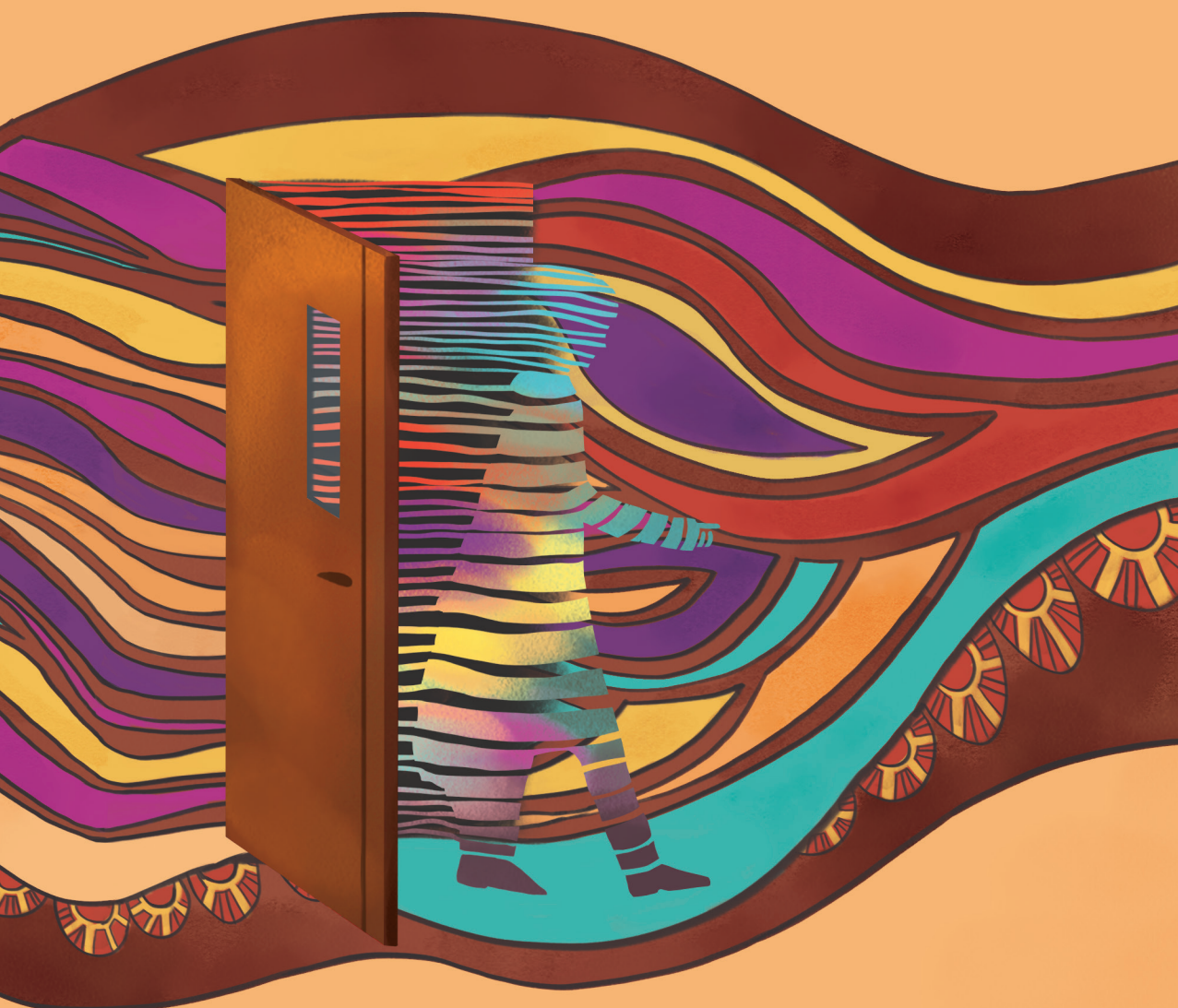


Towards Value-based Healthcare in Hospitals

Dynamic between implementation
strategy and healthcare professional



Veerle van Engen

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Cover: Evelien Jagtman. From linearity to complexity. VBHC calls on professionals to engage with complexity, requiring them to open new doors and move beyond a world often characterized by linear thinking and siloed, protocol-driven, and treatment-focused approaches.

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Towards Value-based Healthcare in Hospitals

Dynamic between implementation strategy and healthcare professional

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Dynamiek tussen implementatiestrategie en zorgprofessional

Thesis

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Veerle Petronella Marchien van Engen

born in Helmond, The Netherlands.

DOCTORAL COMMITTEE

Promotor

Prof. dr. ir. C.T.B. Ahaus

Other members

Prof. dr. R. Huijsman

Prof. dr. D.M.J. Delnoij

Prof. dr. P.B. Van der Nat

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What is essential is invisible to the eye

– A. de Saint-Exupéry, *Le Petit Prince*, Chapter XXI –

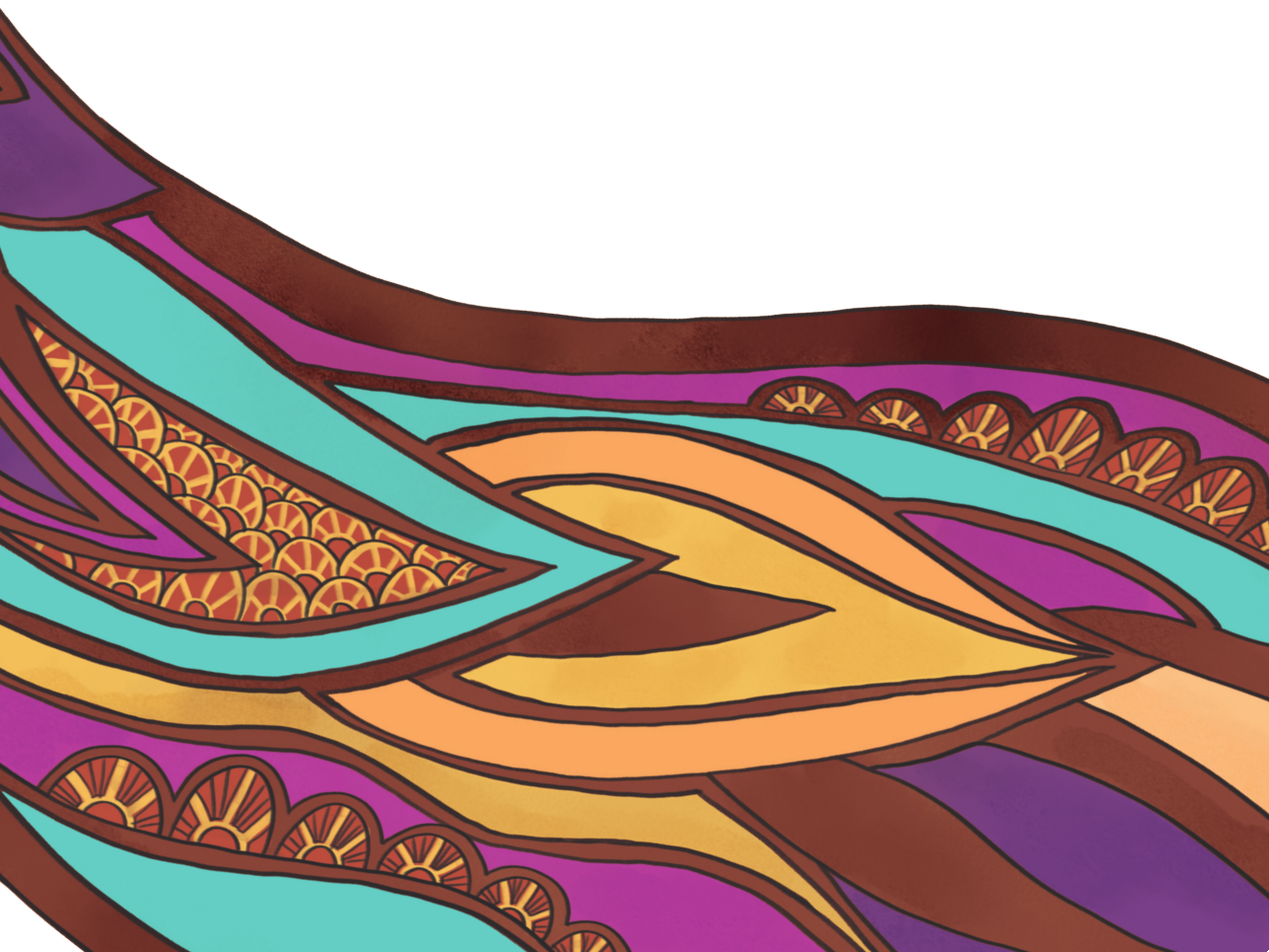
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CHAPTER 1

General introduction



1 INTRODUCTION

*"The same wind blows on us all; the wind of disaster, opportunity and change.
What matters is not the blowing of the wind but the set of the sail."*

– J. Rohn, 1930-2009 –

To avert a crisis in the United States healthcare, Porter and Teisberg introduced a novel approach in 2006, known as Value-Based HealthCare (VBHC) [1,2]. This approach focuses on fundamentally improving the healthcare system by adjusting the way care is delivered, organized, measured, and reimbursed. In essence, VBHC aims to prioritize and optimize value for the patient.

While there are multiple definitions of the concept of 'value' [3–7], they generally converge on the idea that it refers to outcomes that matter to patients relative to the resources invested, measured across the entire cycle of patient care. Therefore, VBHC focuses on understanding the comprehensive care needs of patients with specific conditions and addressing these needs both effectively and efficiently, ensuring that every resource is utilized optimally for the patient's benefit [1,8]. In doing so, VBHC shifts away from traditional, volume-driven, and provider-centric care models.

VBHC has spread from the United States to various other countries, including the Netherlands. Here, this wind of opportunity and change, is also believed—though not yet proven [9,10]—to 'fix' urgent challenges in healthcare, aiming to ensure that services remain accessible, high-quality, and affordable for everyone [11]. These challenges include rising healthcare demands amidst finite resources and underperforming services, where quality metrics often fail to capture outcomes that matter to patients. Moreover, VBHC is anticipated to benefit the healthcare professional. Teisberg, Wallace and O'Hara (2020) state that VBHC "[...] connects clinicians to their purpose as healers, supports their professionalism, and can be a powerful mechanism to counter clinician burnout" [12] (p.683). This is particularly relevant at a time when concerns about professionals' well-being and engagement are growing, with a significant proportion of professionals experiencing burnout [13–17].

Hospitals are key players in the implementation of VBHC. As Porter and Lee (2013) noted, "*All stakeholders in health care have essential roles to play. [...]. Yet providers must take center stage*" [8] (p.70). Healthcare professionals, in particular, are pivotal in driving change [8,13,18,19] and play a crucial role in optimizing value, as "*value is determined by how medicine is practiced*" [8] (p.52). The health of professionals is closely linked to patient satisfaction and clinical outcomes [20–23], as well as to organizational costs [24]. This underscores the critical need for professionals that not only drive but also thrive within the value paradigm.

However, three knowledge gaps hinder progress in the value movement. First, there is limited guidance on how hospitals can shape and facilitate the implementation of VBHC—essentially, on strategizing how to ‘set the sails’ for the winds of value [25]. Second, there is a lack of clarity and consensus on what VBHC entails in daily practice [26]. Third, there has been limited attention to healthcare professionals within VBHC, resulting in a lack of understanding of how VBHC impacts them, for example concerning job strain and motivation [27]. This dissertation aims to help bridge these gaps and further advance the value movement.

The remainder of this chapter introduces VBHC, describing how it is conceptualized or ‘talked about’ (section 2). It then provides insights into its implementation, exploring what it means to ‘walk the VBHC talk’ by discussing the ‘value agenda’ and reviewing the current implementation status of VBHC globally and within the Netherlands (section 3). Finally, the chapter presents the research aims and questions, along with an overview of the dissertation (section 4).

2 TALKING VBHC

Narrow and broad definition

The concepts of VBHC and value are ambiguous [28–31]. Multiple definitions exist [1,3–7], and similarities can be found with other healthcare concepts [32–36]. Initially, Porter and Teisberg defined value narrowly, focusing on outcomes that matter to patients relative to the costs incurred. This is captured in the value equation: $\text{value} = \text{outcomes} / \text{costs}$ [1] (p. 25). A later definition by Teisberg, Wallace, and O’Hara described value as the “*measured improvement in a person’s health outcomes for the cost of achieving that improvement*” [12] (p.682).

Broader definitions include population and societal value, patient experience, and non-financial resources [4–6], such as patient absenteeism in their work [3,4], emotional stress [3,12], and carbon dioxide emission [28,37]. For example, the Centre for Evidence-Based Medicine at Oxford defined VBHC as “*the equitable, sustainable and transparent use of the available resources to achieve better outcomes and experiences for every person*” [6] (p.11).

Three considerations

Three aspects of the concept of value deserve attention [1].

First, value is defined from the patient’s perspective, emphasizing outcomes that matter to them. This distinguishes VBHC from traditional cost-effectiveness analyses [38]. While clinical metrics are important, patients often prioritize factors such as their symptoms, functional abilities (e.g., the ability to walk), and overall quality of life. Patient Reported Outcome Measures (PROMs) enable patients to self-report these outcomes, often through structured surveys [39–42]. These surveys may include general questions, such as “*In general, how would you*

say your quality of life is?" [43], alongside disease-specific questions such as, "Have you had any pain in the area of your affected breast?" for breast cancer patients [44]. Standardizing these measures allows for universal comparisons [42], extending their use cases [45].

Second, resources attributable to patient care should be considered comprehensively [7]. This includes both direct resources, such as treatment and prevention expenses, and indirect resources, such as hospital infrastructure and staffing.

Third, outcomes and resources must be assessed across the entire care cycle of a patient, not just post-intervention. Some treatments may incur higher initial resources but yield long-term benefits. For example, a hip replacement in a fit individual may, after a period of recovery, lead to greater independence—reducing the need for home care expenses—and an improved quality of life. This approach helps avoid zero-sum competition, where cost savings at one provider increase expenses elsewhere.

3 WALKING THE VBHC TALK

With VBHC, Porter and colleagues propose a comprehensive redesign of healthcare delivery, organization, and financing [1,8]. This requires adapting existing structures and challenging deeply ingrained practices [46], raising the critical question: 'how?' [28,47].

The value agenda

To aid healthcare organizations and systems in implementing VBHC, Porter and Lee outlined six elements for adoption in the so-called 'value agenda' in 2013 [8]. These are to: organize into Integrated Practice Units (IPUs), measure outcomes and costs for every patient, move to bundled payments for care cycles, integrate care delivery systems, expand geographic reach and build an enabling Information Technology (IT) platform. Table 1 describes these elements and highlights how they diverge from traditional healthcare practices.

In 2021, Van der Nat expanded the agenda with four additional elements [48]. These additions, among others, emphasize the practical application of outcome and cost information. These include establishing value-based quality improvement initiatives, integrating value into patient communication, investing in a culture of value delivery through education, and creating learning platforms for healthcare professionals. These elements are also explained in Table 1.

Each element of the value agenda is distinct yet mutually reinforcing [8]. For example, an enabling IT platform facilitates accurate cost and outcome measurements. These data can then be used in value discussions with patients and for value-based quality improvement [49,50]. Moreover, outcomes can be factored into bundled payment agreements, incentivizing

IPUs to collaborate effectively. Ultimately, in VBHC, healthcare professionals are held accountable for the value of their collective services for a patient.

Table.1. The six original elements of the value agenda, along with four extensions, highlighting how they may deviate from traditional practice.

Value agenda element	Traditional care practice	VBHC
Original by Porter and Lee (2013) [8]		
1. Organize into Integrated Practice Units (IPUs)	Care is organized around specialty departments. This risks a fragmented approach where professionals focus on isolated aspects of a patient's health and fragmented steps in their care path, resulting in suboptimal services. This structure may also encourage zero-sum competition, where gains achieved by one actor in the care pathway can adversely affect another's outcomes.	Professionals from various disciplines collaborate in IPUs. They ensure coordinated and holistic care throughout the patient's care path, aiming to optimize efficiency and overall benefits for the patient.
2. Measure outcomes and costs for every patient	Measurement often primarily focuses on clinical outcomes, process metrics and charges, with less emphasis on those outcomes that genuinely matter to patients and the actual resources used over the full cycle of care.	Outcomes that matter to patients and invested resources are measured for every patient across the entire care cycle. Outcome measurement likely uses PROMs.
3. Move to bundled payments for care cycles	Fee-for-service payment models incentivize service volume over patient outcomes and service efficiency.	Bundled payments provide a single, fixed price for all professionals involved in a patient's care. This aims to encourage efficient and optimized services.
4. Integrate care delivery systems	Standalone multisite healthcare delivery organizations dominate the landscape, increasing the likelihood of overlapping services.	Integrated care delivery systems aim to deliver optimal care at the best location, minimizing duplication of services.
5. Expand geographic reach	Patients often receive care from nearby hospitals rather than superior ones. Additionally, patients with specific complex conditions are rarely grouped together, impeding the development of specialized expertise.	Superior hospitals for specific medical conditions serve a larger population. This enhances patient access to high-quality care and fosters specialized expertise through sufficient patient volume.
6. Build an enabling IT platform	IT systems may lack interoperability and transparent data sharing, impeding optimal care delivery and learning.	IT systems facilitate timely and integrated data sharing and communication across care networks, including with patients.

Table.1. Continued.

Value agenda element	Traditional care practice	VBHC
Extensions by Van der Nat (2021) [48]		
1. Set up value-based quality improvement	Improvement projects often focus on cost reduction or outcome enhancement , with little attention to their interrelationship. Additionally, they often do not engage healthcare professionals in the process.	Healthcare professionals structurally evaluate and improve care practices to optimize value, using comprehensive outcome and cost data. This may include achieving superior outcomes with fewer resources, making significant improvements in outcomes with modest resource increase, or quitting low-value services. Benchmarks help reduce unwarranted variations and promote best practices.
2. Integrate value in patient communication	Discussions may insufficiently integrate the patient's perspective. Decisions are not always made collaboratively with patients, and the information provided to them is often insufficiently complete.	Professionals integrate the patient's perspective in discussions. They use the patient's self-reported outcomes, like regarding their functioning, to monitor, timely flag and respond to critical issues, and engage patients in decision making [45,51]. They use aggregated PROMs data, which combines data from multiple patients, to predict treatment outcomes and inform patient choices [52].
3. Invest in a culture of value delivery	A culture that may prioritize protocols and clinicians' expertise over patient values, and lacks focus on holistic, collaborative care and value-based care optimization.	A culture that embraces patients as partners, encourages continuous value-based decision-making and improvement, and supports teamwork.
4. Build learning platforms for healthcare professionals	Suboptimal learning platforms hinder knowledge development and exchange.	Learning platforms facilitate knowledge development among healthcare professionals.

VBHC globally

Worldwide, healthcare systems [53–56], hospitals [57–60], and other stakeholders [61,62] have begun to implement VBHC. However, their efforts vary widely in terms of sequence, speed, and extent [25,27,46,47,53,54,59,63]. Many implementations focus on specific aspects of the value agenda and fail to fully integrate the dual focus on both outcomes and resources.

