.
Step 6: Developing a new quality vision in the organisation (based on results of step 5)	• Key stakeholders in quality: local quality team and steering committee in quality. • Presented to board, managerial levels, professionals, patients, kin and primary care setting (Launched the new quality vision: November 2022).	1) Starting with a clear vision, that outlines the behaviours that each stakeholder agrees to uphold. 2) A tailored video has been made to launch this new vision organisation-wide. Each sentence was presented by a professional, ranging to all hierarchical levels of the organisation. For future videos, we would recommend including patients, kin and primary care professionals. By not involving the latter, this vision launch is perceived as a 'professional' story, but in fact also patients', kin's and primary care professionals' experiences were included in vision development. 3) This vision was launched once, but a communication plan is needed to bring this vision alive in the organisation. 4) This vision could be made actionable with related goals and a strategic plan to implement organisation-wide.
Step 7: Assessing the maturity of the implementation of a co-creation roadmap	• In collaboration with the local quality team. • Presented to the steering committee in quality (October 2022).	1) By change of leadership (a new executive was introduced in 2022), more attention was focused on quality management. Quality management is now incorporated in the organisational management. 2) The 'as is' position in maturity supported to uncover management gaps in their QMS. Nevertheless, challenges in maturity are complementary to the challenges in step 1, meaning that current projects still fit the hospital's needs. 3) Defining the desired 'to be'-level in maturity would support the organisation in taking steps forward.
Step 8: Continuous follow-up	• Decided by the board of directors and executives.	/

Chapter 13

General discussion

Introduction and general overview

This PhD study examined how to build a sustainable QMS in hospitals. After the general introduction in chapter 1, a new multidimensional definition of healthcare quality in the 21st century was proposed by including additional insights from patients, kin and primary care professionals in chapters 2, 3 and 6 (RO1). In chapters 4 to 6 (RO2), an instrument to measure quality experiences multidimensionally from a multistakeholder perspective was developed and validated (RO2a); and the between-stakeholder group and between-hospital variation on quality experiences were examined (RO2b). A comprehensive definition of sustainability in QMS of healthcare organisations was proposed in chapter 7 (RO3). In chapters 8 to 11 (RO4), a co-creation roadmap towards sustainable healthcare quality was developed based on international expert opinions, national experts opinions and a narrative literature review (RO4a); and chapter 11 resulted in the development and validation of instruments to measure the maturity of the co-creation roadmap implementation in hospitals (RO4b). Finally, chapter 12 (RO5), concluded the results by investigating a four-year mixed-method action case study of a co-created QMS in Sint-Trudo hospital. Based on the results in chapters 2 to 12 (RO1 to RO5), a conceptual model towards sustainable quality management in hospitals is proposed in this chapter (main RO of this PhD study).

RO1: A multidimensional, co-developed definition of healthcare quality in the 21st century

Recently, widely accepted frameworks of healthcare quality have been reviewed on its relevance based on healthcare quality experiences of the last 20 years, which resulted in the proposal of a new multidimensional quality model [1,2]. This model incorporates existing domains, such as person-centredness by including patients, kin and professionals, and emerging domains which reflect the changing worldview of healthcare, such as ecology [3] and transparency [4]. As previous research has mainly been devoted to perspectives of patients [5–7] and professionals [5,8], an in-depth understanding of healthcare quality was inductively explored based on patients', kin's and primary care professionals' perspectives in chapters 2 [9] and 6 [10] (RO1). The integration of key stakeholders perspectives and their specific knowledge allows going beyond the traditional one-way process in which researchers produce knowledge [11–13]. Patients and kin described healthcare quality mainly with domains *'Partnership and Co-production', 'Dignity and Respect'* and *'Effectiveness'*. From primary care professionals' perspectives, domains *'Partnership and Co-production', 'Effectiveness' and 'Transparency'* were particularly mentioned. A theory-based interpretation of patients' and kin's experiential knowledge and primary care professionals' knowledge, resulted in the deductive validation of the multidimensional quality model [2]. Remarkably, both stakeholder groups, care

receivers and care givers, were strong advocates of successful communication as an essential domain of healthcare quality at macro, meso and micro levels. Patients and kin described communication with a focus on the content, such as being honest during the patient-provider care contact, while primary care professionals emphasised the importance of clear and comprehensive communication, especially during care transitions from the hospital to home. In accordance with research on in-hospital professionals' perspectives [5], extending the multidimensional model by including 'communication' is important to build trustful relationships between patients and providers as well as between staff and management [14–16]. Research has shown that patients' trust in professionals is positively associated with health outcomes [17]. To operationalise the multidimensional quality model in daily practice, it is translated into the *'House of Trust'* (Figure 3.1)*.* This house includes additional quality domains focusing on communication and the *'moment of truth',* i.e. the unique meeting between care receiver and care giver at the hinge point of the front-office and back-office of an organisation. At this hinge point care pathways, care programs, protocols and procedures guide all stakeholders towards healthcare quality and excellence. The integration between front- and back-office initiatives within the organisation and among external stakeholders must be supported by hospital managers and leaders. As emphasised in research [12,13,18–20], the gap between professionals' knowledge and knowledge by experience in the quality management discussion can be bridged by active participation of patients, kin and professionals in the hospital and primary care setting. These participation strategies advance the maturing concept of co-production in healthcare [21,22].

In summary, the definition of healthcare quality in the 21st century is a multidimensional one of core values, technical domains, catalysts (including the domain 'communication') and surrounding domains of person- and kin-centred care (Figure 2.2 and Figure 6.2) [9,10]. This multidimensionality is strengthened by results demonstrating that patients and kin, professionals in the hospital and primary care setting do experience quality as a multidimensional concept in real-life practice settings in chapters 4 [23], 5 [24] and 6 [10]. Moreover, results demonstrated strong correlations between all quality domains and the overall quality assessment of this multistakeholder group (Table 4.3 and Table 6.2). By involving patients, kin and primary care professionals in the development of this definition, we acknowledge their contribution in an inclusive, multidimensional definition of healthcare quality that should be used as a common thread in hospitals' QMS. The dimensional clarity will increase communication among researchers, health practitioners and policymakers. As experiences of 'healthcare quality for patients and kin' and 'how the organisation cares for its professionals' are positively associated with patient outcomes [25,26], measuring them should be recognised as a central pillar of healthcare quality control and continuous follow-up [8,19,27–29]. An instrument is required to measure experiences of the multidimensional definition of healthcare quality from a

multistakeholder perspective and to drive the transformation from a 'person-centred' to 'people-driven' QMS (RO2a).

RO2: Measuring and understanding healthcare quality experiences from a multistakeholder perspective identified multidimensional quality priorities

In RO2a (chapters 4 [23] and 6 [10]), a multi-step approach was used to co-develop and validate an instrument, hereinafter referred to 'FlaQuM-Quickscan', that measures the multidimensional definition of healthcare quality and integrates patients', kin's and professionals' experiences. The FlaQuM-Quickscan is a two-part instrument that mirrors identical quality domains from both perspectives *'Healthcare quality for patients and kin'* (part 1 of the FlaQuM-Quickscan) and *'Healthcare quality for professionals'* (part 2 of the FlaQuM-Quickscan). Rigorous validation steps showed that the psychometric properties confirmed instrument validation from patients', kin's, in-hospital and primary care professionals' perspectives. The uniqueness of the validated FlaQuM-Quickscan is that all stakeholders complete both instrument parts, which implicates that patients and kin have to imagine how the hospital cares for professionals (part 2 of the FlaQuM-Quickscan) and vice versa. Despite that the validation results of primary care professionals are less excellent compared to validation results from patients', kin's and in-hospital professionals' perspectives, the FlaQuM-Quickscan is a first step to involve primary care professionals in co-design of hospital quality management and extends previous literature [30–32]. The observed discrepancy in validation might be the result of the smaller sample size of primary care professionals, although we included a sample of 550 respondents [33,34]. By focusing on the values of integrated care for quality management purposes [35], the FlaQuM-Quickscan is among the first instrument that goes beyond the hospitals' walls to explore healthcare quality experiences. Besides the rigorous validation steps, the process evaluation of instrument dissemination in a multi-centre hospital setting warrants instrument application organisation-wide. In practice, this feasible instrument can be described as an experience measure, such as Patient Reported Experiences Measures (PREM) [36,37] or Clinician Experience Measure (CEM) [38,39], but measuring non-disease specific, organisation-wide experiences based on a comprehensive definition of healthcare quality. In summary, this co-developed, validated instrument closed the gap in measuring multidimensional quality experiences from a multistakeholder, integrated care perspective and enriches existing theories [40,41] by exploring if experiential knowledge of patients and kin differs from the gaps experienced by professionals and vice versa. As research observed variation in healthcare quality experiences between stakeholders [31,42] and hospitals [43,44], further understanding of this variation is needed to support hospital management and policymakers in the transformation of QMS

to ones that fit stakeholders' needs and would give insight in how to approach stakeholder groups differently (RO2b).

In RO2b (chapter 5 [24] and 6 [10]), the multistakeholder and multicentre results from the FlaQuM-Quickscan, as published in NEJM Catalyst, were used to examine between-stakeholder group and between-hospital variation and to set quality-related priorities in practice. Theoretically, the significant difference in experiences of 'patients and kin' and 'professionals' and between hospitals confirmed the differences observed in previous research [31,42–44]. As defined by Shewhart in 1939, understanding of variation can be used as a point of view in quality improvement [45]. Through a management and healthcare policy lens, the FlaQuM-Quickscan results showed that by combining the correlation of the overall quality scores with the quality domains, the difference in mean scores on domains and the variation between hospitals' mean scores, quality-related priorities were identified (Table 5.2 and Supplementary Table 6.1). In our study sample, these priorities seemed to be multidimensional, i.e. technical dimensions, person- and kin-centred care, core values, and catalysts. Despite this multidimensionality, there are some quality domains we need to highlight in Flanders. First, in both instrument parts and scored by all stakeholder groups, the domain *'Dignity and respect'* showed the highest correlation with the overall quality score for all stakeholder groups and confirmed previous research [46,47]. Second, despite the fact that we observed one of the lowest correlations of the domain *'Eco-friendliness'* with the overall quality score and the low mean score of the domain in both parts of the FlaQuM-Quickscan, we recommend hospital management and policymakers to focus on environmentally friendly solutions because of the current healthcare pollution [3]. Third, in both instrument parts and scored by all stakeholder groups, the *'Equity'* domain showed one of the lowest correlations with the overall quality score, the highest mean and one of the smallest variations between hospitals' mean scores. Not prioritizing this domain in hospitals is different than expected in terms of observed variation in patient outcomes in Belgium [48–51], the WHO's 2015 report on evidence regarding healthcare inequity [52] and the inequities in healthcare that have been exposed by the Covid-19 pandemic [53]. The observed discrepancy between our results regarding experiences with equity and international observations might be explained by the fact that the respondents' inclusion criteria in our study were restricted by language (only Dutch-speaking individuals) and neither cultural background nor socioeconomic determinants were surveyed, which might have led to an overestimation of equity-related experiences. In terms of the largest variation between hospitals' mean scores, domains *'Resilience', 'Accessibility and Timeliness'* and *'Holistic care'* are examples of common domains in results of FlaQuM-Quickscan part 1, scored by all stakeholder groups. In FlaQuM-Quickscan part 2, examples of domains were *'Partnership and co-production', 'Person-centredness' and 'Eco-friendliness'.* Between-hospital variations reveal the quality domains on which interhospital

learning should focus. Interhospital collaborations have proven successful in improving patient outcomes, professionals' knowledge, problem-solving skills, attitude, teamwork, shared leadership and habits for improvement [54,55].