VBHC in the Netherlands

In the Netherlands, several hospitals focused their efforts on collecting, using, and transparently reporting outcome data [64–66]. These efforts align with the value agenda

extensions of 'integrate value in patient communication' and 'set-up value-based quality improvement' [48].

VBHC has been supported by government initiatives, such as the 'outcome-based care' program (2018–2022) [67] and the 'integral care agreement,' (2022) which identifies VBHC as one of its four key pillars [68]. The emphasis on outcomes is believed to resonate with professionals' motivations and likely supports wise resource allocation. Shared decision-making is viewed as a component of VBHC in the Netherlands [69] and has been mandatory under Dutch law since 2021 [70]. Ongoing experiments have been exploring adaptations in hospital structures [71], cost measurement [72], and alternative payment methods [57,73]. Nevertheless, in 2024, many Dutch hospitals were still organized by specialty departments, with informal multidisciplinary teams, and continued to operate within a market characterized by regulated competition based on volume [74,75].

4 RESEARCH AIMS

Hospitals and healthcare professionals play a pivotal role in VBHC [1,8,13,18,19]. As the title of this dissertation suggests, advancing VBHC in hospitals requires careful consideration of both the implementation strategy and its interaction with healthcare professionals. However, three knowledge gaps hinder progress. First, hospitals lack guidance on how they can shape and facilitate the implementation of VBHC [28,76,77]. Second, there is a lack of clarity and consensus on what VBHC entails in daily practice [26]. Third, there has been limited attention to healthcare professionals within VBHC [27], resulting in a lack of understanding of how VBHC impacts them, for example concerning job strain and motivation. This dissertation contributes to bridging these gaps through three aims:

Aim 1: Unravelling the implementation of VBHC in a leading Dutch university hospital

Implementation choices influence the success of VBHC [78], making it essential for hospitals to select appropriate implementation strategies. This dissertation aims to provide insights by examining the implementation of VBHC in a Dutch university hospital over the past decade. The central research question addressed is:

How has a Dutch university hospital implemented VBHC, what outcomes have been achieved, and what factors have influenced both its implementation strategy and outcomes?

We use a case study research design [79] with a systems approach, allowing for the examination of external factors affecting the case, as recommended for studying complex change [80]. The case focuses on Erasmus Medical Center (Erasmus MC), one of the largest

university hospitals in the Netherlands, employing nearly 18,000 employees, with 1,215 beds and over 670,500 outpatient visits annually in 2023 [81].

Data sources include internal documents from the hospital's central VBHC program team ($n = 10,536$), four indicators from their implementation monitoring system, a survey of clinicians ($n = 47$), interviews with key contributors to VBHC at the hospital ($n = 20$), and patient data on their completion of PROMs and from their electronic health record ($n = 46,468$ outpatient consultations). Chapters 2, 3, and 4 draw on theories related to change, implementation and complexity [82–90].

Chapter 2 provides a complexity-informed [88–90] case narrative [91], retrospectively examining the shift towards VBHC at Erasmus MC. It examines the evolution of the hospital's VBHC implementation strategy—both as planned and realized—along with key determinants and outcomes over the past decade (2012–2023).

Erasmus MC prioritized the implementation of PROMs in outpatient care. However, challenges remain in eliciting patient responses and ensuring clinicians access and discuss this data during consultations, despite various strategies to facilitate and encourage these practices. Similar challenges have been noted in other hospitals, potentially undermining the value of PROMs and reducing stakeholder buy-in [92–97]. Therefore, **chapters 3 and 4** investigate Erasmus MC's implementation of PROMs and identify strategies to enhance their use.

Chapter 3 uses a mixed methods design to investigate the strategies implemented by Erasmus MC aimed at enhancing response rates among outpatients from nearly 70 subdepartments. This population represents about 17% of all outpatients, with over 10,000 PROMs sent monthly. Although response rates improved, they remained below desired levels. To deepen understanding and inform future strategies, we identify patient and consultation characteristics associated with PROMs completion, estimating a multivariate logistic regression model. Meanwhile, **chapter 4** presents a mixed-methods study examining clinicians' use of PROMs data in outpatient care. It develops insights into the strategies implemented by Erasmus MC to enhance PROMs use and explores key factors driving or constraining clinicians' use of PROMs data in 2023.

Aim 2: Reaching consensus on what constitutes a value-based outpatient consultation

The previous chapters highlight that outpatient care has been central to VBHC implementation at Erasmus MC. However, there is a lack of clarity and consensus on how VBHC translates into practice within outpatient care. This gap is problematic because professionals can only be effectively supported in VBHC if there is a clear and shared understanding of its practical implications. Additionally, these insights are essential for evaluating VBHC implementation

efforts. Therefore, **chapter 5** focuses on prospective sensemaking by addressing the following question:

What activities underpin an ideal value-based outpatient consultation?

A Delphi panel of 19 clinicians pioneering VBHC at Erasmus MC was convened to reach consensus on the activities that underpin an ideal value-based outpatient specialty consultation. The Delphi method, typically used for forecasting and decision-making, leverages the collective expertise of diverse professionals to identify areas of agreement in their views [98].

Aim 3: Examining the perceived impact of VBHC on healthcare professionals

Thriving professionals are vital to the success of VBHC [8,13,18–24], yet the professional is underexplored in VBHC literature [27]. Although there are claims that VBHC benefits professionals [1,12,99], these assertions lack empirical support. Understanding how VBHC impacts the professional can facilitate its adoption and help hospitals optimize beneficial outcomes for professionals while minimizing strain. This investigation is particularly important given the growing concerns about healthcare professionals' well-being [14,17]. To avoid a scenario where VBHC is superficially implemented among unmotivated, stressed, or burned-out professionals, **chapters 6 and 7** focus on the following research question:

How do healthcare professionals perceive the impact of VBHC on themselves?

These chapters use the Job Demands-Resources model [100,101], examining states like motivation and strain, alongside their antecedents, such as work pressure and efforts to positively regulate experiences. Additionally, the model considers how these factors affect healthcare professionals' performance.

Chapter 6 presents a systematic literature review synthesizing 45 empirical, peer-reviewed studies on healthcare professionals in VBHC. The review reveals a substantial lack of focus on healthcare professionals in VBHC literature, leaving the implications of VBHC for them poorly understood. Therefore, **chapter 7** examines this question through interviews with 26 healthcare professionals, focusing on three VBHC-activities: conducting value-based outpatient consultations, pursuing value-based quality improvements, and implementing VBHC, with particular emphasis on PROMs.

Chapter 8 concludes this dissertation by discussing the main findings, followed by overarching reflections and implications for both practice and research.

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AIM 1



Unravelling the implementation of value-based healthcare in a leading Dutch university hospital



CHAPTER 2

A decade of change towards value-based healthcare at a Dutch university hospital: a complexity-informed process study

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ABSTRACT

Background: While healthcare organizations in several countries are embracing Value-Based Health Care (VBHC), there are limited insights into how to achieve this paradigm shift. This study examines the decade-long (2012-2023) change towards VBHC in a pioneering Dutch university hospital.

Method: Through retrospective, complexity-informed process research, we study how a Dutch university hospital's strategy to implement VBHC evolved, how implementation outcomes unfolded, and the underlying logic behind these developments. Data include the hospital's internal documents ($n = 10,536$), implementation outcome indicators ($n = 4$), a survey among clinicians ($n = 47$), and interviews with individuals contributing to VBHC at the hospital level ($n = 20$).

Results: The change towards VBHC is characterized by three sequential strategies. Initially, the focus was on deep change through local, tailored implementation of multiple VBHC elements. The strategy then transitioned to a hospital-wide program aimed at evolutionary change on a large scale, emphasizing the integration of VBHC into mainstream IT and policies. Recognizing the advantages and limitations of both strategies, the hospital currently adopts a 'hybrid' strategy. This strategy delicately combines deep and broad change efforts. The strategy evolved based on accumulated insights, contextual developments and shifts in decision-makers. The complexity of change was downplayed in plans and stakeholder communication. By the end of 2023, 68 (sub)departments engaged in VBHC, enabled to discuss patients' responses to Patient Reported Outcomes Measures (PROMs) during outpatient care. However, clinicians' use of PROMs data showed limitations. While pioneers delved deeper into VBHC, laggards have yet to initiate it.

Conclusions: VBHC does not lend itself to linear planning and is not easily scalable. While there appears to be no golden standard for implementation, blending local and larger-scale actions appears advantageous. Local, deep yet harmonized and system-integrated changes culminate in large scale transformation. Embracing complexity and focusing on the ultimate aims of (re)institutionalization and (re)professionalization are crucial.

1 BACKGROUND

Many international health systems are moving towards Value-Based Health Care (VBHC) [1], a concept introduced by Porter & Teisberg in 2006. VBHC aims to transform traditional volume-centric care systems into value-driven models, where 'value' is defined as the ratio between outcomes that matter to a patient and the costs required to attain these outcomes throughout the entire care cycle [1,2]. Despite widespread interest in VBHC [3,4], insights into its implementation in hospital settings remain scarce [3]. This gap complicates efforts and potentially compromises outcomes as hospitals may need to develop their change strategies from scratch.

VBHC's healthcare reform involves the implementation of six elements outlined in the 'value agenda' (see Box 1) [5]. Based on Dutch experiences, this agenda has been expanded, amongst others to include a focus on value-based quality improvement (addition 1) and on discussing value with patients (addition 2) (see Box 1) [6]. To support these activities and measure outcomes (element 2), Patient-Reported Outcome Measures (PROMs) have gained significant attention. PROMs contain structured questions that enable patients to self-assess and report on their symptoms, functioning, and well-being, often measured through surveys [7,8], requiring enabling IT (element 6).

Box 1. The six original value-agenda elements [5] and the four extensions [6].

Original value agenda elements

Organize care into Integrated Practice Units (IPUs), i.e. multidisciplinary healthcare teams accountable for delivering coordinated care tailored to specific patient conditions, like breast cancer
 Measure outcomes and costs for every patient over the full care cycle
 Move to bundled payments for care cycles, i.e. a single payment made to healthcare providers that covers all services related to a patient with a specific medical condition
 Integrate care delivery across facilities
 Expand excellent services geographically
 Build an enabling Information Technology (IT) platform

Additions to the value agenda

Set up value-based quality improvement
 Integrate value in patient communication
 Invest in a culture of value delivery
 Build learning platforms for healthcare professionals

Hospital have begun to move towards VBHC [9,10], aligning with Porter & Lee's emphasis on providers' critical role in broader system reform: *"All stakeholders in health care have essential roles to play. [...] Yet providers must take center stage"* [11] (p.70). VBHC adapts how contemporary healthcare is organized, delivered, and reimbursed, likely requiring (re) institutionalization and (re)professionalization [12,13]. This is a complex endeavor due to its multifaceted, multi-level scope and the traditional resistance to change among medical

professionals [13]. However, the value agenda lacks guidance on how hospitals can approach this, and literature lacks insights into hospitals' strategies for implementing VBHC [3].

Research indicates that VBHC has been implemented partially thus far, initially focusing on either outcomes or costs but rarely both [3,4,10,14–16]. Despite studies exploring implementation experiences and determinants [14,17–25] and others suggesting roadmaps [26–29], detailed accounts of hospitals' change processes are scarce [30]. Most studies have focused on initial experiences with local pilots, lacking long-term and organizational-level perspectives on change. Noteworthy exceptions include studies by Engels et al. (2024) [31] and Feitz et al. (2021) [32], which share experiences from a decade of value-based quality improvement implementation, and Bonde et al. (2018), studying the shift towards value-based governance [33].

Ramos et al. (2021) emphasized the importance of integrating complexity when implementing VBHC [14]. This approach builds on the increasing attention to embracing complexity in implementation [34–37], organizational change [38], and health services research [39], especially in inherently complex healthcare settings. Complexity thinking contrasts with linear, straightforward cause-and-effect approaches often associated with Implementation Science [35] and certain Change Management models [40]. Instead, it views change as fluid, resulting from multiple dynamics that cannot be fully overseen or managed. Complexity-informed research aims to unravel these dynamics and provide insights into what is happening and why [34,40].

Despite the growing adoption of VBHC by hospitals, there remains a notable gap in understanding its implementation, particularly regarding rich, complexity-informed, organizational-level process studies. This retrospective, complexity-informed process study examines the decade-long (2012–2023) transition towards VBHC in a Dutch university hospital, Erasmus Medical Center (Erasmus MC), aiming to partially close that gap. Specifically, this study aims to unravel how the hospital's strategy to implement VBHC evolved and how implementation outcomes unfolded. Moreover, it aims to examine the logic behind these developments and provide stakeholder reflections on the process.

1.1 National and hospital setting

VBHC in The Netherlands

In the Netherlands, VBHC currently focuses on the collection, use, and transparent reporting of outcomes data relevant to patients. This focus has been supported and guided by the Dutch government for the past 20 years [41], with impetus from a program on outcome-based care that ran from 2018 to 2022 [42]. In 2022, the 'integral care agreement' [43] embraced VBHC as one of the four pillars. Moreover, it outlined two key ambitions to be realized by 2025: first,

making outcome information publicly available for 50% of the disease burden, and second, routine use of these data by healthcare professionals to facilitate Shared Decision-Making (SDM) in consultations and improve quality. These ambitions respectively align with the value agenda extensions 'integrate value in patient communication' and 'set-up value-based quality improvement' [6]. SDM is perceived a component of VBHC in The Netherlands [44] and has been obligatory under Dutch law since 2021 [45].

Dutch hospitals are typically organized in specialty departments with informal multidisciplinary teams and operate in a market with regulated competition based on volume. There are experiments with adapting hospital structures (value agenda; element 1) [15], cost measurement (element 2) [46], and alternative payment methods (element 3) [31,47]. The Netherlands lacks a centralized Electronic Health Records (EHR) system (challenge to element 6; enabling IT). Since 2017, a national learning network has connected patients, healthcare professionals, policymakers, and payers to facilitate knowledge and experience exchange regarding VBHC [48] (value agenda; addition 4).

VBHC in Erasmus MC

Erasmus MC is one of the largest Dutch university hospitals, with site details provided in Additional file 1. In 2012, alongside grassroots VBHC-related initiatives within the hospital, the Executive Board initiated exploration of VBHC's potential [49]. Their interest was sparked when the Chief Executive Officer, invited by the founder of the VBHC Center Europe, attended a masterclass by Michael Porter at Harvard Business School. Earlier, internal consultants had gauged interest in the concept through open sessions, but this had not yet translated into concrete actions.

A Central Support Team (CST) coordinates and facilitates VBHC implementation. The CST grew from 1 full-time equivalent (FTE) in 2013 to approximately 6 FTEs in 2020, and has since been expanded with an integrated IT team. Two former physicians successively headed this team. In 2018, the Executive Board formed a steering committee. Patient are involved in implementation efforts as part of local improvement teams and a central panel. Since 2020, a separate team has been dedicated to international VBHC initiatives.

Throughout the hospital's move to VBHC, there has been a focus on PROMs for clinical and shared decision-making, necessitating significant IT investments. This aligns with the government's emphasis on patient outcomes and the hospital's commitment to viewing the patient as a partner and leveraging the potential of data [50]. Specialty outpatients are asked to complete electronic PROMs before their outpatient consultation. The employed PROMs instruments are listed in Additional file 1.

2 METHODS

This complexity-informed [34–36,51] process study [52] aims to retrospectively unravel how Erasmus MC's strategy to implement VBHC evolved, how implementation outcomes unfolded, the logic behind these developments, and to provide stakeholder reflections on this matter. Examination spans from the start of implementation in 2012 to its status in 2023. Results are presented in a chronologically sequenced narrative [36,52].

2.1 Data sources

This study uses four data sources, including both existing data and newly collected data. Existing data included *documents*, and *implementation outcome indicators*. Data collection included a *survey* among clinicians, and *interviews* with individuals involved in the change to VBHC at the hospital level.

Documents

The first author received access to the CST's online workspaces with 10,536 files spanning from 2012 to mid-2023. Files included implementation plans, evaluations, letters, minutes, and educational and communication materials, amongst others. The initial analysis comprised two-stages: 1) screening of all materials, resulting in the identification of 1,564 documents containing data on strategies, logic, contextual factors, implementation outcomes, and reflections; and 2) examining these files and extracting data.

Implementation outcome indicators

We used four implementation outcome indicators [53,54] from the hospital's implementation monitoring system, which we labeled as follows: 1) *breadth*, i.e. the number of patients and (sub)departments participating in VBHC; 2) *depth*, i.e. the value agenda elements implemented; 3) *PROMs use*, i.e. patients' response rate to PROMs and clinicians' use rates of the PROMs dashboard to view a patient's response; and 4) *sustainment*, i.e. patients' and (sub)departments' continued participation in VBHC. The tracking of patients' PROMs completion and clinicians' use of the PROMs dashboard were automated, providing both daily and longitudinal scores, and could be filtered by department, type of PROM survey, and timespan. However, this extends beyond the scope of this study, which focuses solely on reporting aggregate rates. The other indicators were manually collected in a database by the CST.

Survey

A survey was digitally distributed to all 194 clinicians across the 35 (sub)departments that initiated PROMs implementation as a first step toward VBHC in January 2023, excluding one clinician who had been involved in survey design. Fifteen closed questions were posed (see Additional file 2), which were part of a larger survey (reference: EMC23). Two reminders were

sent. After verifying the 57 responses, 47 were included in the analysis. Table 1 shows the reasons for exclusion and sample sizes for the different data sources.

Interviews

Twenty individuals contributing to VBHC at the hospital level were interviewed (see Table 1). The semi-structured interview questions centered on strategy as outlined in plans, its practical execution, explanations for potential discrepancies, and overall reflections. Participants were purposefully selected to include actors across the entire time span, relying on documents and snowballing. Two individuals refused participation for personal circumstances. The interviews were recorded, and transcribed verbatim.

Table 1. Data sources and sample sizes

Data source	Description		N
Documents (n=10,536)	Files	Included	1,564
		Excluded	0
	Responses	Included	47
		Complete responses	42
		Excluded	10
		Demographic questions answered only (n=5);	
		Not providing patient care (n=2); PROMs not	
		yet available (n=2); No familiarity with PROMs	
		(n=1)	
		Sex	Female
		Age	Average in years (min, max)
Survey (n = 57)	Function	Medical specialist	30
		Nurse	12
		Other (e.g., psychologist, resident-in-training)	5
	Participants	Member Executive Board	1
		Director Quality & Patient Safety	1
		Head VBHC (pre-)steering committee	2
		Member steering committee	2
		Lead CST	3
		Member CST	9
		External consultant	1
		Clinician in VBHC program	1
	Sex	Female	14
	Duration	Average in minutes	53

CST: central support team

2.2 Data analysis

Guided by Langley's (1999) work on analyzing process data [52], we used a three-step, iterative approach to construct a chronological narrative unraveling the evolution of VBHC and associated implementation strategy in Erasmus MC over past decade. Through the lens of complexity science [34–36,51], we aimed to provide a nuanced account on how strategy, outcomes and contextual factors interact (see Figure 1); thereby limiting oversimplification of reality.