To summarize, the significant variation between stakeholder groups and between hospitals identified multidimensional quality priorities at stakeholder and organisational level. This multidimensionality emphasised the need for future multifaceted strategies in hospitals, that target to improve more than one dimension at once. As these variations in healthcare quality experiences in Flemish hospitals were unknown, the FlaQuM-Quickscan showed its ability to close this gap. The experiences are a smoke signal for hospitals that can be used complimentarily to the principles of experience-based co-design methods in the healthcare setting [56], such as focus groups or interviews with key healthcare stakeholders. The latter strengthens the definition and prioritisation of goals in their QMS. Continuous monitoring of stakeholders' experiences can serve as a catalyst for quality improvement.

RO3: Sustainability of QMS is a multi-factorial concept of continuously evolving and dynamically interacting processes

Sustainability research in healthcare was mainly related to environmental, financial and social sustainability. In hospitals, QMS constitute an important method for improving patient outcomes and ensuring its sustainability is critical. Nevertheless, the exact meaning of *"sustainable quality management systems in healthcare organisations"* remained unclear and knowledge in this area is nascent. In RO3 (chapter 7), conceptual clarity was brought by proposing a comprehensive definition of sustainability of QMS by identifying its prerequisites, essential components and consequences (Figure 7.2). The concept analysis revealed that sustainability is a multi-factorial concept referring to myriad processes situated on four factors: (1) the goals, (2) resources, (3) the QMS itself and (4) the individuals. The processes related to these factors are interacting dynamically, evolving constantly and require maintained efforts and attention over an extended period of time to reach sustainability. The focus on the relations and interconnections of the QMS components rather than on the individual QMS components themselves is in line with the latest generation of systems thinking, also called the 'the complex adaptive systems approach' [57]. A recent review of barriers and facilitators to sustain hospital-wide improvements, published later than the inclusion criteria of our search strategy in chapter 7, confirmed these interactions between factors [58]. Identified key processes of sustainability in this PhD study are described as an ongoing and continuously evolving 'moonshot' that already begins while the QMS is implemented. Defining the concept of sustainability as a 'process' rather than an 'outcome', calls for a vision of sustainability that is much broader than just the last stage of a 'phased approach' or a 'funded project'. Moreover, the focus on learning and innovation circles in our

definition, facilitates the continuous adaptation based on healthcare stakeholders' needs and on further improving patients' and professionals' outcomes. This principle of continuous adaptation aligns with the need to strengthen the resilience of healthcare organisations to overcome major challenges, such as during the COVID-19 pandemic [59,60]. Providing a univocal definition of sustainability of quality management systems informs theory development as key factors for healthcare organisations were uncovered.

RO4: A co-creation roadmap towards sustainable quality of care and measuring the maturity of the co-creation roadmap implementation

In RO4a (chapters 8 [61], 9 [62] and 10 [63]), sustainability drivers were incorporated in a holistic roadmap based on the integration of international expert opinions, national expert opinions and a narrative review of research articles and grey literature reports from internationally recognised (research) institutes in healthcare. This roadmap features six primary drivers for a sustainable quality policy, related to 19 building blocks (secondary drivers) and made actionable for hospitals with 104 evidence-based action fields (Figure 10.2). The identified drivers are prominently described in existing literature of QMS, for example in white papers of the AHRQ [64], the WHO [65] and the OECD [66]. For hospitals, the roadmap suggests that a manageable number of drivers, building blocks and action fields may support the sustainable incorporation of quality into the daily workflow of healthcare professionals.

Because no assessment tool was available to measure the maturity of the co-creation roadmap implementation in hospitals, a multi-phase approach to develop and validate maturity tools in co-design with 19 hospitals was used in chapter 11 (RO4b). This approach resulted in two validated maturity tools: (1) a maturity matrix with 52 sub-components and (2) a co-creation scan with 19 statements. The complexity of the development, implementation and sustainability of an organisation-wide QMS in a dynamic and multidisciplinary setting as hospitals makes measuring the co-creation roadmap implementation a difficult exercise. Nevertheless, the comprehensive, but concise maturity tools offer insights into both the current maturity of hospitals' QMS, i.e. the 'as-is' position with uncovered gaps, and the knowledge needed to guide further development towards sustainability, i.e. the desired 'to-be' position. By applying a tailored approach in hospitals, these tools allow healthcare leaders at both the hospital and policy level to identify areas on which to focus, to develop a strategic plan, to monitor growth in maturity over time and to support comparison between hospitals' maturity levels.

Overall, clarifying the definition of sustainability in QMS improves the communication between hospital managers, clinicians, policymakers and researchers (RO3) and the identified drivers guides them towards a sustainable, mature QMS (RO4). In both the theoretical definition of sustainability (chapter 7) and the practical roadmap of sustainability drivers (chapters 8 [61], 9 [62] and 10 [63]), building a QMS in co-creation with healthcare stakeholders has been vaunted as a key process. Given the presumptive positive outcomes of co-creation [67,68], it has become an attractive strategy for healthcare organisations that aim to re-engage professionals for quality again. Combining the theoretical definition of sustainability's prerequisites, essential components and consequences and the practical roadmap with sustainability drivers in one comprehensive, evidence-based conceptual model can support hospitals in the development of a sustainable, co-created QMS that is supported organisation-wide.