Step 1. Building the core strategy narrative

From *document* data, primarily annual implementation plans, and enriched by *interview* data we extracted the VBHC elements intended for implementation, the targeted population, the envisioned timeline of change, and noted the year of the plan. This information was used to develop a chronologically sequenced narrative of how the intended strategy to implement VBHC evolved [52]. In parallel, from *document* data, primarily evaluations, and *interview* data we mapped how strategy was realized, i.e. the practical execution. 'Strategy as intended' and 'strategy as realized' are used as headers in the Results section.

We identified strategy attributes using the factors of depth and breadth [55–58]. The depth factor assesses the extent of radical adaptation, focusing on the comprehensiveness of change in reference to the value-agenda and their integration in practice. The breadth factor evaluates the organizational scope of change, specifically measuring the degree of engagement of all patients and professionals, as well as the adaptation of organization-wide processes, policies, and systems. Both factors provide insight into the degree of (re-) institutionalization and (re-)professionalization around VBHC. Additionally, we draw inspiration from Maes and Hootegeem's typology for understanding various dimensions of change, including stride (incremental – revolutionary) and pace (slow – quick) [59].

Step 2. Defining phases and adding implementation outcomes per phase

We temporally bracketed [52] the narrative into phases based on significant shifts in intended strategy. The four *implementation outcome indicators* provided a snapshot of the implementation status at the end of each phase. These indicators required no further analyses. Additionally, we included the outcome sustainability [54], which captured stakeholders' beliefs in the long-term endurance of VBHC, derived from *document* and *interview* data. This outcome is different from sustainment, which assesses whether implemented initiatives were continued.

Step 3. Enriching the strategy narrative with logic and reflections

Finally, we added information on the logic behind observed developments in the narrative and stakeholder reflections, derived from *document* and *interview* data. Data were open-coded and then axially coded into categories based on their shared topics using ATLAS.ti [60,61].

Survey results were used to capture clinicians' experiences with the transition to VBHC and their perceptions of the current VBHC implementation strategy. We examined and reported item-level frequencies.

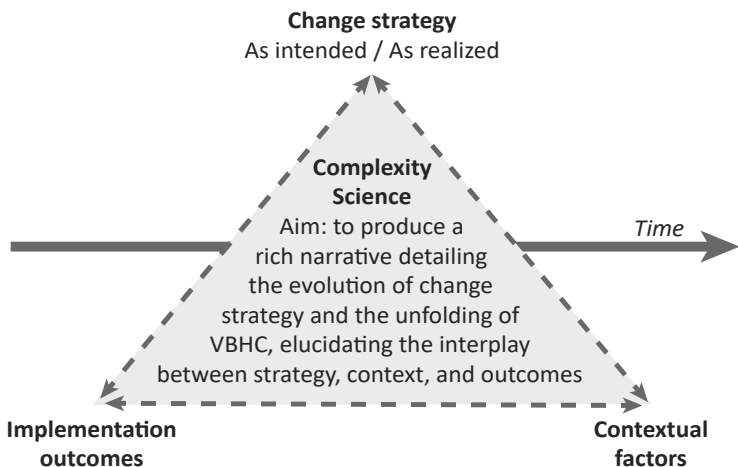


Figure 1. Data analysis

3 RESULTS

Erasmus MC's strategy to implement VBHC underwent two significant shifts over the decade. Initially, from 2014 to 2019, following a year of preparations, the aim was achieving deep, i.e. transformational, change by implementing multiple VBHC elements. Change efforts concentrated on small number of teams, supported by the CST (see section 1.1.) After a one-year pilot among six teams, the CST and the Executive Board decided to continue this 'depth-first' strategy, gradually expanding to other teams.

By 2020, implementation shifted into a multi-year, hospital-wide program, adopting a 'breadth-first' strategy. This strategy aimed for large-scale, evolutionary change and initially focused on uniform implementation of PROMs across the entire hospital with integrated IT. Eventually, this strategy evolved into a 'hybrid' strategy that delicately integrates both local, tailored and large-scale, uniform changes, continuing into 2024.

Throughout these strategies, there has been a consistent focus on PROMs and their use in outpatient specialty consultations (value agenda; element 2 and addition 2). The change process evolved organically, with the VBHC implementation strategy adapting based on accumulated insights and contextual developments, seizing opportunities as they arose.

Figure 2 outlines the change process, including some key contextual factors described in section 1.1.

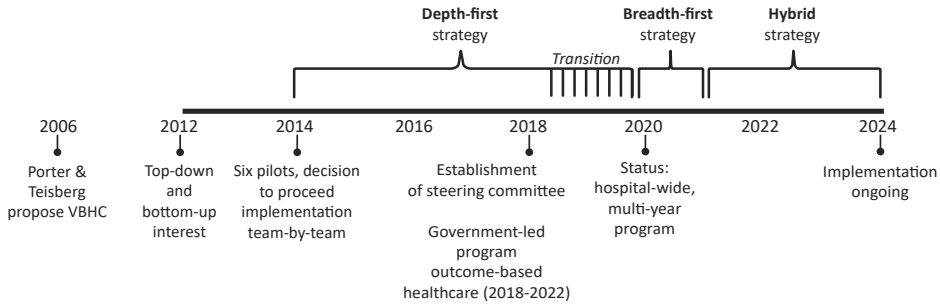


Figure 2. Timeline depicting the evolution of the strategy and key moments

On average, clinicians rated the implementation process of PROMs 5.4 out of 10 and implementation outcomes 4.9 out of 10 (both min 1, max 9), with no significant differences among those commencing implementation across both strategies. Despite the hospital conducting research on VBHC initiatives [29,62–74] (see Additional file 3), it had not yet quantitatively examined the impact of VBHC initiatives across the hospital on patient outcomes and costs. Additionally, the impact on the workforce remained unknown. This has become a growing concern, both to maintain investment and convince skeptics. Interviewee 1 expressed: *“Despite our strong belief in it, there comes a point where we need to provide evidence of its impact, especially considering the substantial investment of resources.”* This is echoed by an internal document dated 20/5/19, stating *“There is a need to determine the tangible benefits of VBHC, not only for the patient but also financially.”*

In the remainder of the Results we discuss the ‘depth-first’ strategy (section 3.1) and the ‘breadth-first’ strategy turning into ‘hybrid’ strategy (section 3.3). For each, we discuss key contextual factors, implementation as intended, implementation as realized, outcomes, and reflections. In section 3.2, we describe the phase that bridges the ‘depth-first’ and ‘breadth-first’ strategies.

3.1 ‘Depth-first’ strategy

Context

During the years 2014-2019, interviewees encountered several challenges that hindered the success of VBHC. While the Executive Board verbally supported VBHC, their commitment varied with changes in board composition. Interviewee 15 remarked, *“The Executive Board did not fully give the green light for the movement we were making.”* The need to request a budget annually created insecurity and required significant time and effort. According to interviewees, the building of a new hospital building (2009-2018) and change of Electronic

Health Record (EHR) provider in 2017 diverted attention and resources. Interviewee 14 regretted that the Executive Board did not use the opportunity of the new building to structure the hospital around medical conditions instead of siloed disciplines (value agenda; element 1). Interviewee 9 partially attributed this caution to reorganization issues faced by a Swedish hospital implementing VBHC [75]. The CST also faced limitation from PROMs and supportive IT not yet being available. The team's capacity (see section 1.1) and the lack of IT support consistently bottlenecked progress, resulting in waiting lists for (sub)departments seeking to initiate VBHC implementation and compromised implementation support (internal document 20/5/19).

'Depth-first': strategy as intended

Together with an external consultant, the CST developed a plan outlining how informal, multidisciplinary teams overseeing all care around a patient condition, such as cleft lip, could implement VBHC with their assistance. The focus was on achieving deep change by implementing numerous elements of the value agenda (see Figure 4, quadrant A). They would assist a few teams at a time, providing tailored support and applying learnings from earlier trajectories to new teams, gradually expanding until VBHC was implemented for all patient conditions.

Initial steps in the team-level plan aimed at fostering collective understanding of VBHC, selecting PROMs, and defining appropriate measurement moments in the care path. These sessions would involve representatives from the clinical team, patients, and the CST. Next, the clinical team would measure PROMs among outpatients a few days prior to their consultation using an online survey and discuss patients' responses during their appointment (value agenda; element 2 and addition 2). Moreover, they would measure costs through Time-Driven Activity-Based Costing [76] (also element 2). Subsequently, after approximately nine months, the team would use the aggregated PROMs data to drive value-based quality improvements (value agenda; addition 1). To support these activities, three tools were to be developed: an electronic PROMs survey system, a consultation room dashboard displaying a patient's PROM outcomes and another for improvement purposes displaying aggregated PROMs data (element 6). Other VBHC elements such as networked care (element 4), benchmarking (part of addition 1) and bundled payment (element 3) were not integrated in this plan but were anticipated to be addressed in subsequent steps or on request. Ultimately, the vision was: *"To give clinicians the feeling that they collectively operate their own shop. [...] A shop that can promote its services to insurers, patients, and other medical facilities, emphasizing its commitment to delivering exceptional value"* (interviewee 14). At the organizational level, middle management would undergo VBHC training (addition 3).

'Depth-first': strategy as realized

The above-mentioned three tools were developed, and teams started using PROMs in their outpatient specialty practice. Certain teams were supported to implement additional elements of the value agenda, e.g. bundled payment, however, without concurrently adhering to the initial plan.

Unforeseen circumstances prompted two additions to the abovementioned team-level plan. First, due to limited availability of PROMs, multiple teams were compelled to contribute to the development of PROMs, e.g. [64,77–85], causing delays but fostering support for the content of PROMs. These efforts extended to the development of Patient Reported Experience Measures [86,87]. Second, it became evident that care pathways were often either missing or outdated, requiring significant revamping efforts. This presented an opportunity for making initial care pathway improvements, yielding benefits in the eyes of clinicians. Additionally, three training sessions were developed, one of which trained clinicians in discussing PROMs with outpatients.

Four key aspects of the initial plan were not realized as intended. First, cost measurement was discontinued due to challenges in accurately assessing costs, e.g., allocating square meter prices and costs of assistive personnel to patients with specific conditions. Financial intricacies in the university hospital, involving funds for education and research, heightened the complexity. Moreover it was indicated that *"prioritizing quality as the starting point for change facilitated clinician engagement"* (interviewee 9). Second, PROM-informed care improvement activities occurred less frequently than anticipated due to limited IT support, constraints on workforce time, and suboptimal data quality. Third, among the first teams, the intended nine-month timeframe was not met due to the initial development of tools taking several years, causing disappointment and frustration. Fourth, training for department heads and managers was discontinued at their request, resulting in limitations in their support to clinical teams. Reasons included perceived theoretical abstraction and a mismatch with the trainer's style. In 2018, the implementation plan was adjusted to accelerate the implementation of PROMs using generic items, initiating the shift towards the 'breadth-first' strategy.

Implementation outcomes in 2019

In 2019, the outcomes achieved could be characterized as semi-deep and relatively narrow in breadth (see Figure 4, quadrant B). Thirty-eight teams out of more than 200 were in the process of implementing electronic PROMs, of which ten achieved PROMs measurement and sustained this practice up to 2020, with eight continuing into 2024. Ten teams paused implementation due to capacity issues or challenges in team functioning. Additionally, one department implemented PROMs independently of the CST's central VBHC efforts. Some teams implemented additional VBHC elements next to PROMs (see Table 2). Yet, by the end of the study, no team implemented all elements in the value agenda.

In total, PROMs were distributed to 36,135 unique outpatients, with the majority (22,737 unique outpatients) involving the department that implemented PROMs independently. The monitoring system's data indicated limitations in patients' *use of PROMs*, i.e. their compliance in responding. Anecdotal data showed variations in clinicians' *use of PROMs* during outpatient specialty consultations, with some always using them and others never. A more detailed exploration of these topics falls outside the scope of this study.

The *sustainability* of implementation, i.e. predicting long-term endurance, faced limitations, as described in the section below. In 2019, apart from cost measurement, VBHC initiatives were *sustained*, indicating the actual continuity of implementation. Most of these initiatives continued through 2024, except for the PROM-informed care improvement activities, which were halted shortly after the strategy shift in 2020 and are expected to be restarted in 2024.

Table 2. Implementation outcomes in 2019

Outcome	Topic		N
Depth and breadth	Enabling IT	# teams with infrastructure	10 and 1 department
	PROMs	# teams collecting PROMs	10 and 1 department
		# teams preparing implementation	28
		# unique outpatients receiving PROMs	36,135
	Care pathway improvement	# teams, not-based on PROMs data	38
		# teams, PROMs data-informed	10
	Cost measurement	# teams	3
	Benchmarking	# teams	3
	Networked care	# teams	2
	Bundled payment	# teams	1

'Depth-first' strategy: reflections

Some interviewees appreciated the emphasis on deep implementation by incorporating multiple elements of the value agenda, accommodating diverse clinician interests and ambitions, and providing various learning opportunities. Furthermore, this approach aimed not only to adapt how care is delivered, but also how it is organized and reimbursed. This comprehensive approach was considered essential for achieving and sustaining change by aligning all forces. However, there were concerns about overwhelming conservative professionals, as many clinicians already find using PROMs challenging, as noted especially by interviewee 10.

The approach of implementing VBHC among informal multidisciplinary teams was deemed crucial for VBHC by some (see also the limitations of a departmental approach described in

the next section). However, it also posed challenges related to reliance on team functioning and the varying support and motivation from both colleagues and department heads in specialty departments. Interviewee 3 exemplified this: *"In surgery, there were one or two of those VBHC teams. But they had many colleagues who were not involved, lacked understanding, and lacked belief in VBHC. These colleagues depicted these teams as if they were a group of hobbyists."* Further, the Executive Board expressed dissatisfaction with the limited reach despite substantial investments. Some clinical teams served relatively small patient populations, prompting questions about whether to prioritize conditions with larger patient volumes or continue with the most enthusiastic clinical teams. However, the lack of data on patient volumes by care path hindered prioritization based on such information.

Moreover, the tailored, localized approach resulted in *"[...] a surge of local, enthusiasm-driven initiatives"* (interviewee 12). While enhancing the fit of solutions and local actors' ownership, this approach faced drawbacks. Interviewees mentioned fragmented implementation efforts, conflicting local visions, lack of critical mass and absence of a stable overarching strategy. The developed IT saw advances yet had limitations, not optimally laying the groundwork for other value agenda elements. Each team had its own customized PROM-solution developed, leading to a proliferation of PROMs and IT applications, for which there was neither enough funding nor workforce for development and maintenance. Further, this situation hindered cross-departmental data analysis and collaboration, and imposed a burden on multimorbid patients to complete multiple overlapping surveys. Additionally, clinicians encountered limitations from PROMs not being EHR-integrated.

Taken together, the tailored, team-focused approach hindered scaling and posed risks to sustainability. Notably, an internal document (8/12/2013), showed that many of these limitations were foreseen at the start. The proposed solutions, such as integrating PROMs in the EHR and the use of generic PROMs, appear to have gained feasibility and acceptance only at a later stage.

3.2 Towards a shift in strategy

The year 2019 was primarily dedicated to evaluating and reorienting change, led by an internal consultant. The shortcomings of the 'depth-first' change phase led to disappointment, waning patience, and a loss of credibility in the initial VBHC implementation strategy across various organization layers. An internal document (20/5/2019) states: *"collaboration on multiple fronts—strategic, tactical, and operational—has not been successful everywhere, resulting in current noise regarding the topic and the future vision of VBHC."* Another document, dated 22/5/2019, states: *"It is not a pilot project but rather a cultural shift, yet it remained stuck in the pilot phase."* Nevertheless, prior achievements motivated a commitment to advancing VBHC, anticipating benefits from expanding its reach, and taking it to a higher level of maturity: *"After the initial pioneering phase, there is a need for structure. There is a need to implement*

and sustain VBHC from a strategic, hospital-wide standpoint.” Interviewee 3 explained that successful change necessitates a delicate balance between local, and centralized efforts: “It is nice to see that enthusiasm, but there must also be a counterweight to it. If VBHC is completely determined by people who are extremely passionate about working with outcomes, then one dies in beauty. [...]. However, it should not just become very practical and managerial either, turning it into a cold, soulless program.”

In the lead-up to professionalizing VBHC, in 2018, the Executive Board formed a steering committee to address buy-in challenges among major stakeholders such as IT, department heads and clinicians. The formation of the steering committee was “a kind of rescue” (interviewee 4) as it “[...] assigned a leadership role to several people, increasing their engagement” (interviewee 5). Yet, one member of the steering committee reflected: “I am not sure if we actually steer. It is primarily an information exchange platform” (interviewee 2). Although the CST suggested the Executive Board to head this steering committee (internal document 20/5/2019), a department head who had independently achieved PROMs implementation in their department was appointed as the head.

This person’s belief in evolutionary change, starting with PROMs, along with the desire to approach change from a hospital-wide perspective, and contextual factors such as the development of generic PROMs, contributed to shifting the strategy from ‘depth-first’ to ‘breadth-first.’ Despite some disagreement from the former VBHC head, the Executive Board approved the new strategy, designating it as a multi-year, hospital-wide program starting in 2020.

3.3 ‘Breadth-first’ strategy

Context

National attention for VBHC strengthened (see section 1.1), and there was improved availability of PROM instruments. As VBHC became a hospital program, the CST extended to include an integrated IT team. However, the capacity of the CST continued to pose a consistent bottleneck in progress. While financial resources transitioned from annual budget allocations to multi-year funding, internal documentation (22/12/2022) indicates that financial constraints still led to scaled-down plans. Similarly to before, no dedicated resources to implement VBHC were made available to (sub)departments, although they also did not face direct monetary costs associated with VBHC implementation.

The Executive Board expressed verbal support for VBHC, although perceptions of its adequacy varied among interviewees. Starting in 2022, their involvement extended to requiring (sub)departments to formally report on their VBHC activities and acknowledging those that performed well. COVID-19 prompted exploration of new applications of VBHC principles, for example as a triage tool for the limited operating room capacity [88–90]. Nonetheless, this

initially encountered resistance from some, as it could potentially lead to loss of revenues, and later lost urgency as the COVID-19 situation stabilized.

'Breadth-first': strategy as intended

The 'breadth-first' strategy aimed to incrementally implement VBHC across the entire hospital (see Figure 4, quadrant C). Contrary to the previous focus on informal, multidisciplinary teams around patient conditions, implementation advanced through the traditional structure of (sub)departments, tackled a few at a time, if they showed interest. There was a central belief in simplifying implementation for clinicians, unifying tooling and embedding change in the hospital's systems and policies. As a result, the role and power of the CST expanded, diminishing front-line clinicians' involvement, and significant effort went into professionalizing IT.

Implementation was guided by an organization-level, multi-year plan (2020-2024) that consisted of eight sequential steps to be executed over a five-year period (see Figure 3). Although this plan appears quite straightforward, interviews uncovered nuances, less linearity, and uncertainties. The first three years would focus on VBHC knowledge promotion and the implementation of three-tiered, EHR-integrated PROMs (value agenda; elements 2 and 6). In 2020, the first step was to homogenously implement generic PROMs (tier 1) throughout the entire hospital, encompassing questions related to daily functioning and quality of life. The underlying idea was that this standardized set could rapidly enable the entire hospital to measure PROMs, immediately presenting opportunities to enhance the quality of patient consultations (value agenda; addition 2). These generic PROMs (tier 1) would be complemented by domain-specific PROMs in 2021 (tier 2), measuring outcomes relevant for specific patient groups, and eventually tailor-made, disease-specific PROMs in 2022 (tier 3). According to interviewees prioritizing generic PROMs was resource-driven, rather than the ideal for patients and clinicians. Additional value agenda elements were scheduled for 2023 and 2024, yet detailed plans for these were not disclosed. The creation of Integrated Practice Units (value agenda; element 1) was considered inappropriate in several cases because of small patient populations for rare diseases and the hospital's complex organizational and financial structures.

'Breadth-first': strategy as realized

Although the content of the plan remained largely the same and was acted upon, there were seven notable changes in the timing, and order. Overall, these changes indicate a departure from the linear progress presented in Figure 3.

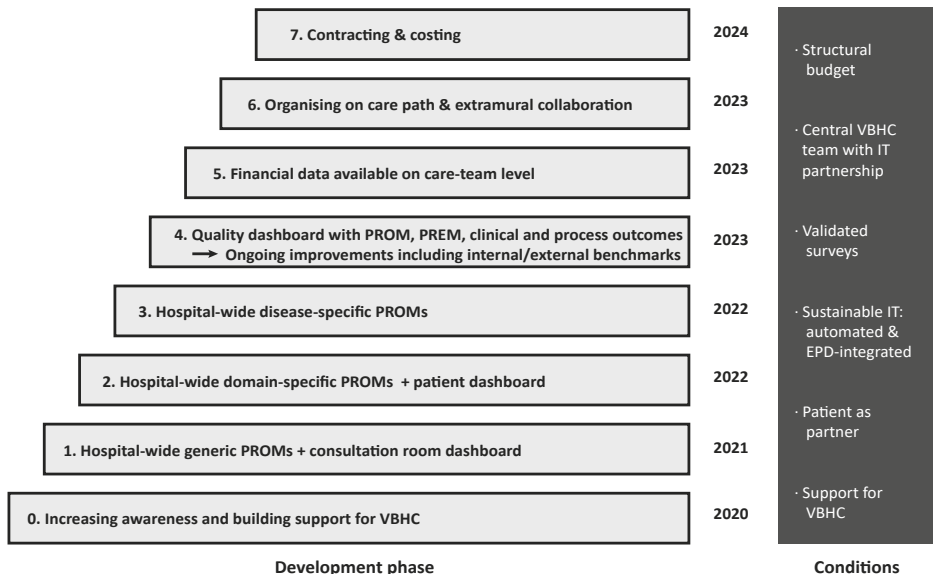


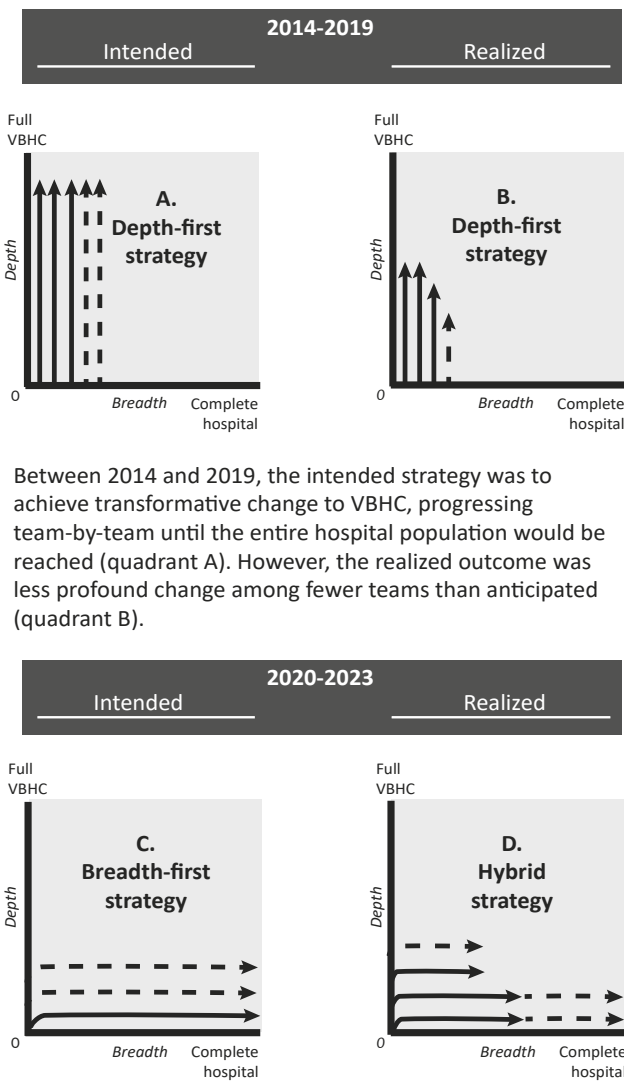
Figure 3. The 'breadth-first' strategy plan (translated from internal document Annual Plan 2023)

First, (sub)departments increasingly requested the complete three-tiered PROMs set, rather than waiting for the hospital-wide implementation of generic PROMs before moving on to domain and disease-specific PROMs. Survey results, interviews, and documents emphasize that generic PROMs often did not provide enough benefits to clinicians and patients. Interviewee 15 noted: *"generic does not do justice to the complexity inherent in an academic setting."* Implementing complete PROM sets required customization, which subsequently slowed down the expansion to larger populations. Second, contrary to the initial plan for homogeneous change, there was increased heterogeneity in implementation. The strategic plan dated 20/03/2023, refers to the adoption of a 'hybrid' strategy. In this 'hybrid' strategy, the CST combined uniform, larger-scale approaches with tailored, local approaches. The goal was to advance hospital-wide implementation of generic PROMs and integrate VBHC in the hospital system, while simultaneously provide support to several (sub)departments to adopt disease-specific PROMs and deepen their VBHC implementation through subsequent value-based interventions (see Figure 4, quadrant D). For example, teams will start PROMs-informed quality improvement in 2024. Moreover, a new cost measurement pilot is attempted, guided by the belief *"in the healthcare crisis that is unfolding, we cannot avoid addressing the costs"* (interviewee 3). Third, the planned development of a dashboard for patients to review their PROM outcomes was postponed due to the hospital-wide development of a smartphone application, where this feature is intended to be integrated. According to interviewee 6, the current absence hindered patients' active engagement. Fourth, change fell behind on the extended schedule. Fifth, despite the delay, various unplanned activities were undertaken. These 'spin-offs' were in response to workforce requests or external developments, like

COVID19. For example, clinicians requested the use of the PROMs' IT infrastructure to inquire about patients' medication and lifestyle. Additionally, PROMs were included as a metric for triage. Sixth, documents indicated that unforeseen IT challenges caused considerable PROMs dashboard loading times due to data accumulation, prompting several clinicians to stop discussing PROMs. This required additional attention to resolve and promote clinicians' re-uptake, thereby compromising implementation outcomes. Last, in response to limitations in clinicians' use of PROMs, the CST began offering on-the-job coaching on how to discuss PROMs. This effort was deemed necessary in addition to other training resources like a manual and courses.

Implementation outcomes in 2023

In 2023, the VBHC adoption status is diverse, with some departments starting to embrace VBHC more deeply, while others have yet to initiate it. In December 2023, 68 (sub)departments collected PROMs among their outpatients, of which 50 implemented a complete, three-tiered PROM, i.e. generic, domain-specific and disease-specific. In November 2023, 12,335 PROMs, with separate tallies per PROM, were sent to 5,107 unique outpatients. This is 17 percent of all outpatients, and is a conservative estimate for two reasons: it incorporates duplicate PROMs registrations from canceled appointments, and not all outpatients are eligible for PROMs participation. Ineligible are patients seeking acute or psychiatric care or a second opinion, those with a one-stop-shop appointment, certain patients with intellectual disability, neurodiversity, and specific selections determined by (sub)departments. Patients' and clinicians' *use of PROMs* fell below expectations (see Table 3), despite initiating several interventions to enhance this. Investigation into this matter falls outside the scope of this study. Overall, the VBHC implementation was deemed increasingly *sustainable* (see section below). Regarding actual *sustainment*, results indicate that two (sub)departments quit using PROMs due to a shift in the patient treatment policy, moving towards a one-time visit without follow-up consultations.



Between 2014 and 2019, the intended strategy was to achieve transformative change to VBHC, progressing team-by-team until the entire hospital population would be reached (quadrant A). However, the realized outcome was less profound change among fewer teams than anticipated (quadrant B).

Starting in 2020, the new strategy aimed for hospital-wide change and the integration of VBHC into hospital policies and IT systems, implementing one VBHC element hospital-wide before moving on to the next (quadrant C). What emerged was what we term the hybrid strategy. This approach continued phased implementation of VBHC, element-by-element, across the hospital. At the same time, it supported teams that had already adopted initial elements to advance with subsequent ones, thereby enhancing both depth and breadth (quadrant D).

Figure 4. The evolution of strategy, as intended and as realized, along the dimensions of depth and breadth. The arrows symbolize implementation efforts.

Table 3. Implementation outcomes at the end of 2023

Outcome	Topic		N
Depth and breadth	Enabling IT	# teams with infrastructure	Hospital-wide
	PROMs	# (sub)departments collecting PROMs	68
		% outpatients reached (see note in main text)	17
		# PROMs sent in total	278,269
		# PROMs sent monthly	> 10,000
PROMs use	Patients	# PROMs completed 07/2020-12/2023	≈ 123,000
		% response rate 07/2020-12/2023 (average)	43
		% response rate 12/2023 (average)	52
	Clinicians	% patient responses opened in dashboard 07/2022-12/2023 (average)	17
		% patient responses opened in dashboard 12/2023 (average)	15
Sustainment	Patients	% patients discontinuing PROMs use	Data missing
	Clinicians	# (sub)departments discontinuing PROMs	2

'Breadth-first' strategy: reflections

The focus on hospital-wide change enabled the adaptation of core policies and systems and facilitated communication through hospital-wide channels. Further, associated uniformity and standardization streamlined IT implementation. Yet, overreliance on uniformity and standardization introduced limitations, such as diminished local-fit and a sense of ownership among local sites. Further, decision-making authority and responsibilities increasingly shifted to the CST, placing an additional burden on their limited capacity. Interviewee 3 reflected on the diversity among clinicians, noting the need for complementary use of local, tailored implementation efforts that allow for heterogeneity: *"Some people are very enthusiastic about VBHC, hoping for a swift and comprehensive implementation, while others have reservations and are pleased with the slower, phased process we follow."* Several interviewees believed a core strength lied in the eventually adopted 'hybrid' strategy that enabled both tailoring to match local sites' interests and needs along with coherence and system integration, improving sustainability.

Perceptions regarding the prioritization of PROMs were mixed. Interviewee 11 clarified the rationale for commencing with PROMs before other value agenda elements: *"One creates a slippery situation when changing the care pathway first or when altering it during the collection of baseline data. Ensuring the availability of patient outcome data is crucial to assess the impact of modifications made to the care pathway."* However, interviewee 20 expressed doubt: *"eliminating inefficiencies from your process may not always result in an immediate*

improvement in patient outcomes [...] However, it could potentially lead to benefits like cost reduction or increased efficiency”, emphasizing that it is crucial to include various outcomes.

In contrast, interviewee 17 disliked this priority, perceiving that the concentrated focus on outpatient use of PROMs limited behavior change: *“It is not just the dialogue with the patient that nurtures the culture, absolutely. But the collaborative effort to enhance care serves as the other culture nurturer.”* Interviewee 16 reflects *“we did not consider the effects of focusing on one VBHC element while pausing or neglecting the others. [...] In my opinion, this was no longer in balance.”* Moreover, the narrow focus overlooked the perverse incentives associated with the prevailing healthcare system, such as volume-based payment. Interviewee 18 encountered conflicting messages, needing to prioritize value but occasionally being asked to increase volume once again. Documents described similar issues, such as the inability to simplify a care pathway due to payments being linked to specific steps. Moreover, while implementation among (sub)departments enhanced scalability, increased collegial understanding, and improved patient volumes, potentially facilitating clinicians to adopt new routines, it simultaneously raised concerns. Interviewee 17 and 14 respectively described: *“[...] clinicians still manage their personal responsibilities within the confines of their own consultation rooms while VBHC is about taking collective responsibility for the entire care path.”* and *“Focusing solely on one’s own discipline limits the potential impact on enhancing patient outcomes, rendering PROMs less relevant”*. Overall, these issues raised concerns that the initial ‘breadth-first’ strategy could potentially lead to VBHC becoming *“a wrongly loaded concept or an empty shell”* (interviewee 17).

Nonetheless, in general, interviewees appreciated the newly developed (IT) foundation, with some anticipating it *“to function as a catalyst”* (interviewee 19). The combined VBHC-IT team was considered a strength. Survey responses indicated that 45% of the clinicians (n=19) endorsed hospital-wide change, 40% (n=17) supported phased implementation, and 38% (n=16) prioritized outpatient PROMs use, highlighting mixed perceptions.

Regarding healthcare professionals’ motivation, limitations emerged due to the extended time for the implementation: *“One can’t keep clinicians engaged and maintain momentum for five years”* (interviewee 6). Furthermore, interviewees noted constraints stemming from a lack of perceived urgency for change and the absence of disincentives for non-adherence: *“There is no fire. There are no patients dying if you don’t use PROMs”* (interviewee 11). Some clinicians perceived themselves as already working in a value-based manner prior to VBHC (survey respondent 39) or believed it would be a passing trend (survey respondent 11). Interviewees also noted limitations regarding the lack of evidence and the terminology around VBHC, with ‘value’ sometimes being associated with a monetary focus (interviewee 11). Inconsistent framing and policy competition were highlighted as sources of confusion and change fatigue (interviewee 3).

With the implementation experience obtained thus far, some change actors desired an immediate hospital-wide rollout of generic PROMs with increased Executive Board mandate. Others endorsed the current phased strategy of cultivating enthusiastic adopters and tailored implementation support. Interviewee 19 stated: *“It has to come from the right motivation, not just because there is a checkbox to be ticked.”*

4 DISCUSSION

This retrospective, complexity-informed process study unraveled the decade-long (2012-2023) transition towards VBHC at Erasmus MC. It explored how the hospital's strategy to embrace VBHC evolved, how implementation outcomes unfolded, and the underlying logic behind these developments. We found that achieving the healthcare transformation intended by VBHC requires moving beyond siloed and linear theories on change. Instead, integrated and complexity-informed approaches [34,35] seem necessary to successfully (re)institutionalize and (re)professionalize [12] according to the VBHC paradigm [1,6,11] as ultimate aims.

The evolution of implementation strategy

Erasmus MC adopted a data-driven, patient outcome focused approach to VBHC, emphasizing the electronic capture of PROMs among outpatients and the discussion of individual patients' responses during their outpatient specialty consultations. PROMs appear to act as 'functional pressure' [91], enabling clinicians to adapt their roles to VBHC by integrating holistic information about patients' experienced symptoms, functioning, and quality of life. This operationalization of VBHC aligns with the extended 'value agenda' [6]. While we cannot claim a direct cause-effect relationship, this focus is consistent with the Dutch government's emphasis on patient outcomes [41–43], the obligation of SDM under Dutch law [45], and the hospital's mission to position the patient as a partner [50].

Over the course of a decade, Erasmus MC's strategy to implement VBHC evolved from what we termed 'depth-first' to 'breadth-first,' and eventually to a 'hybrid' strategy. Depth refers to the level of transformative change, while breadth refers to the scope of organization-wide change [55–58]. Initially, the focus was on deep change through local, tailored implementation of multiple VBHC elements. The strategy then transitioned to a hospital-wide program aimed at evolutionary change on a large scale, emphasizing the integration of VBHC into mainstream IT and policies. For example, PROMs were integrated into the EHR and VBHC was gradually formalized through its integration into mandatory reporting cycles for departments. This reduction in depth has also been observed in other VBHC-implementations [3,4,21,31,92]. While both strategies yielded successes, they also had limitations. Therefore, the hybrid strategy aimed to delicately combine deep and broad change efforts.

The strategy evolved organically throughout the decade, diverging from linear-looking plans. Change was facilitated and coordinated by the CST, as recommended [26], which was later effectively extended with an integrated IT team. They adapted the VBHC implementation strategy based on accumulated insights and contextual developments, seizing opportunities as they arose. The CST navigated challenges including financial limitations and uncertainties, as well as their VBHC initiatives outpacing external advancements like PROMs development and payment reform. Additionally, the strategy evolved as implementation matured and decision-makers changed, underscoring complexity arising from individuals holding differing values regarding the move to VBHC [93].

Combining depth and breadth focused strategy

Combining a strategy that balances ‘depth-focused’ and ‘breadth-focused’ change seems crucial for achieving and institutionalizing VBHC. Figure 5 illustrates this delicate equilibrium using a causal loop diagram [94], showing reinforcing and balancing forces, labeled ‘R’ and ‘B.’

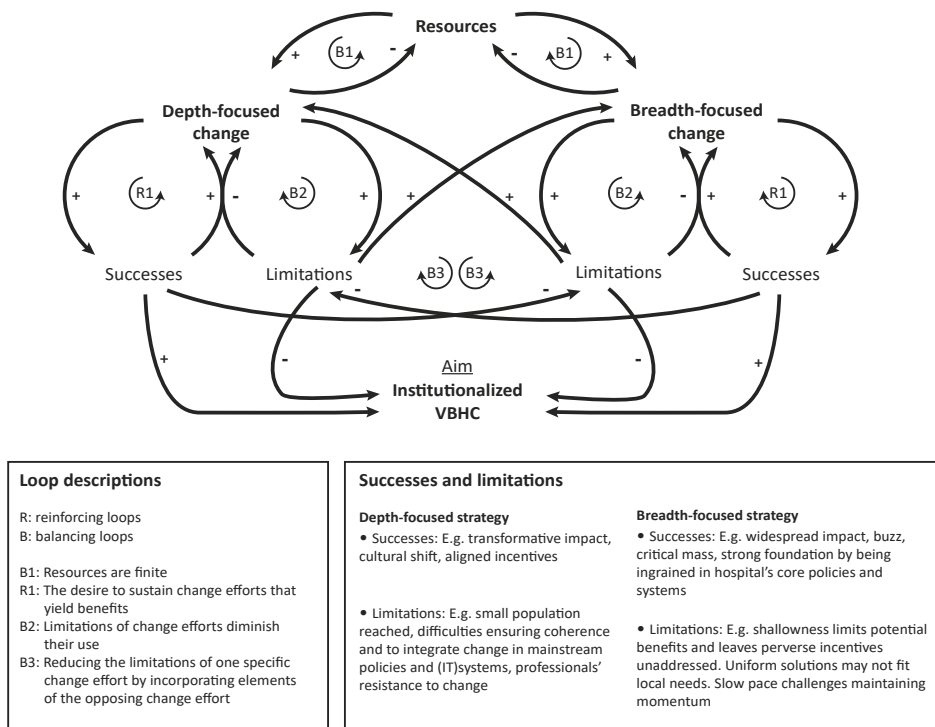


Figure 5. A causal loop diagram illustrating key dynamics in ‘depth-focused’ and ‘breadth-focused’ change.