RO5: Co-creating a quality management system in a pilot study as an opportunity and lessons learned for other hospitals

In RO5 (chapter 12), a practice gap existed regarding what, how and when different steps are taken in real-life practice settings to develop a co-created QMS aimed at sustainably and continuously engaging all stakeholders. In the Sint-Trudo hospital, a 310-bed acute-care hospital in Flanders with over 1,000 employees including about 140 physicians, that achieved an accreditation label from the JCI in summer 2018, the hospital's Chief Executive Officer (CEO) wondered why the QMS was not sustainably embedded into the daily workflow of professionals. Later that year, a research chair at KU Leuven was established to conduct research on the development of a sustainable QMS in this acute-care, regional hospital. This research created the opportunity to explore in-depth the phenomenon of QMS development in its natural, organisational setting. In a four-year mixed-method action case study a rich, detailed description of co-creation processes in a real-life practice setting was obtained by including both qualitative data in terms of semi-structured interviews, focus groups, documentary and observational data and quantitative data in terms of experience surveys. In this inductive research stage [69], a participatory action design was used, i.e. the PhD student was present at the hospital two days a week as participatory researcher, to observe why a QMS develops in a particular manner. The pilot results showed the successful involvement of patients, kin, in-hospital and primary care professionals in quality management (Table 12.1), which timeline should be considered during co-creation processes (Figure 12.1) and how co-creation processes have nurtured changes in the QMS (Figure 12.2).

By shedding light on how to co-create with patients, kin and healthcare professionals, this case study served as practical resource to advance the field of co-created QMS and contributed to its 'body of knowledge'. Results revealed that committed leadership at all hierarchical levels is essential to enhance organisational engagement to co-creation and to ensure resources. Because this hospital was an early adaptor to test new instruments, tools and models, we could translate practical experiences in lessons learned for other hospitals, which were shared during inter-hospital collaboratives. The lessons learned ensure that if we were to redo the case study with the current practical and theoretical knowledge, we would have a different approach to co-create a sustainable QMS, such as involving patients and kin from the inception towards sustainability. These insights should be incorporated in future conceptual models to develop a sustainable QMS in hospitals.

Main RO: A conceptual model to develop a sustainable QMS in hospitals

By integrating the results of chapters 2 to 12 [9,10,23,24,61–63], a conceptual model towards sustainable QMS in hospitals is developed (Figure 13.1) (Main RO). The chapter results include a co-developed, multidimensional definition of healthcare quality in the 21st century (RO1), an instrument to measure healthcare quality experiences multidimensionally from a multistakeholder perspective and to identify quality-related priorities (RO2), a multi-factorial definition of sustainability in QMS of healthcare organisations (RO3) and a co-creation roadmap towards sustainable quality of care whose maturity of implementation can be measured via maturity tools (RO4) and, finally, a mixed-method action case study of a co-created QMS in the Sint-Trudo hospital (RO5). The new conceptual model consists of prerequisites and essential drivers to develop a sustainable QMS in co-creation with the key healthcare stakeholders, i.e. patients, kin and professionals in the hospital and primary care setting, and the consequences of a sustainable QMS. The path towards sustainability is presented as a continuing process that begins while the QMS implementation is prepared. Nevertheless, as described by Shah (2020) [70], the prerequisites, essential drivers and consequences in the QMS should not be considered as isolated entities, but as being sequential. Four identified factors echo constructs found in sustainability frameworks [58]: (1) the goal, (2) resources, (3) the QMS itself and (4) the individuals. These factors are interconnected and interact dynamically over time as mechanisms of quality sustainability.
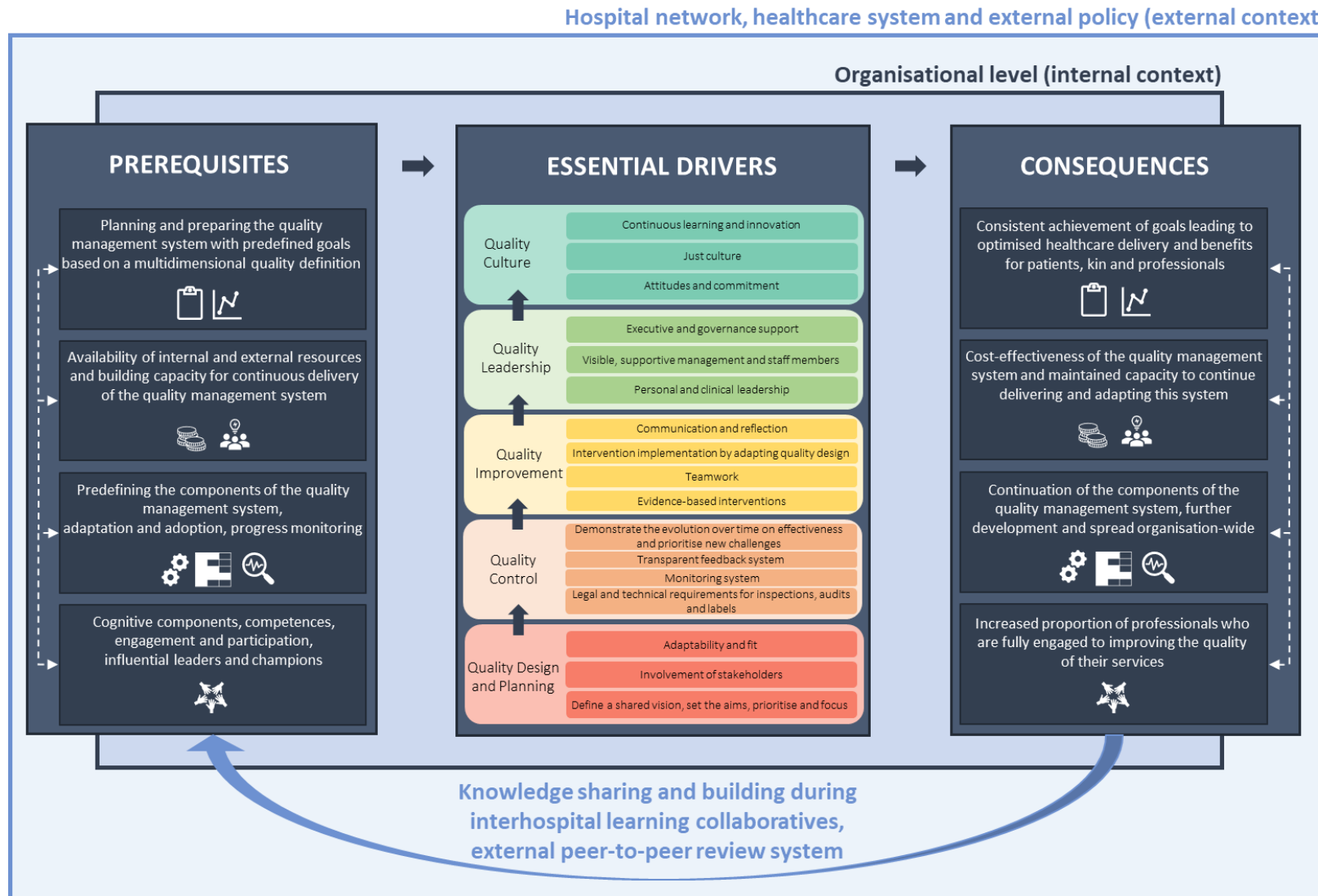
Figure 13.1 A conceptual model towards sustainable QMS in hospitals.

Notes (Figure 13.1):

- - - (dashed line)	= the interaction between factors (i.e. the goals, resources, the QMS and individuals)
📋	= experience measures
〽	= patient and professional outcome measures
🪙	= financial measures
👥	= capability measures
⚙	= definition and design of QMS components
▤	= management measures ('as is'-position versus 'to be'-position of the QMS maturity)
🔍	= progress monitoring of measures
✴	= measures on individual level

Prerequisites

Four prerequisites for sustainable QMS are included in the conceptual model: (1) Planning and preparing the QMS with predefined goals based on a multidimensional quality definition, (2) Availability of internal and external resources and building capacity for continuous QMS delivery, (3) Predefining QMS components, adaptation and adoption, progress monitoring and (4) Cognitive components, competences, engagement and participation, influential leaders and champions.

Sustainability of QMS in hospitals starts with thoughtful planning and preparing it. Quality-related goals can be defined based on quality experience measures, such as via the FlaQuM-Quickscan that measures quality experiences multidimensionally from a multistakeholder perspective (chapters 4 [23], 5 [24] and 6 [10]) and that supports to understand variation between quality experiences, or based on outcome measures, such as via the prospective measurement of mortality, readmission, length of stay and other patient safety indicators registered in minimal hospital data [50]. By combining experience and outcome measures, hospitals can strike the balance between 'soft' and 'hard' data in quality management. To reach these quality-related goals, internal and external resources and an education, training and communication plan are needed, as mainly described in our action case study (chapter 12). As also shown in literature [11,22], education should not only focus on increasing the knowledge and skills professionals, also patients and kin can be trained to participate and co-create in quality management. Resources of a sustainable QMS can be measured in terms of the cost of (poor) quality, such as failure costs, prevention costs and appraisal costs as suggested by renowned experts Feigenbaum and Crosby [71–73]. Defining the current maturity of QMS components can be supported by maturity tools that define the 'as-is' and 'to-be' position of the implementation of sustainability drivers in their QMS (chapter 11) and by hospitals' inspection reports on the compliance to the generic

standards and disease-specific standards. The latter are controlled by the government in Flanders. Based on self-assessment data of their QMS maturity and external inspection reports, quality management goals can be defined in healthcare organisations. Moreover, monitoring systems can be installed in organisations to demonstrate adoption and progress in these goals. Adapting QMS components to ensure they fit the organisation is facilitated by the role of the organisation's healthcare quality manager, who is essential to ensure a balance between the bottom-up approach in quality management and leadership from board to bedroom (chapter 9 [62]). Interestingly, research demonstrated that hospitals with more effective management practices provided higher quality care [74]. To implement QMS components in practice, engaged professionals and committed, visionary and influential leaders are essential but more research on potential drivers for engagement of professionals in practice and organisational culture is needed [75,76]. Improving professionals' skills, knowledge and experiences can be facilitated by empowering them to take leadership roles in the QMS development [77]. This advances professionals' entrepreneurship in the 21st century.

Essential drivers

Five essential drivers are described at the core of the conceptual model: (1) Quality Design and Planning, (2) Quality Control, (3) Quality Improvement, (4) Quality Leadership and (5) Quality Culture. These five drivers are related to 17 building blocks as described in the co-creation roadmap in chapter 10 (Figure 10.2) [63].

By using the data assembled in the requisites of the conceptual model, a shared quality vision based on a multidimensional quality definition (chapters 2 [9] and 3) and an action plan that keeps the continued focus on the predefined goals, the needed resources and the adequate capacity to deliver the QMS components should be developed. The fit of the vision, goals and action plan in the organisation's culture and structure was found to be essential (chapters 7 and 10 [63]) and needs to be adapted based on stakeholders' and external needs (chapters 8 [61] and 10 [63]). To operationalise the vision, goals and action plan, a well-defined monitoring and transparent feedback system with actionable, understandable, real-time data is needed to demonstrate the evolution of quality over time and to reflect if further adaptations are needed. To further adapt the QMS and improve the healthcare delivery, evidence-based interventions implemented by a multidisciplinary team are essential, followed by communications of the 'why' of adaptations and reflections on the re-assessment of progress in improvements. As stated by Don Berwick [78] and Helen Bevan [79], *"Trojan mice instead of Trojan horses are needed to change".* They described that many people across the system who have the skills and agency to test out small, well focused changes to address complex problems (Trojan mice) nearly always works better than large pilot and roll out projects (Trojan horses). Additionally,

sharing information of quality measures and presenting data results in different hospital committees was time-consuming, but essential for co-creation in quality management in our action case study (chapter 12). These first three drivers of the co-creation roadmap, i.e. 'Quality Design and Planning', 'Quality Control' and 'Quality Improvement' are based on traditional concepts derived from Juran's Trilogy [80]. In the next driver, i.e. 'Quality Leadership', quality champions and leaders on all hierarchical levels are needed to ensure that the entire organisation is imbued with the importance of quality improvement and that stimulates institutionalization and routinization of QMS components organisation-wide. One of the biggest challenges related to individuals is embedding quality improvement in the professional's DNA, which proved to be essential in the results of chapter 9 [62]. The aim of a sustainable QMS is to grow towards the last driver, i.e. 'Quality Culture', of which the essence is related to attitudes and commitment of individuals, a "just culture" and a culture of continuous learning and innovation.