The loops titled ‘B1’ highlight the competing demands for resources. Our findings reveal a strategic choice between allocating resources to facilitate transformative change for a few

individuals or fostering incremental progress across the entire hospital. The remainder of the causal loop diagram demonstrates that both depth-focused and breadth-focused strategies contribute positively to VBHC institutionalization. However, each approach also brings its own limitations, which necessitate resolution through the opposing strategy.

For example, deep change efforts may face challenges such as lack of coherence, inadequate integration in organization-wide processes, insufficient support by peers, and slow scalability. These issues can be addressed through broader actions. Conversely, broad change initiatives may be criticized for their superficiality, uniformity, and slower development in depth, potentially resulting in VBHC becoming an 'empty shell.' To counter these limitations, it is crucial to complement broad initiatives with localized, in-depth efforts (loops B3).

These findings underscore the tension between deep and broad change, demonstrating that deep change cannot be uniformly imposed on a large scale [58,95,96]. Instead, large-scale deep change appears to emerge as the cumulative outcome of at the organizational level facilitated and coordinated local, deep change trajectories. Therefore, VBHC is not easily scalable, and its implementation poses a challenge of balancing both types of efforts.

Implementation outcomes

This study provides additional evidence of partial VBHC implementation, focusing more on patient outcomes than costs [3,4,10,14–16]. Moreover, it reveals significant diversity in the hospital's adoption status, with some departments embracing VBHC more deeply than others. Over the decade, progress was hampered by capacity constraints of the CST, resulting in waiting lists to start VBHC.

In 2023, PROMs implementation reached 68 (sub)departments and, as a conservative estimate, 17 % of all outpatients. Each month, more than 10,000 electronic PROMs are sent, and clinicians are supported by a consultation room dashboard for discussing PROM outcomes with patients. Clinicians expressed moderate satisfaction with both the process and outcomes of implementing PROMs. The developed (IT)foundation is poised to spearhead subsequent efforts in value-based quality improvement. Additionally, stemming from the depth-first strategy, a few teams pioneered networked care, benchmarking initiatives, and bundled payments. However, the hospital's efforts have mostly lacked an extramural focus, and care has remained organized around disciplines and reimbursed based on volume so far.

Achieving satisfactory patient response to PROMs and clinicians' acknowledgment of this data proved challenging. This is concerning because their behaviors ultimately determine the success of VBHC, even if PROMs are recognized as tools. Limitations may be due to suboptimal facilitation and difficulties in (re)professionalization. Our findings suggest that clinicians may not perceive a strong enough sense of urgency for change to prompt

immediate action or disrupt habitual ways of working, while such urgency is considered critical in various change theories [97,98]. They may also be hindered by current conditions and institutional complexity (see below). Another factor could be healthcare professionals' existing belief that they already deliver value-based care and not necessarily see the benefit of using PROMs for this purpose. Nonetheless, the heightened focus on VBHC may have initiated gradual behavioral shifts among healthcare professionals, such as a greater emphasis on patient priorities and resource allocation. However, further studies are needed to validate this assumption of micro-level institutionalization processes [98].

Institutional complexity

From our findings, we note challenges of institutional complexity, where individuals confront institutional logics that prescribe different norms and behaviors [99]. This complexity appears to hinder the institutionalization of VBHC. For instance, professionals are expected to work value-based while still being paid based on volume. Additionally, VBHC inherently seems to hold levels of institutional complexity, asking professionals to simultaneously consider patient outcomes and costs. When resources are limited, this could create value conflicts, such as deciding whether to prioritize those in highest need, equity, or achieving the greatest value for society [100].

VBHC not only imposes changes on professionals' work but also relies on them to drive the transformation [101]. However, healthcare professionals' contemporary competences and attitudes, i.e. their professionalization, may not align with the demands of driving and thriving in VBHC [13,102]. In our study, we observed a limitation: characteristics of complex change, such as unpredictability, uncertainty about outcomes, and the need for experiential learning, were not fully integrated into plans, stakeholder communications and training. This oversight may have contributed to unwarranted expectations and limited stakeholder engagement [95].

Recommendations for practice

One should not waste time trying to define the ultimate strategy to implement VBHC, as this is illusory. As others have noted, there seems no 'good' or 'bad' strategy for VBHC [103,104]. It seems important to avoid overly linear approaches and limit dichotomous thinking. Instead, adapt based on continuous learning and co-evolving conditions [59,105,106]. We recommend integrating knowledge from diverse theoretical schools on change, striving for the higher-level aims of (re)institutionalization and (re)professionalization [12]. Achieving and institutionalizing VBHC requires investments in both systems and people, supported by transformational leadership [107] and sponsorship at all levels. One may benefit from integrating VBHC into all operations rather than treating it as a separate initiative, and capitalizing on the expertise, energy, and creativity of the workforce. These investments should be sustained, recognizing that cultural shifts and new practices typically require significant time to take root [108].

Change agents could familiarize themselves with the different pathways to institutional change [98], mechanisms to propel change [57], and the concept of complexity [34,35,93].

A critical question revolves around VBHC's impact on the medical and nursing profession: how does VBHC and its implementation align with or challenge contemporary values, role identities, and capabilities of healthcare professionals? The answer seems contingent on how VBHC is operationalized. What is expected of healthcare professionals in VBHC? Are they tasked to achieve what matters to individual patients, engage in SDM, provide inclusive care, oversee and collaborate in patients' full care cycle, enhance prevention, evaluate interventions not only in relation to outcomes but also in terms of their costs, and so on? How are these role identities and capabilities structurally integrated into medical and nursing education and demonstrated by role models in practice? Similarly, we have limited knowledge on how to cultivate and sustain a workforce capable of driving and thriving in care transformations and evolving professions, such as VBHC.

A deeper understanding about what VBHC, and associated concepts like high-value, cost-conscious care (HVCCC), imply for practice [74,109], along with studies on their alignment with and implications for education [110–112] are needed. Helpful resources include a tool to evaluate HVCCC attitudes [113] and support for developing change capability [114], medical leadership [115] and nurse leadership [116]. Above all, aligned with complexity thinking [34–36,51], every actor has a role to play in (the journey to) VBHC, and no one can truly oversee and manage the entire process.

Strengths and limitations

Limitations include that this study is focused on a Dutch university hospital, which context may differ from other healthcare organizations. The local conceptualization of VBHC, which is impartial and emphasizes two extensions to the original value agenda, may differ from how other organizations operationalize and approach VBHC. Nevertheless, we believe that several insights provided by this study transcend specific value-agenda elements and may hold true for complex change in general. Our focus on organizational-level change represents just one element in the broader chain of actors. Avenues for future research include embracing individual and team levels, leadership, the broader healthcare context, education, and the interplay among these factors. Methodologically, linear models do not fit well when studying complex change, and it should be acknowledged that conclusions on effective strategies are often impossible since outcomes are frequently not attributable to a single cause and outcomes like culture change take time to manifest [108].

Regarding data, document and implementation outcomes data rely on analyses conducted by the CST, potentially introducing bias. Interviewees' accounts may be influenced by recall bias. The low survey response rate (29%) is a limitation, although the high variation in respondents'

satisfaction suggests the inclusion of clinicians with both positive and negative opinions. The timing of the survey followed a period of IT challenges in using PROMs, potentially affecting results. Finally, the implementation outcome indicators on patient responses to PROMs and professionals' use of the PROMs dashboard serve as proxies rather than capturing the actual value derived from improvements in the quality of conversations. We regret that limitations in the hospital's data analytics have constrained us from integrating data such as patients' experiences with the care they received. Addressing these constraints in data access and connectivity is crucial, as it is essential for facilitating research on the impact of VBHC.

Notwithstanding these limitations, this study contributes to bridging the gap in the literature on how to achieve VBHC in hospital-setting [3]. Through our long-term, organization-level, complexity-informed study design, our work offers a distinctive contribution to the existing literature, surpassing the scope of local pilot studies and studies oversimplifying change by lacking attention to non-linear dynamics.

5 CONCLUSION

Insights from a decade of VBHC implementation in a Dutch university hospital suggest that VBHC does not lend itself to linear planning and is not easily scalable. There appears to be no golden standard for change. Rather, achieving the transformation intended by VBHC requires moving beyond siloed theoretical schools on change. It necessitates an adaptive and delicate approach that combines 'depth' and 'breadth' focused efforts, underpinned by transformational leadership and sponsorship at all levels. Local, deep changes facilitated and guided at both organizational and system levels culminate in large-scale transformation. Embracing complexity and focusing on the ultimate aims of (re)institutionalization and (re)professionalization are crucial. At the core of this endeavor lies the imperative to sustain this transformative journey collectively, driven by capability, opportunity, and motivation.

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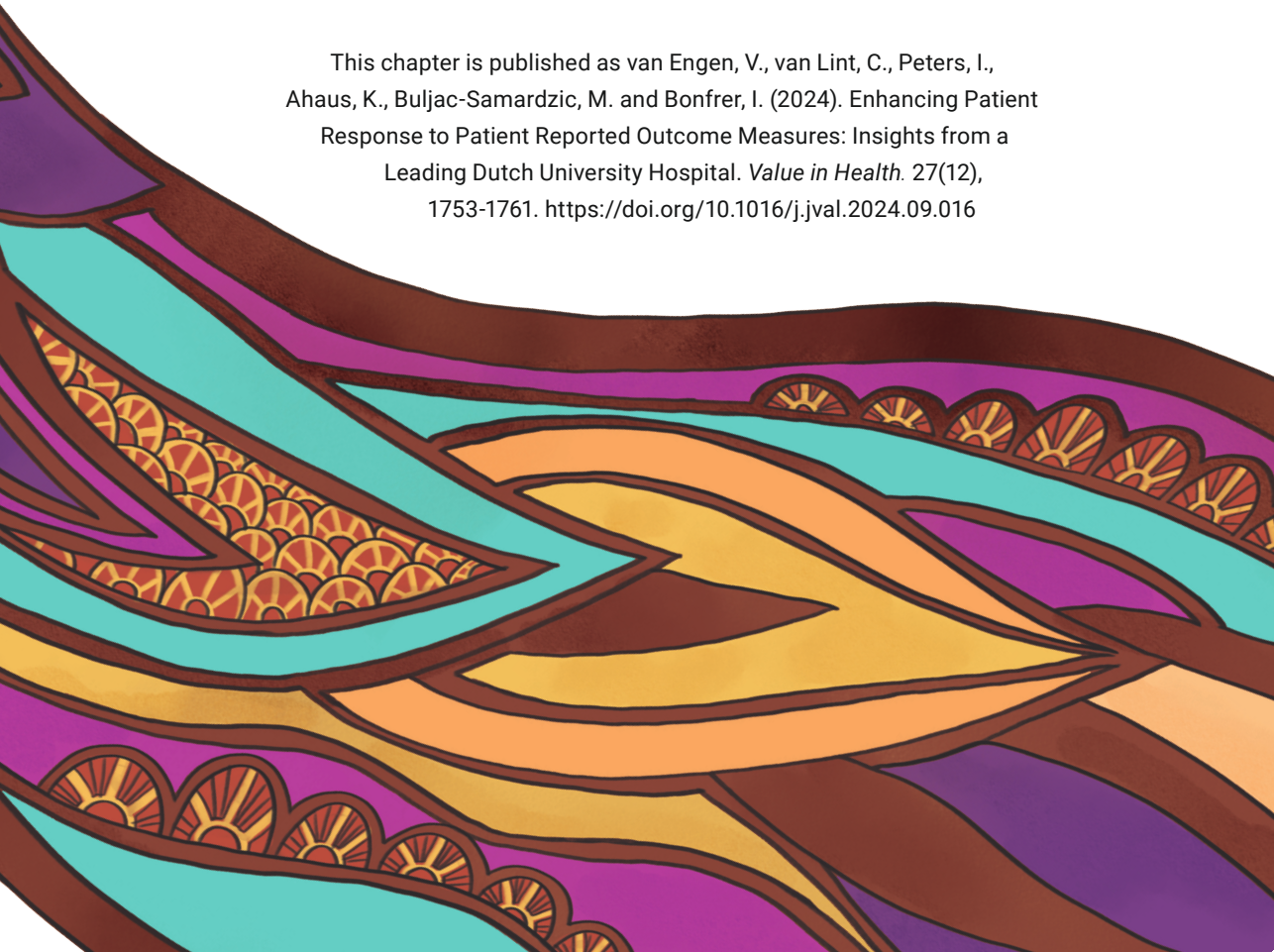
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CHAPTER 3

Enhancing patient response to patient reported outcome measures: insights from a leading Dutch university hospital

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ABSTRACT

Objectives: Engaging patients with Patient Reported Outcome Measures (PROMs) is a widely recognized and pressing challenge, yet our understanding of how to achieve this is limited. This study investigated strategies implemented by a Dutch university hospital aimed at enhancing response rates among outpatients from nearly 70 subdepartments. Response rates improved, but remained below desired levels. To deepen understanding and inform future strategies, we identified patient and consultation characteristics associated with response behavior.

Methods: We investigated strategies and their underlying rationales through document analysis of internal hospital documentation (2020-2023) using the COM-B model. We exploited electronic health record data to identify patient and consultation characteristics associated with PROMs completion, estimating a multivariate logistic regression model ($n= 46,468$ outpatient consultations).

Results: Thirteen strategies targeted outpatients' capability, opportunity, and motivation to complete PROMs. In 2023, PROMs were completed in over half (56%) of the 46,468 unique consultations for which a PROM was sent. Challenges persisted in establishing effective feedback mechanisms and accommodating non-Dutch speaking patients. The multivariate analysis showed significantly higher response among patients of high or middle socioeconomic status and those with an in-person consultation, i.e. not using telehealth. Women, patients attending a follow-up visit, or those having their consultation on a Friday were slightly less likely to complete PROMs.

Conclusions: Response rates to PROMs improved but remained below desired levels, despite multiple strategies. Hospitals may benefit from effective patient feedback on PROMs and tailoring strategies to engage specific patient groups. These approaches can enhance successful implementation and promote equity in VBHC.

1 INTRODUCTION

Value-Based Health Care (VBHC) gained interest in healthcare systems worldwide, driven by the imperative to optimize value in patient care [1,2]. Patient value is high when the outcomes that matter most to a patient are achieved effectively and efficiently relative to the costs involved [1,2]. Additionally, societal value and equity are increasingly emphasized in VBHC [3]. Patient Reported Outcome Measures (PROMs) gained significant interest for measuring outcomes from the perspective of patients [4–7], as a crucial component for VBHC [8]. PROMs are tools enabling patients to assess their functional status and well-being, often through an online survey [9]. At the individual patient level, PROMs may contribute to patient understanding and their involvement in self-care, symptom monitoring and tailored care delivery [10]. Aggregated PROMs data can be used to evaluate and improve care [11]. However, patient response rates to PROMs have been suboptimal across various settings, thereby limiting the full potential utility of PROMs in enhancing value in patient care [11–17]. These low response rates hinder clinicians' decision-making, introduce bias in analyzing aggregated PROMs data, and pose a risk of diminishing stakeholder buy-in for sustaining PROMs. Therefore, efforts are urgently needed to improve response rates [12,16].

While various factors have been identified that influence PROMs completion [15,18,19], such as the method of PROM delivery [17] limited attention has been given to studying strategies aimed at enhancing response rates, despite recognition of this as a critical next step [20,21]. Thus far, studies reporting on PROMs implementation in VBHC were predominantly health condition-specific, lacking hospital-wide insights [15,22]. Recently, however, centers reported on their PROMs implementation strategy [23,24]. Moreover, many studies considered in-clinic patients or specific timepoints, such as admission or discharge, with a minority of studies focusing on the use of electronic PROMs for routine outpatient care [15,22]. Research into patient response to PROMs for purposes such as registries has identified associations with various explanatory variables, including socioeconomic status (SES) [25], language and disease severity [25–27], and having a follow-up consultation [27]. The variables sex and age yielded inconsistent results across studies [25–27], underscoring the need for hospitals to conduct local investigations.

Motivated by the widely acknowledged and urgent challenges in achieving high PROMs response rates, along with the limited insight into how to accomplish this, this study aimed to investigate the efforts of a leading Dutch university hospital to enhance PROMs completion among outpatients of nearly 70 specialty subdepartments. While response rates showed a notable increase between 2021 and the end of 2023, they remained below desired levels. By the latter year, PROMs were completed in over half (56%) of the 46,468 unique consultations for which a PROM was sent. In this study, we investigated the strategies implemented by the hospital aimed at enhancing response rates. Furthermore, we analyzed patient and

consultation characteristics associated with PROMs response to inform potential future strategies aimed at further enhancing response rates.

2 THE SETTING

This study was conducted at one of the largest Dutch university hospitals, seeing nearly 200,000 unique patients annually. Almost a decade ago, the first specialty subdepartments began inquiring PROMs among their outpatients using electronic surveys [28–31], with the objective of advancing VBHC by discussing outcomes during patients’ consultations [32–34]. Subsequently, additional subdepartments continued to join in a step-wise approach, facilitated by a central support team, leading to a steady increase in the number of outpatients receiving PROMs. In 2023, PROMs were sent to outpatients from 68 subdepartments, covering around 17% of the entire outpatient population.

Process of using PROMs

Patients received the request to complete one or multiple electronic PROMs one week before their specialty outpatient consultations via email (see Figure 1, left). The hospital used different PROM tools across three tiers: generic, domain- and disease-specific (see Figure 1, right). Patients were able to complete each survey separately (i.e. ranging from 1 to 3 surveys) by logging into a secure patient portal.