Consequences

The consequences of sustainability in QMS are not discrete variables whose strength of effects can be easily measured in isolation from one another. Overall, a sustainable QMS should result in improved healthcare delivery and benefits for patients, kin and professionals, which can be monitored in terms of experience and outcome measures, as described in the prerequisites of this conceptual model. A second consequence of sustainability is the cost-effectiveness of the QMS on the one side, measured by monitoring costs in relation to the benefits and by monitoring the investments needed to keep the QMS 'alive' in the organisation. On the other side, maintained capacity to continuously deliver and adapt the QMS is an essential outcome related to the 'resources' factor of sustainability. Third, the continuation of QMS components and their further development and spread organisation-wide can be monitored via re-assessing the maturity of the QMS. Ideally, the maturity tools (RO4b, chapter 11) would become routine indicators collected by hospitals alongside the range of performance indicators being periodically collected in hospitals [81]. These maturity tools also measure the increased proportion of professionals fully engaged in quality in the drivers 'Quality Leadership' and 'Quality Culture' (chapter 12). A dashboard showing temporal trends of sustainability measures can support healthcare organisations in their path towards sustainability [82,83] and makes comparing the progress of sustainability factors between hospitals possible. Nevertheless, as described in a recent review of sustainability measures [84], more research instruments are needed to improve the psychometric and pragmatic quality of current measures in this field.

The influence of internal and external context

As confirmed by previous literature [58,85,86], sustainability processes are influenced by the internal context, i.e. the organisational setting, as well as the external context, i.e. hospital networks, the healthcare system and its external policy. This is in line with the overarching driver in the co-creation roadmap, i.e. 'Quality Context' (Figure 10.2) [63]. In Flanders, the government has allowed each hospital to design its own QMS, which can be guided by the proposed conceptual model for sustainable quality management (Figure 13.1). Nevertheless, a recent multistakeholder discrete choice experiment (DCE) in Flanders [87] revealed a strong preference for the coordination of quality improvement initiatives at the level of hospital networks, which have been reinforced by the Flemish government since 2020 [88]. As emphasised by international experts (chapter 8 [61]) on the one side and as exemplified in the Danish National Quality Programme [89] and the English National Health system [90] on the other side, (in)effective quality management strategies and generated knowledge can be shared during inter-hospital learning collaboratives. Breakthrough improvement collaboratives, as originally defined by the Institute for Healthcare Improvement (IHI), have been proliferated internationally because of improved processes and patient outcomes [55,91]. Aligning goals of these collaboratives with external requirements and using a profound methodology of improvement and outcome measurement were described as essential strategies to sustain improvement collaboratives [92]. Benchmarking reports presenting between-hospital variation in experiences and outcomes can foster the process of knowledge sharing on management activities and lessons learned to speed up the improvement of QMS maturity in hospitals. Additionally, as self-assessment tools, such as the maturity tools (chapter 11), are an essential part of organisations' sustainability, it requires that professionals are honest in their assessment of the 'as-is' position of their maturity and not score 'what someone might want to see' [83]. As illustrated in other industries [93] and in some healthcare cases [94], peer-to-peer reviews can be an effective strategy to check results of self-assessment instruments on reliability in practice settings.

In the present study, we proposed a conceptual model that focuses on a holistic, integrated approach to sustainable QMS in hospitals (Figure 13.1). By reconciling integrative, mixed-method research, a conceptual framework was built with prerequisites, essential drivers and consequences. These are described as sequential with four factors, i.e. (1) the goals, (2) resources, (3) the quality management system itself and (4) the individuals. Hospitals need to be aware that sustainability is influenced by the internal and external context of the organisation. The path towards sustainability is described as a continuous process, of which knowledge can be shared and built during interhospital learning collaboratives and checked during an external peer-to-peer review system. While the model is presented by a simple visualization, it encapsulates considerable complexity and requires substantial

and maintained efforts to implement and sustain the described processes into practice. To support this implementation and sustainability in a pragmatic and tangible way for hospitals, suggestions are made on how to measure and follow-up the described processes related to the four factors.

Strengths and limitations of the PhD study

This PhD study and the research presented in its chapters comes with its own strengths and limitations. First, the study is strengthened by the organisation-wide approach of healthcare quality management and its sustainability, which are rare within the literature [95], and adds important insights to theory development related to organisation-wide quality management in healthcare organisations. A second strength of this study is related to the societal value of our research results. Study results are not only used for development and validation purposes but also immediately for quality improvement purposes in the participating hospitals. For policymakers, hospital managers and clinicians, our results serve as a guideline for further development of the QMS in their organisations. A third strength is the use of quantitative and qualitative research designs and a variety of analyses on individual, stakeholder group and hospital level, underlining the importance of mixed-methods designs to develop instruments and conceptual models with theoretical and practical value for the healthcare landscape. Fourth, to guarantee the validity and reliability of the chapters using qualitative research methods, consolidated criteria to inductively analyse data and to report qualitative results were strictly adhered. More specifically, the QUAGOL and COREQ guidelines were used to analyse and report focus groups and interviews [96,97], the stepwise method for concept analysis of Walker & Avant was used to identify unique characteristics of the concept 'sustainability' [98] and Jabareen's eight-phase approach was used to develop an integrative co-creation roadmap [99]. The replicability of our qualitative results was enhanced by reporting detailed methods sections, interview guides and quotations of participants. To enhance research quality of qualitative designs, context and researcher triangulation was used by developing our conceptual model in a multi-centre setting in which regular peer reviews were conducted between our research team and healthcare quality experts [100]. As stated by Carter et al. (2014), researcher or investigator triangulation involves the participation of two or more researchers in the same study to provide multiple observations and conclusions [100]. In chapters 2 (RO1), 8 (RO4) and 9 (RO4), investigator triangulation was explained by describing the involved research team members, their relevant research experience in the studied topic, their educational background and their current job status. A fifth strength relates to the bottom-up approach of this hospital-initiated study by addressing questions of major relevance to end-users and clinicians, and the co-development of conceptual frameworks and instruments with patients, kin, healthcare professionals in the hospital and primary care setting. These strong empirical foundations and a breadth of perspectives and research designs underpinning the results enhance the theoretical, managerial, clinical and political

relevance of this PhD study. Currently, in Flanders (Belgium), 23 hospitals, that are members of the FlaQuM-Consortium, are implementing the developed and validated instruments and models organisation-wide. By doings so, this PhD study is not just a virtual and conceptual presentation of research results, but also demonstrated its implication for real-life practice settings.

It is important to note that this PhD study also has limitations. Study-specific limitations have been discussed within each chapter. Overall though, as our research took place before, during and after the COVID-19 pandemic, it had not only a profound impact on hospital care since 2020 but also on the course of our studies. Because the research took place in one healthcare system (Flanders), we suggest being careful with generalizing the findings of this study on international level. A first reason is that the focus groups were only conducted in three hospitals (chapter 2 [9]) and the detailed case study results of a co-created QMS took only place in one acute-care, general hospital, i.e. the Sint-Trudo hospital. A second reason is that we used the term 'saturation' in our qualitative research designs to indicate that on the basis of the data that have been collected no further data collection is necessary. Despite referring to existing definitions of saturation in our chapters, it remains challenging to describe this methodological principle in this thesis manuscript. Another reason is that a convenience, geographically restricted sample of hospitals, that are members of the FlaQuM-Consortium in Flanders (Belgium), was mainly used to validate instruments. Through an open call by our research institute, hospitals were asked to write a motivational letter if they were willing to be involved in the FlaQuM-Consortium and its co-developed instruments. This means that these hospitals showed their willingness to participate in testing the instruments in this PhD study on the one hand and are research and innovation focused on the other hand. This may not be the case in all hospitals. As stated in previous literature [101–103], implementation is more likely to become sustained when the healthcare organisation is ready for change. Hospitals who were not part of the FlaQuM-Consortium may have had different outcomes in healthcare quality experiences. However, as this study was designed to develop and pilot test instruments and models, initial data was obtained in order to assess the psychometric properties and the use of instrument results to understand the variation between stakeholders groups and hospitals for the first time. We also noticed an important variation between these stakeholder groups and hospitals, even in a sample of organisations who are open for change and innovation. Last, we might assume that the duration of the development of a co-created QMS in the action case study in the Sint-Trudo hospital (chapter 12) was not sufficiently long, although we used a four-year mixed-method design. This is confirmed by previous research, which suggests that mean timeframe between the end of active implementation and the sustainability evaluation was minimum 1.5 years and maximum 7.0 years [104]. This PhD study, however, laid out important findings

and conceptual models towards sustainable QMS for researchers, hospital management and policymakers that may be used in future studies.

Future directions

As the research in chapter 12 was focused on a pilot study in an acute-care, regional hospital, testing the implementation of the conceptual model presented in this PhD study and following-up the sustainability of QMS in a multi-centre study is a first research priority. A large sample size would allow further examination of the proposed model in living labs. Observing the hospitals in the FlaQuM-Consortium will gain valuable insights into the implementation and sustainability processes of these organisations and into the impact on patient, professionals, team and quality management outcomes. A realistic evaluation model by describing the context, mechanism and outcomes can be used as a guideline for a longitudinal, multi-centre study focusing on the implementation of our conceptual model and on understanding the influence of the context on this implementation [105]. The Consolidated Framework for Advancing Implementation Science (CFIR) [106] can be used to further inspire the evaluation of factors influencing the implementation and the extension of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework for factors influencing the evaluation in terms of maintenance and adaptations over time [107]. Using these frameworks in a mixed-methods, prospective study design, will help to understand if, how and why our conceptual model works and is needed to ensure that the first findings of our action case study (chapter 12) hold. Thus, new analyses comparing the implementation in a number of hospitals are in progress. In a deductive process of multiple case studies [69], analyses would allow to improve current theories by having a broader understanding of sustainability and the use of the conceptual model in practice. Further international research is needed to fully understand the generalizability of the conceptual model and its relevance, transferability and reach in a global context. As an exhaustive list of sustainability measures was not presented in this PhD study, there is scope however to more fully understand how sustainability of QMS can be measured. So, a second field of future research is required on ways to measure sustainability to support the implementation, follow-up and comparison of QMS between organisations. Measurements can be inspired by worldwide known instruments and frameworks, such as the instrument to measure psychological safety defined by Edmondson [108] or the IHI Framework for Improving Joy in Work [109]. As our proposed conceptual model towards sustainability emphasizes the importance of context-specific adaptations of the QMS, we propose to develop an overall measurement framework with generic as well as context-specific components. A third future research opportunity can focus on interhospital learning collaboratives. The results of the FlaQuM-Quickscan and the maturity tools in this PhD study have already been made available to the hospitals in the FlaQuM-Consortium within detailed benchmark reports. These reports allow

identification of their own hospital scores in relation to the other hospitals. Besides benchmark reports, hospitals also received an individual report with organisation-wide, detailed data for each internal stakeholder group, such as professional groups, and if desired, for different hospital wards or departments. Next to quality experience measures, the hospitals received benchmarking on outcome measures, i.e. 'hard' data, such as mortality, readmission, length of stay and other patient safety indicators [48–50]. These data, combined with new data on cost of poor quality measures and data on the key individuals in the QMS, could support hospitals in the continuous follow-up of the four consequences as described in our new conceptual model (Figure 13.1). However research gaps remain disclosing how hospitals actually use this provided information in their organisation for quality management purposes. The field of sustainability in QMS is still far from being mature.