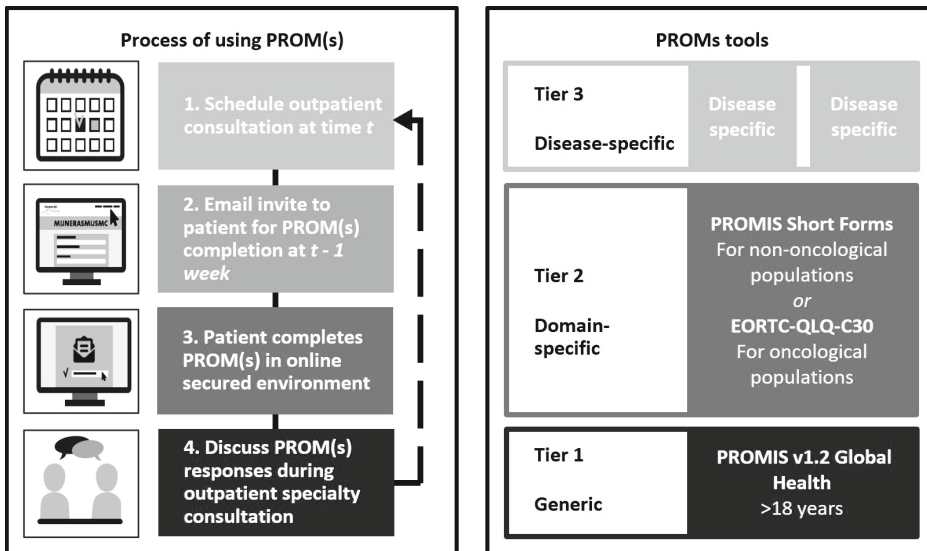


Figure 1. Process of using PROMs (left) and the three tiers of PROMs (right). For the generic tier, the hospital uses PROMIS-10 [35]. Within the domain-specific tier, PROMIS Short-Forms (SF) [36] are used among the non-oncological population and the EORTC QLQ-C30 CAT [37] is used for the oncological population. Subdepartment can select additional disease-specific surveys.

3 METHODS

Two distinct yet complementary methods were used to comprehensively understand the challenges associated with enhancing patient response to PROMs and how these could be addressed. First, we qualitatively analyzed internal documentation on PROMs implementation from 2020 to 2023. This aimed to investigate strategies that the hospital implemented and their underlying rationales, providing insight into why specific strategies were or were not used. Second, given persistent limitations in patients' response rates, we estimated a multivariate logistic regression analysis using patients' PROMs completion data and Electronic Health Record (EHR) data. This analysis aimed to identify patient and consult characteristics associated with PROMs completion. While the first step aimed to provide actionable insights into possible strategies, the second angle was anticipated to yield insights that may guide future strategies, enabling the development of a more effective set of strategies to support patients.

3.1 Internal documentation

Data collection and inclusion

Author VvE obtained access to the digital workspace from the central support team, containing 8,984 files. This team facilitated and oversaw the implementation of PROMs. To identify documents on hospital-level strategies, their underlying rationales, and unaddressed barriers, the following keywords were used to systematically discern potentially relevant files: 'response,' 'compliance,' 'evaluation,' 'barrier,' 'facilitator,' 'challenge,' 'plan,' 'intervention,' and 'strategy.' Files were screened and included if either contributing new strategies that the hospital implemented to enhance response rates or factors associated with outpatients' response behavior to PROMs. These data were extracted. If files referred to other files, these were also screened in the analysis. This resulted in data extraction from ten documents. The list of extracted strategies was reviewed with a member of the central support team to distinguish between strategies successfully implemented and sustained and those that were not, accompanied by an inquiry into the underlying reasons.

Data analysis

We first mapped the extracted strategies onto the COM-B model as part of the Behavior Change Wheel [38]. COM-B identifies 'capability,' 'opportunity,' and 'motivation' as essential conditions for achieving the desired behavior. Strategies were categorized according to the specific construct they appeared to target. Barriers to PROMs response that remained unaddressed were labeled as 'unsolved barriers.' Subsequently, we matched the hospital's strategies to the nine intervention functions as stated in the Behaviour Change Wheel (education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modelling, enablement) [38].

3.2 PROMs completion and EHR data

Data collection and preparation

PROMS response data to generic and domain-specific PROMs (n = 53,992 consultations) were retrieved from 01/12/2022 to 30/11/2023, along with de-identified patient information from the EHR. Data were merged based on patient identification (ID) and consultation number. Subsequently, we used the latest available postal code area SES data from Statistics Netherlands (dataset 2021, including students)[39] and merged this data using the first four digits of a patient’s home address. We split patients’ SES scores into tertiles reflecting *high*, *middle*, and *low* SES.

We excluded consultations involving pediatrics and those for which SES data could not be obtained due to patients living abroad (see Figure 2) [39]. This led us to include 28,588 unique patients, with 46,468 outpatient consultations and 76,647 sent PROMs. The higher number of outpatient consultations and sent PROMs compared to the unique patient count was due to some patients having multiple outpatient visits throughout the study period, each associated with one or several PROMs. Differentiating by PROM instrument, the generic PROMIS v1.2 Global Health was sent for 43,452 outpatient consultations, the domain-specific non-oncological PROMIS Short-Forms (SF) for 13,715 consultations, and the oncology-specific EORTC QLQ-C30 CAT for 19,480 consultations (see Results, Table 1).

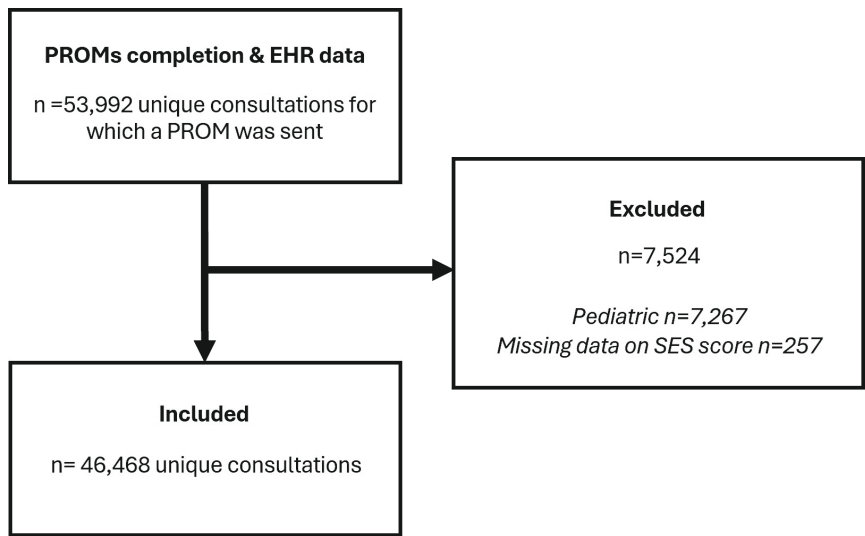


Figure 2. Sample selection

Multivariate logistic regression

We estimated a multivariate logistic regression of the binary outcome y_{cp} , 'PROM completed', where 1 indicated completion of at least one of the received PROMs for a specific consultation and 0 indicated non-completion. The same regression equation was separately estimated for four additional outcomes of interest y_{cp} : 'all PROMs completed' which was coded as 1 if all PROMs for a specific consultation were completed and 0 otherwise, as well as the separate surveys 'PROMIS v1.2 Global Health completed', 'PROMIS SF completed', and 'EORTC completed.' The content of the PROMIS SF is described in Figure 1.

$$y_{cp} = P_p + C_c + \varepsilon_{cp}$$

We included three patient-specific (P_p) variables: *female*, *age*, and *SES high/SES middle/SES low*, and five consultation-specific (C_c) variables: *consultation took place*, *teleconsultation*, *follow-up*, *Monday/midweek/Friday*, and *morning/afternoon*. ε_{cp} represented the error term.

We included the variables *female*, *age*, *SES (high/middle/low)* and *follow-up* based on previous research [25–27,40]. These studies revealed varying relationships between gender and PROMs response rates: showing higher non-response rates among men [25], women [26], while others found no significant relation [27]. Non-response was associated with both younger patients under 55[25] and older patients [26,27]. Higher SES was associated with higher PROMs response rates [40]. Additionally, new patients were more likely to respond compared to follow-up patients [27]. The type of PROM tool did not significantly influence response rates [27].

The inclusion of *Monday/midweek/Friday* and *morning/afternoon* was inspired by a study suggesting that the dimension time might affect PROMs response rates, although this study focused on the timing of sending PROMs [41]. Our qualitative findings identified *teleconsultation* as a potentially relevant variable. Patients often perceived this type of consultation as less conducive to discussing PROMs, which they verbally linked to non-response behavior (see Results.) We also considered whether the *consultation took place*, anticipating that patients might be less likely to complete PROMs if their outpatient visit did not occur as scheduled.

Consultation took place was coded as 0 when the consultation was canceled or rescheduled by either patient or provider. *Teleconsultation* was coded as 1 if the consultation description in the EHR included 'telephone', 'video' or 'e-mail', as opposed to no such distinction. *Follow-up* was coded as 1 if the healthcare professional identified the consultation as pertaining to a 'control patient' in the EHR, as opposed to 'new patient.' The two remaining consultation specific variables reflected whether the consultation was planned for a *Monday*, the three days in the middle of the week (*midweek*) or the *Friday*, and in the *morning* or the *afternoon*.

4 RESULTS

4.1 Implemented strategies and their rationales

The hospital implemented thirteen core strategies to address non-response, informed by several patient evaluations. Table 1 summarizes these strategies, organized according to their focus on enhancing patients' capability, opportunity, or motivation [38]. The strategies related to six out of nine intervention functions: education, training, enablement, environmental restructuring, incentivization and persuasion [38]. The intervention functions not identified were coercion, restriction, and modelling. Three unresolved barriers remained concerning patients' opportunity and motivation.

Table 1. Thirteen strategies aimed at enhancing PROMs response through enhancing patients' capability, opportunity, and motivation, and three unsolved barriers.

Category	Enhancing capability	Enhancing opportunity	Enhancing motivation
Implemented strategies (intervention function)	1.1. Invitation to complete the PROM(s) (education)	2.1 Alternative log-in code (enablement)	3.1 Education on purpose and benefits (education; persuasion; incentivization)
	1.2. Animated video instructions (education)	2.2 Phone application (environmental restructuring)	3.2 Disease-specific PROMs (other: adapt the innovation)
	1.3 Assisted completion – training function (training)	2.3 Assisted completion – enablement function (enablement)	3.3. Feedback on PROM responses (education; persuasion)
	1.4 Reminders (enablement)	2.4 English translations (enablement)	3.4. Asking non-responders to respond (education; persuasion)
			3.5 Minimal survey burden (other: adapt the innovation)
Unsolved barriers		Non-Dutch speaking patients	Perceived inappropriateness for one's consultation
			Prior negative experiences

4.1.1 Enhancing capability

The hospital implemented four strategies aimed at ensuring patients possessed the necessary knowledge, skills, and attention to complete PROMs. Strategy 1.1 supported patients in understanding that they needed to complete PROMs. Strategies 1.2 and 1.3 aimed to support patients in acquiring the knowledge and skills required to access and complete PROMs, addressing barriers such as limited procedural knowledge and digital proficiency. Strategies 1.4 focused on enhancing patients' memory and attention, addressing the barrier of patients forgetting to complete PROMs. Additionally, some patients mistakenly assumed they had already completed the PROM, *"likely due to confusion with other hospital surveys like the COVID-19 symptom checklist"* (internal document dated 16/9/21).

Strategy 1.1: invitation to complete the PROM(s). Patients received appointment letters mentioning that they will receive an invitation to complete the PROM(s) one week prior to their consultation, see also strategy 3.1. In 2022, messages were *“expanded to include specific appointment dates and clinic locations to clarify for which appointment the PROM was required”* (internal document dated 14/7/22).

Strategy 1.2: animated video instructions. An animated video was created to guide patients through the PROM completion procedure, up to the point where they discuss their responses with the clinician. However, the 2021 evaluation revealed that most PROM responders did not watch the video, as they did not open the attached flyer containing the video link in the email. They found the email instructions clear enough. Among the patients who did watch the video, almost all found it helpful.

Strategy 1.3: assisted completion - training function. In-hospital PROM completion assistance was initially provided using volunteers with tablets in local waiting rooms, fostering patients' skills for subsequent independent completion. As PROMs became more widespread, a central service center was established, dedicated to assisting patients with PROM completion. However, due to limited use, this service was integrated into the more generic 'Patient Service Center.' This center also handled requests via email or phone, monitoring and intervening on frequently posed questions.

The use of in-hospital completion service was monitored, showing that between July 1st, 2020, and October 10th, 2023, around 6% of initial non-responders effectively used this service to complete their PROM. Over the years, this percentage decreased while overall response rates increased, signifying a trend towards more patients completing PROMs independently without the use of this service. The reduced use of the phone/email helpdesk also suggested a declining need for assistance. The shift to more PROMs completions outside the hospital seemed beneficial as in-hospital completion presented two key limitations. First, some patients experienced discomfort completing their PROMs in the hospital due to time pressure from their upcoming consultation and general stress. Second, in-hospital completion posed challenges in providing clinicians timely access to patients' PROM outcomes for use in their consultation preparations.

Strategy 1.4: reminders. Automated email reminders were sent to non-responders three days before their appointment, including weekends. The hospital considered using digital posters in waiting rooms as additional prompts but decided against it since waiting rooms accommodated patients from various disciplines, some of which did not yet use PROMs.

Additionally, medical students piloted phone call reminders to non-responders one day before their consultation, following the success of local secretaries in this role, as some

patients overlooked email reminders. While this increased response rates, this practice was discontinued primarily due to high costs. Moreover, some patients expressed discomfort with receiving unsolicited phone calls, feeling that the hospital was exerting pressure on them to complete the PROMs.

4.1.2 Enhancing opportunity

Four strategies aimed to ensure that patients experienced no external barriers to PROMs completion. Yet, one barrier remained insufficiently unaddressed. Strategies 2.1 and 2.2 aimed to enhance access to PROMs, amongst others addressing the issue of patients unable to log in to the secured web-based patient portal where the PROM could be accessed due to missing or forgotten national Digital Identification (DigiD). Strategy 2.3 involved the assisted completion service (strategy 1.3), shifting its focus from training to enablement. Strategy 2.4 aimed to provide patients who speak English but not Dutch the opportunity to complete PROMs.

Strategy 2.1: alternative log-in code. Non-responders checking in at the hospital kiosk at the day of their consultation received a temporary code to access their PROM, eliminating the need for their DigiD. They could complete their PROM using this code at the Patient Service Center (see strategy 1.3).

Strategy 2.2: phone application. Efforts were made to integrate PROM surveys into an upcoming phone application, aiming to improve ease and accessibility: *"Filling out the questionnaire on a phone is more accessible than using a PC or tablet. Therefore, the development of this app is expected to have a positive effect on compliance"* (internal document dated 14/7/22).

Strategy 2.3: assisted completion - enablement function. The in-hospital assistance (see strategy 1.3) enabled PROM completion among patients without computer or phone access, as well as those with visual or manual impairments. While support from patients' relatives could potentially aid in their PROM completion, concerns were raised regarding the impact of the relative's presence on the accuracy of their answers.

Strategy 2.4: English translations. Volunteers in several waiting rooms assisted patients who spoke English but not Dutch by providing printed copies of the official English version of the PROMIS v1.2 Global Health survey, alongside the official Dutch online version. Volunteers were trained to assist English-speaking patients in completing the Dutch PROM by using this side-by-side comparison.

Unsolved barrier: non-Dutch speaking patients. Limited options were available for non-Dutch speaking patients since PROMs were only available in Dutch due to limitations in the EHR: *"It is desirable to have the PROMs surveys and related information available in different*

languages. Unfortunately, [name EHR provider] does not yet support this capability. We remain vigilant in exploring opportunities as they arise" (internal document dated 14/7/22). Strategy 2.4 provided partial but not comprehensive support for non-Dutch speaking patients, and its usage declined further with the move to the more generic 'Patient Service Center,' where this service was not available (see strategy 1.3).

4.1.3 Enhancing motivation

Five strategies were implemented to encourage patients to complete their PROMs. Strategy 3.1 aimed to clarify the purposes and benefits of PROMs. Initially communication to patients was unclear and generic, with messages like "you have a task to be completed" (internal document dated 21/5/22). Strategies 3.2 and 3.3 aimed to tackle the barrier of patients perceiving limited benefit from completing PROMs or experiencing mismatches with their expectations. For example, patients expected their responses to be discussed during consultations, yet all the hospital's patient and research evaluations showed limitations in this area. Strategy 3.4 focused on motivating non-responders. Strategy 3.5 focused on issues stemming from survey length and overall survey fatigue: "The burden is too high; too many questionnaires and other forms need to be filled out" (internal document dated 14/7/22).

Strategy 3.1: education on purpose and benefits of PROMs. Patient communication about PROMs emphasized that the survey helps them prepare for their consultation and express their priorities. The message intentionally did not promise that their responses will be acknowledged and discussed by their clinician to prevent disappointment from unmet expectations. Patients were directed to a webpage available in Dutch and English for more information.[42,43] The Dutch webpage also included a movie featuring clinicians explaining the relevance of VBHC and the use of PROMs, along with a patient testimonial.

Strategy 3.2: integration of disease-specific PROMs. To enhance patients' perceived relevance of PROMs and address concerns that "some patients felt that the survey content did not align with their specific illness or condition; the questions were perceived as too general" (internal document dated 28/8/21), subdepartments were enabled to include disease-specific PROMs, next to generic and domain-specific PROMs.

Strategy 3.3: feedback on PROM responses. Clinicians were supported and encouraged to inform patients that they had reviewed their responses, and to discuss these responses generally, as well as to explore specific items in-depth if needed. Based on the June 2023 evaluation, patients appeared to be three times more likely to complete a subsequent PROM if their clinician had accessed their responses to the previous one. Additionally, a patient dashboard was planned to enable patients to review and interpret their outcomes independently (internal document 11-07-23), reducing the sole reliance on healthcare professionals for feedback.

Strategy 3.4: asking non-responders to respond. Clinicians were also encouraged to ask non-responders to complete subsequent surveys and to explicate the relevance of PROM questions to their patients. Amongst others, this aimed to address the barrier where patients perceived completing PROM as *“irrelevant when their condition is stable”* (document dated 14/7/22).

Strategy 3.5: minimal survey burden. To minimize patient burden, subdepartments were limited to inquiring three disease-specific surveys with no overlapping items. Most PROMs were limited to being distributed only once every three months and only if the patient had an appointment scheduled. Computer Adaptive Testing (CAT) was used to shorten certain surveys, dependent on technical possibility: *“Within this system [CAT], the next question is determined based on the response to the previous one. This ensures patients are not asked irrelevant questions”* (internal document dated 3/2/22). Data warehousing allowed all involved professionals to access a patient’s outcomes while safeguarding that certain sensitive information from disease-specific PROMs was not universally accessible. This strategy reduced repetitive inquiries for patients seeing multiple healthcare professionals due to multimorbidity.

Unsolved barriers: perceived inappropriateness for one’s consultation and prior negative experiences. No strategy comprehensively targeted non-response due to patients perceiving their consultation as inappropriate for discussing PROMs: *“a telephone consultation was perceived as inappropriate, as well as discussions focused on more critical matters, or those involving treatments”* (internal document dated 14/7/22). A second unresolved barrier is the limitation in PROMs completion due to prior negative experiences. To exemplify, IT issues temporarily prevented completion and disappointment manifested when patients’ responses were not discussed by their clinician (internal document 11-07-23). Furthermore, some patients experienced negative emotions associated with completing PROMs, such as heightened stress from being confronted with their health status or stemming from difficulties during completion. Clinicians noted that these emotions negatively impacted the sentiment during consultations, next to potentially limiting patients’ future engagement with PROMs. In response, although not aimed at enhancing response rates, clinicians were given the ability to selectively exclude patients who disliked PROMs from automated inquiries. Despite introducing limitations on the use of aggregated PROMs data, the hospital’s primary focus remained on ensuring that PROMs served the best interests of patients.

4.2 Response rates

Based on PROMs response rates that the hospital monitored and reported in their evaluations, we found that rates improved over the years, with a 17% increase in response rates between 2021 and the end of 2023. Based on the one-year PROMS response data and EHR data, from late 2022 to late 2023, we observed that adult outpatients completed one or several PROM(s) prior to their consultation for over half (56%) of the 46,468 unique consultations for which a PROM was sent, as shown in Table 2. In 46% of the consultations all the sent

PROMs were completed. In the next section, we report the results for the outcome variable *PROM completed*. Appendix 1 presents the results for the remaining outcome variables, i.e. *all PROMs completed*, *PROMIS v1.2 Global Health completed*, *PROMIS SF completed*, and *EORTC completed*.

Table 2. Summary Statistics outcomes

Outcome variables	N	Mean (%)
PROM completed	46,468	55.8
All PROMs completed	46,468	45.5
PROMIS v1.2 Global Health completed (generic)	43,452	55.4
PROMIS SF completed (domain-specific, non-oncological patients)	13,715	49.8
EORTC QLQ-C30 CAT completed (domain-specific, oncological patients)	19,480	45.1

4.3 Patient and consult characteristics associated with PROMs completion

Slightly more than half of outpatients receiving PROMS were female (53%) with an average age of 57 years (min 18, max 97), as shown in Table 3. In 95% of cases, the planned consultation occurred without cancellation by patient or healthcare professional. Approximately 23% of consultations for which PROMs were sent out took place via teleconsultation, i.e. via phone or internet. About 26% of consultations were identified in the EHR to pertain a new outpatient, while 74% were follow-ups.

Table 3. Summary Statistics explanatory variables of PROMs recipients

Category	Variable	Mean (%)
Patient characteristics (P_p)	Female	52.6
	Age	56.9
	SES high	33.5
	SES middle	33.4
	SES low	33.1
Consultation characteristics (C_c)	Consultation took place	94.9
	Teleconsultation	22.9
	Follow-up	74.0
	Monday	18.6
	Midweek	64.0
	Friday	17.4
	Morning	55.4
	Afternoon	44.6

We observed statistically significant higher response rates for consultations involving outpatients of high or middle SES, see Table 4. Higher response rates were also more likely for consultations that actually took place, potentially because patients may anticipate cancellations. For consultations that did not take place in person, i.e. ‘teleconsultation’, keeping all else equal, PROM completion was less likely (odds ratio 0.616). Furthermore, women and patients attending a follow-up visit or having their consultation on a Friday were slightly less likely to complete PROMs. We did not find a statistically significant relation between PROMs response and the consultation taking place in the morning or afternoon. Additionally, Table 2 displays that non-oncological outpatients showed slightly higher response rates to their specific survey compared to oncological outpatients. Sensitivity checks were performed by assessing the consistency of results using various operationalizations of the variables *age*, *Monday/midweek/Friday* and *morning/afternoon*. These checks qualitatively suggested similar results in terms of odds ratios and p-values.

Table 4. Multivariate logistic regression of PROM completed on person and consultation characteristics

Category	Variable	Odds ratio	p-value
Person characteristics (P_c)	Female	0.881	0.000
	Age	1.000	0.668
	SES high	1.976	0.000
	SES middle	1.675	0.000
Consultation characteristics (C_c)	Consultation took place	5.799	0.000
	Teleconsultation	0.616	0.000
	Follow-up	0.817	0.000
	Monday	1.168	0.000
	Midweek	1.092	0.001
	Morning	0.977	0.258
	Constant	0.202	0.000

Note: $n = 46,468$ consultations. Reference values are SES low, Friday, and afternoon.

5 DISCUSSION

Achieving high patient response rates to PROMs is widely recognized as a pressing challenge [11–17]. However, there is limited understanding of how to accomplish this. Therefore, this study explored how a leading Dutch university hospital aimed to enhance outpatients' response to electronic PROMs within the context of VBHC [31]. Through document analysis, we investigated the implemented hospital-level strategies and their underlying rationales. While response rates improved over the years, they remained below desired levels despite implemented strategies. To deepen our understanding of response behavior and inform future strategies, we estimated a multivariate logistic regression model using PROMs completion data and EHR data to identify patient and consultation characteristics associated with non-response.

We identified thirteen strategies targeting patients' capability, opportunity, and motivation to complete PROMs. These strategies included six out of the nine intervention functions: education, training, enablement, environmental restructuring, persuasion and incentivization [38]. An unused yet potentially relevant function is modeling, which involves providing examples of how other patients complete and discuss PROMs. Additionally, restriction and coercion were not used, signaling that the hospital aimed to enhance PROMs use with positive reinforcement rather than punitive measures.

PROMs completion increased over the years, resulting in adult outpatients completing a PROM prior to their specialty consultation in over half (56%) of the 46,468 unique consultations for which a PROM was sent between late 2022 and late 2023. Although causal relationships between the implemented strategies and the observed enhanced response rate could not be established, certain strategies that the hospital implemented are identified as supportive in prior research in other settings, including clear communication on the purpose of PROMs [15], email reminders [12,13,15,16,41,44,45], and the use of Computer Adaptive Testing to reduce survey length and improve perceived relevance [16,44]. The forthcoming use of a phone application to inquire PROMs is also expected to be impactful, given the highest response rates observed in mobile applications [12].

Despite the strategies, the hospital continued to face challenges in achieving high response rates. Persistent challenges in response behavior may have stemmed from limited understanding of response behavior, thereby constraining possible strategies, and suboptimal execution of strategies. For example, certain strategies were limited by constrained budget or were vulnerable because they depended on the actions of others. Additionally, certain hospital-wide strategies, like reminders in waiting rooms, were not yet feasible due to PROMs being available to just one-fifth of the total outpatient population.

A significant issue in the studied hospital was that PROMs were available only in Dutch due to EHR constraints. Our multivariate analysis further reaffirmed lower socioeconomic status (SES)[25] as predictors of non-response. To ensure that PROMs are inclusive and do not exacerbate health inequities [23,46], hospitals may benefit from enhancing user experience and service design [46]. Developments in inclusive chatbots may also be of interest [47,48].

Additionally, our analysis revealed that response was significantly less likely for follow-up consultations [27] compared to new patient consultations, and for teleconsultations compared to consultations conducted in the hospital setting. Moreover, women and those having their consultation on a Friday had slightly lower odds of completing PROMs. These areas warrant targeted strategies. While in some cases statistically significant, the estimated odds ratios for age of the patient and whether the consultation took place in the morning were close to 1, suggesting these do not currently warrant further targeted action to reduce non-response.

Furthermore, our findings highlight the critical need to focus on clinicians' behavior and their role in improving patient response rates. Sending PROMs connected to patients' outpatient visits set patient expectations regarding the use of these data by clinician during consultations [44,49], potentially boosting response rates by establishing personal benefits. However, failure to address patients' responses during consultations led to patient disappointment and reduced likelihood of future completion [50]. Establishing alternative feedback mechanisms beyond sole reliance on clinician feedback could help alleviate this issue.

Notably, clinicians in the studied hospital could manually exempt patients from completing PROMs when the negative consequences, like heightened stress from difficulty in completion, outweighed the benefits from the patient's perspective. While exempting patients from PROMs may be preferable for the individual patient, it poses a challenge in maintaining the representativeness of aggregated data[13,16], forming a consideration for hospitals to address.

Regarding the overall approach to enhancing patient response to PROMs, Implementation Science (IS) [51] can be helpful [20]. IS explores the factors that facilitate or impede the integration of innovations, such as PROMs, into practice and identifies strategies to support this integration [52–54]. Its cyclical process involves identifying areas for improvement [55,56], selecting and applying strategies [38,57–61], and evaluating outcomes [62,63], with useful resources referenced. Contextual parameters help clarify why a strategy may be effective in one setting but not in another, and thus warrant careful consideration [61]. Insights from published IS studies on PROMs can also guide hospitals in the implementation process [20,64,65].

Additionally, there has been an increased emphasis on integrating complexity thinking in IS [66,67]. Complexity thinking underscores that patient response behavior is influenced by multiple factors in non-linear and unpredictable ways, beyond the control of any single entity. Therefore, adopting an adaptive and experiential approach is crucial. In this iterative process, Justin Smith's Longitudinal Implementation Strategy Tracking System could be a useful tool for monitoring strategies and adaptations [68].

In terms of limitations, we were unable to explore the effectiveness of individual strategies due to their combined and dynamic use. Limited data availability hindered the inclusion of explanatory variables considered relevant elsewhere, such as language and disease severity [25–27]. Another limitation is the reliance on conclusions drawn from internal hospital documents rather than basing them on own analyses. Nonetheless, our study among outpatients from nearly 70 subdepartments contributed to addressing the widely experienced critical need to improve patient response rates to PROMs. It offered actionable insights into possible strategies, and identified patient and consultation factors that could be relevant for consideration in future strategies. In doing so, our study surpassed the scope of existing barrier and facilitator studies, as well as local pilot studies in the existing literature. Future studies could explore departmental differences in response rates and include additional explanatory variables to provide a comprehensive understanding of PROM response behavior.

In conclusion, this study emphasized the importance of understanding and addressing the diverse factors that influence patient response behavior to PROMs. Hospitals could benefit from establishing patient feedback mechanisms for PROMs, tailoring strategies to specific patient groups—such as those with low SES and those receiving teleconsultations—and embracing IS. These approaches can enhance effective implementation and promote equity in VBHC.

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CHAPTER 4

Enhancing clinicians' use of electronic patient-reported outcome measures in outpatient care: mixed methods study

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ABSTRACT

Background: Despite the increasing use of patient-reported outcome measures (PROMs) for collecting self-reported data among hospital outpatients, clinicians' use of these data remains suboptimal. Insight into this issue and strategies to enhance the use of PROMs are critical but limited.

Objective: This study aimed to examine clinicians' use of PROMs data for value-based outpatient consultations and identify efforts to enhance their use of PROMs in a Dutch university hospital. First, we aimed to investigate clinicians' use of outpatients' PROMs data in 2023, focusing on adoption, implementation, and maintenance. Second, we aimed to develop insights into the organizational-level strategies implemented to enhance clinicians' use of PROMs data from 2020 to 2023. This included understanding the underlying rationales for these strategies and identifying strategies that appeared missing to address barriers or leverage facilitators. Third, we aimed to explore the key factors driving and constraining clinicians' use of PROMs in 2023.

Methods: We integrated data from 4 sources: 1-year performance data on clinicians' use of PROMs (n=70 subdepartments), internal hospital documents from a central support team (n=56), a survey among clinicians (n=47), and interviews with individuals contributing to the organizational-level implementation of PROMs (n=20). The Reach, Effectiveness, Adoption, Implementation, and Maintenance framework was used to analyze clinicians' adoption, implementation, and maintenance of PROMs. Strategies were analyzed using the Expert Recommendations for Implementing Change taxonomy, and results were structured around the constructs capability, opportunity, and motivation.

Results: On average, around 2023, clinicians accessed PROMs data for nearly 3 out of 20 (14%) patients during their outpatient consultation, despite numerous strategies to improve this practice. We identified issues in adoption, implementation, and maintenance. The hospital's strategies, shaped organically and pragmatically, were related to 27 (37%) out of 73 Expert Recommendations for Implementing Change strategies. These strategies focused on enhancing clinicians' capability, opportunity, and motivation. We found shortcomings in the quality of execution and completeness of strategies in relation to addressing all barriers and leveraging facilitators. We identified variations in the factors influencing the use of PROMs among frequent PROMs users, occasional users, and nonusers. Challenges to effective facilitation were apparent, with certain desired strategies being infeasible or impeded.

Conclusions: Enhancing clinicians' use of PROMs has remained challenging despite various strategies aimed at improving their capability, opportunity, and motivation. The use of PROMs may require more substantial changes than initially expected, necessitating a shift in clinicians' professional attitudes and practices. Hospitals can facilitate rather than manage clinicians' genuine use of PROMs. They must prioritize efforts to engage clinicians with PROMs for value-based outpatient care. Specific attention to their professionalization may be warranted. Tailored strategies, designed to address within-group differences in clinicians' needs and motivation, hold promise for future efforts.

1 INTRODUCTION

1.1 Background

Despite the increasing volume of patient-reported outcome measures (PROMs) data collected in hospitals [1], clinicians' use of these data remains suboptimal [2,3]. PROMs are tools designed to capture patients' own perceptions of their health, functioning, and quality of life [4,5], often through electronic surveys [1,3]. In outpatient care, clinicians can use a patient's PROMs data to screen and monitor important outcomes and involve patients in medical decisions [6]. In this way, PROMs facilitate value-based health care (VBHC) [7,8], aiming to optimally allocate resources to achieve outcomes that matter to patients.

Achieving and maintaining consistent use of PROMs data by clinicians presents difficulties, requiring them to adapt their data use behavior and acquire new skills [3,9,10]. Therefore, to realize the full benefits of PROMs, it is imperative to understand the factors influencing clinicians' use of PROMs and develop strategies that facilitate and motivate their use in outpatient care [8,10,11].

1.2 Previous work

Clinicians' use of PROMs data has been proposed as an important metric to evaluate implementation success of PROMs [12]; however, it has received limited attention thus far. The underuse of PROMs data is concerning because the effectiveness of PROMs relies on clinicians acting upon the received data [13-16]. Moreover, clinicians' explicit use is essential for encouraging continued patient participation in future PROMs [17,18].

While comprehensive overviews of barriers to and facilitators of PROMs implementation exist [12,19-21], these often lack a specific focus on clinicians' perspectives and behaviors [9] and leave gaps in understanding how to respond to the identified factors. While some studies propose hypothetical strategies on the basis of identified barriers [22,23], insights from real-world experiences are limited. A few exceptions provide insights into clinicians' experiences with PROMs [10,24-27], their self-reported use [24,26], and implemented strategies [12,20,28]. Thus, there remains a critical need to learn from both successful and less successful implementation experiences aimed at enhancing clinicians' use of PROMs [10,25,29,30].

1.3 Case

This study draws attention to clinicians' use of PROMs in a Dutch university hospital, Erasmus Medical Center (Erasmus MC), and the organizational-level strategies initiated to enhance this practice. Adopting a stepwise approach, the first specialty departments began collecting electronic PROMs from their outpatients around 2017, aimed at fostering VBHC [31-33]. New subdepartments continued to join this initiative, continuing into 2024. A central support team

(CST) facilitated and coordinated this change, comprising around 6 full-time equivalent and an integrated IT team.

At Erasmus MC, patients complete PROMs before some of their outpatient consultations. To prevent survey overload, a maximum frequency for PROMs completion is set in agreement with subdepartments. This means that during outpatient consultations, clinicians will have a subset of patients for whom new PROMs data are available. Clinicians are expected to review these data and discuss them with the outpatient to inform care decisions and actions. This process is facilitated by a consultation room dashboard that visualizes outcomes over time and compares them to reference values. This dashboard shows summary scores as trend lines and allows clinicians to access patient responses to specific items. Clinicians can access this dashboard, which is fully integrated into the patient's electronic health record (EHR) since 2020, both during preparation for consultations and during the consultations themselves. For the first time, patients will receive feedback on their completed PROMs during their consultation. Individually, they can only access item-level responses without visualizations that aid in interpretation. In future, a separate patient dashboard is planned to offer these additional features.

Figure 1 [34-36] outlines the process of using PROMs, the specific tools used, and it provides a visual representation of the dashboard. In addition to the PROMs items, the patient survey includes an open-ended question designed to capture topics that the patients wish to discuss during their consultation. Additional file 1 provides further information on dashboarding.

By the end of 2023, PROMs were delivered to nearly one-quarter of the outpatient population from 70 subdepartments. However, clinicians' use of PROMs data remained limited. This is despite numerous strategies organically and pragmatically applied by the CST to facilitate and encourage use, including those previously reported as supportive [12,20,28]. This discrepancy highlights the need for further investigation and makes Erasmus MC an intriguing case for investigation.

1.4 Objectives

The objectives of this study are 3-fold. First, we aimed to outline the issues with clinicians' underuse of outpatients' PROMs data in Erasmus MC around 2023, focusing on adoption, implementation, and maintenance. Second, we aimed to develop knowledge on the organizational-level strategies implemented to enhance clinicians' use of PROMs data from 2020 to 2023. This includes understanding the underlying rationales for these strategies and identifying any strategies that appear missing to address barriers or leverage facilitators. Third, we aimed to investigate the key factors driving and constraining clinicians' use of PROMs in 2023.

This approach helps understand how implementation unfolds in a real-life context using standardized frameworks to ensure that findings can be compared with other cases and replicated in different settings [37]. In addition, the findings may inform future strategies aimed at facilitating and promoting clinicians' use of PROMs.

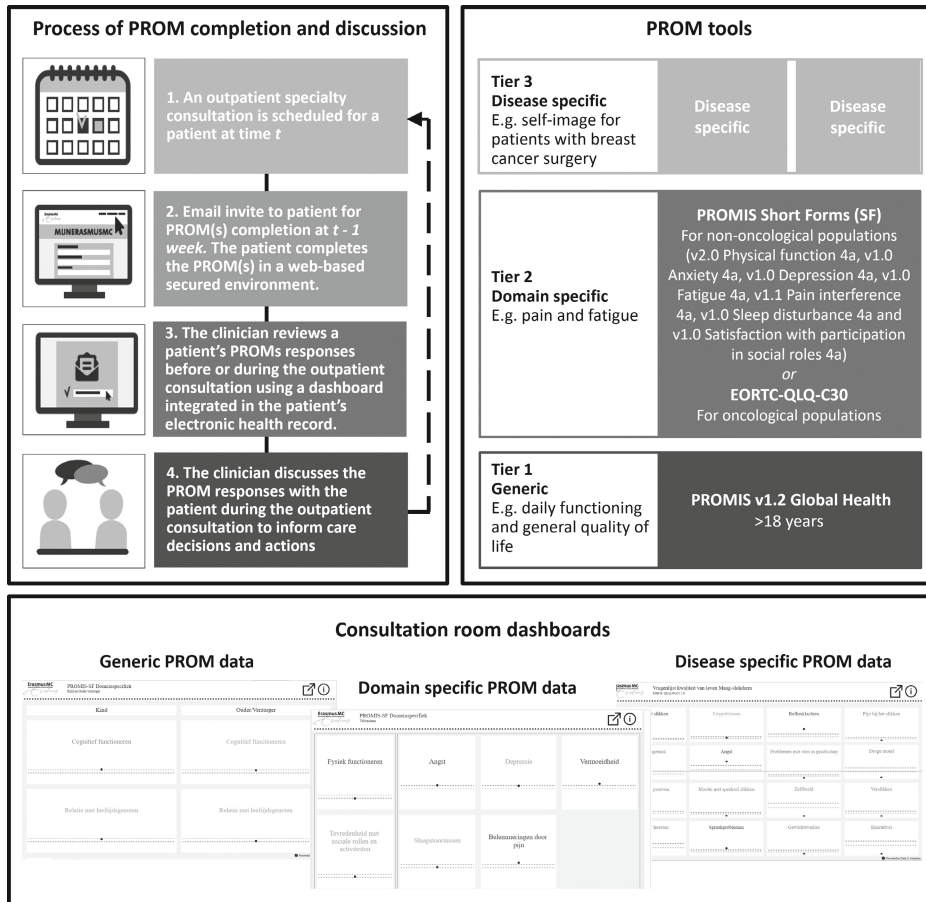


Figure 1. The process of patient-reported outcome measures (PROMs) completion and discussion (top-left), the 3 tiers of PROMs tools used (top-right), and an impression of the dashboard designs (bottom). For the generic tier, the hospital used the Patient-Reported Outcome Measure Information System (PROMIS; version 1.2; Global Health). Within the domain-specific tier, PROMIS short forms (SF) were used among the nononcological population, including version 2.0, Physical function 4a; version 1.0, Anxiety 4a; version 1.0, Depression 4a; version 1.0, Fatigue 4a; version 1.1, Pain interference 4a; version 1.0, Sleep disturbance 4a; and version 1.0, Satisfaction with participation in social roles 4a. The European Organisation for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30 CAT) was used for the oncological population. Subdepartments could select additional disease-specific PROMs.