Conclusion

In this PhD study, we introduced a conceptual model towards sustainable quality management in hospitals, developed by integrating mixed-methods results. This conceptual model is supported by multiple validated instruments and tools. The common thread for this model, instruments and tools is the multidimensional definition of healthcare quality including core values, technical domains, catalysts and surrounding domains of person- and kin-centred care. Sustainability of quality management systems is a multi-factorial concept focusing on continuous improvement of four different factors: (1) the goals, (2) resources, (3) the QMS itself and (4) individuals, which are interacting dynamically and evolving over time. Thus, sustainability is situated on the macro, meso and micro levels of healthcare. The developed model, instruments and tools, which are currently implemented in 25 Flemish hospitals, are specific for the healthcare sector and are widely applicable in hospitals that aim to build a contemporary, durable QMS by using a bottom-up, co-creation approach with patients, kin and professionals in the hospital and primary care setting. In this mixed-methods PhD study, qualitative and quantitative research results were integrated to develop an evidence-based conceptual model towards sustainable QMS in hospitals. This mixed-methods design involved all stakeholders: 26 focus groups were conducted with patients and kin (n=35), primary care professionals (n=22) and content experts (n=79); 56 semi-structured interviews were conducted with international experts in healthcare quality (n=12), healthcare quality managers from 20 hospitals as national experts (n=23) and professionals employed in the Sint-Trudo hospital (n=21); analyses of articles (n=107) were conducted, i.e. in the concept analysis (n=31), in the development of the co-creation roadmap (n=59) and in the development of the maturity tools (n=17); the FlaQuM-Quickscan was validated based on data from patients and kin (n=5,891), professionals (n=7,724) and primary care professionals (n=550); and, finally, the maturity tools were developed based on a Delphi round with healthcare quality managers (n=19) and validated based on data from healthcare professionals (n=119). Our contributions and possible avenues for future work are further refinement of the model, instruments and tools based on a longitudinal, multi-centre study examining their implementation and impact.

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(1) **Claessens, F.,** Castro, E.M., Jans, A., Jacobs, L., Seys, D., Van Wilder, A., Brouwers, J., Van der Auwera, C., De Ridder, D., & Vanhaecht, K. (2022). Patients' and kin's perspective on healthcare quality compared to Lachman's multidimensional quality model: Focus group interviews. *Patient Education and Counseling, 105*(10), 3151–3159.

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(2) Lachman, P., Vanhaecht, K., **Claessens, F.** (2023). Quality for the future: New ways of thinking with the Multidimensional Model. *International Forum on Quality and Safety in Health Care.* Oral Presentation, Copenhagen, Denmark, 15-17/05/2023.

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(4) **Claessens, F.,** Vanhaecht, K. Co-creation roadmap towards sustainable quality of care: a multi-method study. *European Health Management Association 2022 Annual Conference*. Oral Presentation, Brussels, Belgium, 15-17/06/2022.

(5) **Claessens, F.** Success factors for sustainable quality management in hospitals: the experiences of quality experts. *European Congress of Qualitative Inquiry.* Multimedia Presentation. Online congress, 02-04/02/2022.

ACKNOWLEDGEMENTS, PERSONAL CONTRIBUTION AND CONFLICT OF INTEREST STATEMENTS

ACKNOWLEDGEMENTS

PERSONAL CONTRIBUTION

Chapter 2: Fien Claessens (FC) performed the data collection of the focus groups, which were moderated by Anneke Jans (AJ), Eva Marie Castro (EMC) and Laura Jacobs (LJ). The data analysis was led by FC and during peer review moments discussed with AJ, EMC, LJ, Deborah Seys (DS) and Kris Vanhaecht (KV).

Chapter 3: FC was involved in the conceptual development of the House of Trust.

Chapter 4: FC developed the instrument in collaboration with EMC, LJ, DS and KV. FC performed the analysis in this chapter, aided by DS and Luk Bruyneel (LB).

Chapter 5: FC was involved in the data collection and performed the analysis in this chapter, aided by DS and Luk Bruyneel (LB).

Chapter 6: FC performed the data collection of the focus groups, which were moderated by AJ en EMC. FC performed the analysis in this chapter, aided by DS and Luk Bruyneel (LB).

Chapter 7: FC performed the search strategy for the concept analysis, validated by EMC.

Chapter 8: FC and Jonas Brouwers (JB) conducted the interviews with international experts in quality and patient safety and analysed the data together. Data analysis was performed by FC, JB and EMC.

Chapter 9: FC conducted the interviews with healthcare quality managers. Data analysis was performed by FC and EMC.

Chapter 10: FC performed the search strategy for the narrative review, validated by DS and KV.

Chapter 11: AVW performed the data collection of the focus groups, which were moderated by Charlotte Van der Auwera (CVDA) and KV. The development of the tools was led by FC and validated by CVDA and KV. FC performed the data analysis in this chapter, aided by DS.

Chapter 12: FC performed the data collection of the action case study. The focus groups were moderated by AJ and analysed by FC and AJ. FC performed the data analysis in this chapter.

CONFLICT OF INTEREST STATEMENTS

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Bedankt, allemaal!

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The hospital on the cover is made of Rubik's cubes. These Rubik's cubes refer to the use of the Co-Creation Roadmap in hospitals (Chapter 10 of this PhD dissertation). There are similarities between solving a Rubik's cube and implementing the Co-Creation Roadmap. First, the cube consists of six different faces and the roadmap consists of six different primary drivers. The cube's faces and the roadmap's drivers are presented in different colors. Second, there is flexibility to solve the Rubik's cube or to implement the co-creation roadmap in practice. You can start with the preferred face or primary driver and never start from scratch. Third, while solving the cube or implementing the roadmap may seem simple, in practice it is complex. Fourth, in some phases you have to take one step backward to be able to move two steps forward. Finally, you can choose the speed of progress when solving the cube or implementing the roadmap.