2 METHODS

2.1 Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki and exempted from formal approval under the Dutch Medical Research Involving Human Subjects Act by the Medical Research Ethics Committee of the Erasmus School of Health Policy & Management (ETH2223-0225). All participants consented to participation and the publication of quotes. Survey data were collected in a way that ensured participants remained anonymous, and interview data were pseudonymized. All data were stored in a secured space. Participants did not receive compensation.

2.2 Data sources

Overview

This study used 4 sources of data: implementation outcome indicators, a survey, hospital documents, and interviews. Data collection was part of a broader study on the implementation of VBHC [33]. Implementation outcome indicators were used specifically for objective 1, whereas the other data sources were used to address objectives 2 and 3.

Implementation outcome indicators

The hospital monitored the degree to which clinicians accessed the PROM consultation room dashboard. We extracted the percentage of completed PROMs accessed by clinicians from the hospital's monitoring system, covering the 12-month period from February 2023 to January 2024. We used the aggregated data that eventually included 70 subdepartments. Investigating subdepartmental differences in the use of PROMs was outside the scope of this study. We analyzed both the average percentage of completed PROMs accessed by clinicians during the week of the patient's consultation and on the day of the consultation. While the former indicates the use of PROMs to prepare for consultations, the latter serves as a proxy for discussion with the patient.

Hospital documents

Internal hospital documents were accessed through the digital workspace of the CST, to which author VvE was granted access. This workspace was established around 2020. A systematic search was conducted using the following keywords: compliance, evaluation, barrier, facilitator, challenge, plan, intervention, and strategy. This yielded 56 files. These were then screened for data pertaining to factors facilitating or impeding clinicians' use of PROMs or strategies aimed at enhancing their use, followed by data extraction. If files referred to other files, these were also considered for inclusion. Subsequently, the list of extracted strategies was cross-validated with author MDH-A, a member of the CST, to distinguish between planned and executed strategies.

Survey

In January 2023, a collective survey, named EMC23, was digitally distributed to all 194 clinicians across the 35 subdepartments that collected PROMs data from outpatients in 2022. One clinician involved in the survey design was excluded from participation. The participants remained anonymous and untraceable. The survey comprised 26 items (Additional file 2), developed based on preliminary insight from document analysis. The items delved into clinicians' self-reported use of PROMs, prominent factors influencing this, and their overall satisfaction with the implementation process and outcomes achieved. In addition, the respondents were asked to evaluate a subset of implemented strategies and had the opportunity to provide comments. Two reminders were sent. As shown in Table 1, 47 responses were included in the analysis.

Table 1. Data sources, sample sizes, and participant characteristics

Data source, theme, and description		Values
Survey in January 2023 (N=194)		
Responses, n (%)	Total	57 (29.4)
	Excluded	10 (5.2)
	Demographic questions answered (n=5)	
	Not providing patient care (n=2)	
	PROMs ^a not yet available (n=2)	
	No familiarity with PROMs (n=1)	
	Complete	42 (21.6)
Sex of included responses (n=47), n (%)	Female	35 (74.5)
	Male	12 (25.5)
Age (y), mean (SD; range)	Age	46 (8.2; 31-64)
Function of included responses (n=47), n (%)	Medical specialist	30 (63.8)
	Nurse	12 (25.5)
	Other (eg, psychologist and resident in training)	5 (10.6)
Interviews February-April 2023 (N=20)		
Participants, n (%)	Member executive board	1 (5)
	Director quality and patient safety	1 (5)
	Head VBHC ^b implementation	2 (10)
	Member steering committee	2 (10)
	Lead VBHC program team	3 (15)
	Member VBHC program team	9 (45)
	External consultant	1 (5)
	Clinician in VBHC	1 (5)

Table 1. Continued.

Data source, theme, and description		Values
Sex, n (%)	Female	14 (70)
	Male	6 (30)

^aPROM: patient-reported outcome measure.

^bVBHC: value-based health care.

Interviews

For a process evaluation on the implementation of VBHC [33], author VvE conducted 20 semi structured interviews with individuals involved in the central implementation effort during the past decade (Table 1). Two individuals refused participation for personal reasons. Participants were identified through documents and snowball sampling. Interviews were recorded and transcribed verbatim. Given the hospital's focus on implementing PROMs in their move to VBHC, interviewees provided valuable insights into the hospital's efforts and experiences in enhancing clinicians' use of PROMs. The portion of the interview guide that elicited relevant comments for this study is presented in Additional file 5. We reanalyzed these transcripts, extracting information on barriers and facilitators for clinicians to use PROMs, strategies and their rationales, and areas for improvement. These data complemented the other sources mentioned in the *Data Sources* section, enriching the findings of this study.

2.3 Theoretical lenses and data analysis

Overview

Given the intricate nature of the implementation of PROMs, adopting a multifaceted research approach is imperative [12], typically including contextual factors, the innovation (PROMs), strategies to support effective implementation of the innovation, and implementation outcomes interact, as illustrated in Figure 2. These elements align with the objectives of this study. Therefore, our methods were plural, incorporating the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework [38]; the Expert Recommendations for Implementing Change (ERIC) taxonomy [39] and associated 9 clusters [40]; and the COM-B constructs [41].

We reviewed multiple strategy taxonomies and evaluation frameworks as summarized by Nilsen [42], selecting the aforementioned frameworks due to their alignment with this study's objectives and data, widespread use, compatibility with the health care setting, and clarity in presenting results. These frameworks were used for post hoc, deductive data analysis; these frameworks are explained in subsequent sections.

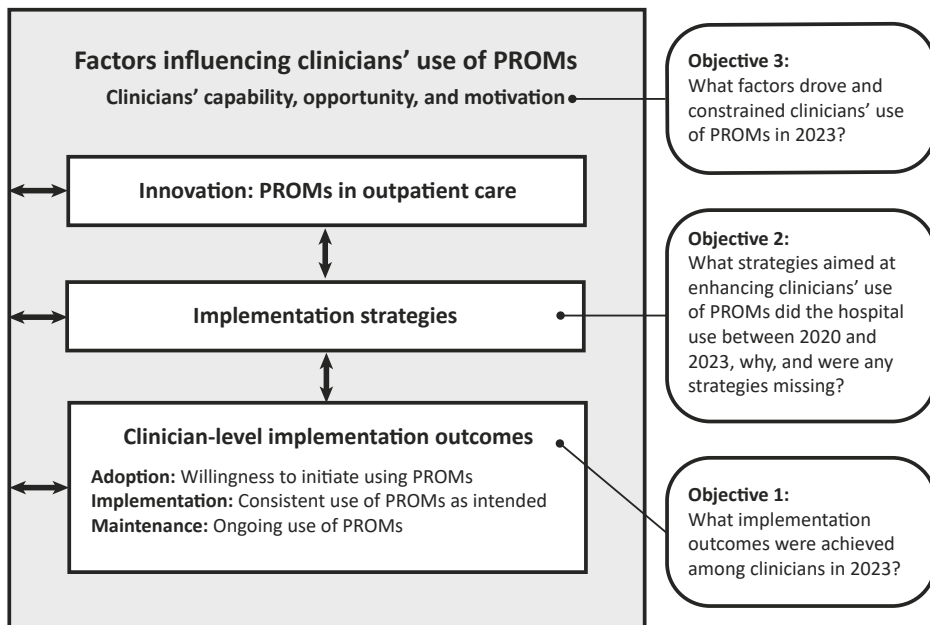


Figure 2. Study objectives. PROM: patient-reported outcome measure.

Objective 1: implementation outcomes among clinicians in 2023

The RE-AIM framework [38] guides the planning and evaluation of programs by examining 5 outcomes: reach, effectiveness, adoption, implementation, and maintenance. This study focused on the latter 3 outcomes at the individual level rather than at the department or hospital level. While the collection of PROMs among outpatients was a departmental choice, individual clinicians subsequently needed to adopt, implement, and maintain using PROMs. In this study, adoption denoted individual clinicians' willingness to initiate the use of PROMs data from their patients. Implementation denoted the consistency of clinicians' use of PROMs as intended, that is, acknowledging outcomes and discussing results with the patient during their consultation to inform decisions. Maintenance referred to the clinicians' ongoing use of PROMs. Reach and effectiveness have not been directly studied in this research but were indirectly addressed, as they are contingent upon the extent to which clinicians adopt, implement, and maintain PROMs use [8,11].

We examined the outcomes adoption, implementation, and maintenance through *survey* data, reporting item-level frequencies for two key questions: (1) How frequently do you examine patients' responses to PROMs? with the following response options: I never used PROMs, I stopped looking at PROMs, occasionally, as often as possible, and always; and (2) To what extent do you discuss these outcomes with the patient during the consultation? (for those who examine PROMs) with the following response options: never, occasionally, as

often as possible, and always. We supplemented these data with insights from the hospital's implementation outcomes indicators, for which no further analyses were required.

Objective 2: implemented and missing strategies from 2020 to 2023

We retrospectively analyzed Erasmus MC's implementation efforts. First, we documented all strategies applied by the hospital from 2020 to 2023 based on *document* and *interview* data, focusing on understanding why these strategies were chosen, particularly in response to barriers or facilitators. For each strategy, we aimed to deductively specify the actor, action, target of the action, temporality, dose, and implementation outcome affected and provide a justification (Additional file 6) [43].

Besides describing the practical application of strategies at Erasmus MC, this study mapped discrete ERIC strategies [39] to the identified strategies using a coding manual developed by Fridberg et al [44]. ERIC provides a compilation of 73 discrete strategies that one can use to effectively implement an innovation in a health care setting [39], which have been mapped into 9 strategy clusters [40]. These clusters are mentioned in the *Results* section. The manual excluded the discrete strategy of facilitation due to overlap with other strategies. This study also included 10 strategies proposed as additions to the ERIC taxonomy: provide stakeholders with the possibility to attend educational meetings [44], recruit clinicians with competence in the innovation [44], provide stakeholders with resources [44], act as a role model [44], assess and redesign workflow [45], create web-based learning communities [45], engage community resources [45], plan for outcome evaluation [46], obtain worker feedback about the implementation plan [46], and communication as a strategy category [47].

To deepen our understanding, we included stakeholder reflections on strategies from *documents*, *interviews*, and *survey* data, including comments on their feasibility and perceived utility. We coded these data by mapping them to the respective strategy they pertained to, allowing us to cluster relevant information accordingly. Subsequently, we integrated these qualitative data into the results per strategy. The dataset was too limited to conduct thematic analyses on a per-strategy basis. Furthermore, we assessed whether identified barriers or facilitators in our data were addressed through these strategies. If not, these cases were labeled as *missing strategies*.

We observed that our data aligned effectively with the constructs of capability, opportunity, and motivation, which are components of the COM-B model [41]. Therefore, we structured our results around these constructs, finding them intuitive and straightforward for conveying our findings.

Objective 3: key factors influencing clinicians' use of PROMs in 2023

On the basis of document analysis, we identified key barriers and facilitators to clinicians' use of PROMs. In the survey, clinicians rated the perceived influence of these factors on their PROMs use (Additional file 2). They also had the opportunity to identify additional factors.

We analyzed item-level scores for the entire survey population by grouping agree and partly agree into a single category. Likewise, disagree and partly disagree were grouped into a single category. The categories neutral and no opinion remained unchanged. Moreover, we conducted subsample analyses to explore differences among different user profiles. Clinicians were allocated to 3 groups depending on their self-reported use of PROMs: nonusers, frequent users, and occasional users. Nonusers included clinicians who reported never attempting to use PROMs or ceasing to use PROMs. Frequent users comprised those who reported using PROMs as often as possible or always. Clinicians who reported occasional use remained unchanged.

3 RESULTS

3.1 Objective 1: implementation outcomes among clinicians in 2023

Implementation outcome indicators

The hospital monitored that, on average, from February 2023 to January 2024, clinicians accessed PROMs data for nearly 3 out of 20 patients (14%; SD 1.6%) on the day of each patient's consultation. This data served as a proxy for discussing PROMs with the patient. During the week of the patient's consultation, which included the use of PROMs data for triage and consult preparations, this percentage was slightly higher, averaging at 19.5% (SD 2.4%). While variations in the use of PROMs data were apparent across subdepartments and individual clinicians, these specifics were outside the scope of this study.

Yearly data suggested a slight, albeit minimal, increase in the percentage of completed PROMs of unique patients accessed by clinicians using the dashboard (Figure 3). It is important to note that during 2024, the number of participating subdepartments grew from 38 to 70, implying that around half of the clinicians were in the adoption and implementation stages, while the other half were potentially moving toward the maintenance stage.

Survey data

Clinicians' self-reported use of PROMs, as derived from our survey in early 2023, revealed issues across all 3 RE-AIM outcomes. Adoption issues were apparent, with around one-tenth (5/47, 11%) of the respondents never attempting to review their patients' PROMs responses (Table 2). Implementation issues, characterized by inconsistent use of PROMs as intended, became evident, with more than half (27/47, 58%) of the clinicians examining completed PROMs infrequently. Moreover, among those who examined PROMs, less than one-third (10/35, 29%) reported always discussing PROMs data with patients. Less than one-fifth of the respondents (6/35, 17%) did not engage in this activity at all. Furthermore, 15% (7/47) ceased examining PROMs, indicating a maintenance issue.

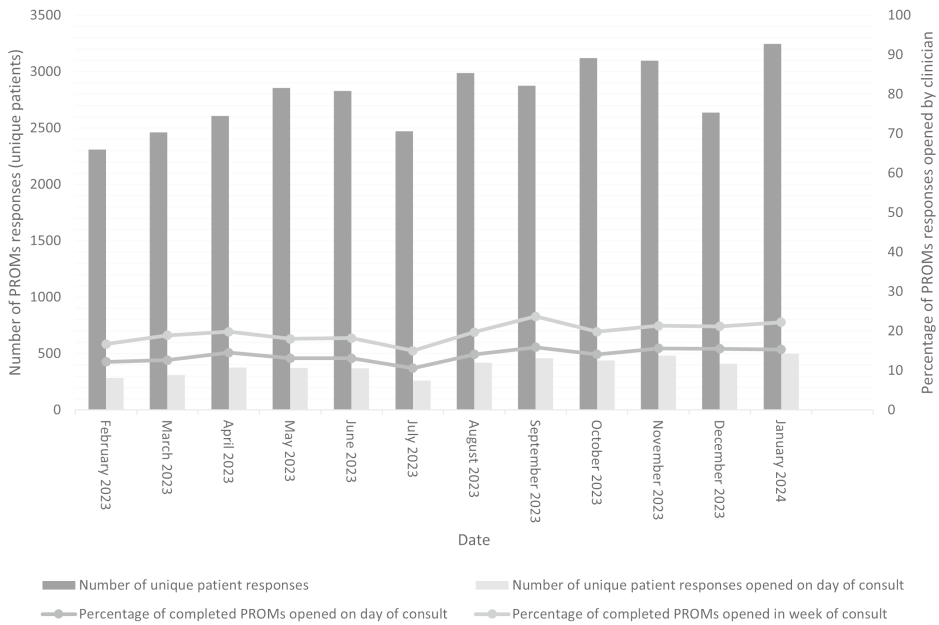


Figure 3. Patient-reported outcome measures (PROMs) dashboard use rates among clinicians from February 2023 to January 2024

Table 2. Clinicians' self-reported use of patient-reported outcome measures (PROMs)

Items and answers		Values, n (%)
Frequency of examining patients' responses to PROMs (n=47)	Never attempted	5 (10.6)
	Ceased	7 (14.9)
	Occasionally	17 (36.2)
	As often as possible	10 (21.3)
	Always	8 (17)
Frequency of discussing PROMs with patients (among those examining PROMs at least occasionally; n=35)	Never	6 (17.1)
	Occasionally	10 (28.6)
	As often as possible	9 (25.7)
	Always	10 (28.6)

3.2 Objective 2: implemented and missing strategies from 2020 to 2023

Overview

Table 3 summarizes the strategies that the hospital implemented alongside their corresponding ERIC strategies, structured according to the COM-B constructs of capability, opportunity, and motivation. The hospital used 27 (37%) out of 73 discrete ERIC strategies to enhance clinicians' use of PROMs alongside 5 proposed additions to the ERIC taxonomy. These are elaborated upon in the subsequent section and specified in Additional file 6.

Table 3. Strategies applied by the hospital, structured around the COM-B constructs of capability, opportunity, and motivation and corresponding strategies from the Expert Recommendations for Implementing Change (ERIC) taxonomy

COM-B construct targeted by the strategy and strategies by the CST ^a , except otherwise noted	ERIC strategies ^a (except when referenced and noted with N)
Capability	
Conducted a kick-off session and shared a self-developed written and video manual	15. Conduct educational meetings. 29. Develop educational materials. 31. Distribute educational materials
Developed and distributed a pocket guide on discussing PROMs ^b with patients	29. Develop educational materials. 31. Distribute educational materials
Developed and conducted training and highlighted external training opportunities	29. Develop educational materials. 31. Distribute educational materials. 52. Promote network weaving
Made training flexible (e-trainings) and sometimes accredited	N1. Provide stakeholders with the possibility to attend educational meetings [44]. 29. Develop educational materials. 69. Create or change credentialing and/or licensure standards
Was accessible for questions and tailored support	43. Make training dynamic. 63. Tailor strategies. 8. Centralize technical assistance
Provided coaching on the job	16. Conduct educational outreach visits. 71. Use train-the-trainer strategies
Organized peer-to-peer discussion events	20. Create a learning collaborative
Opportunity	
Created hospital-wide awareness about PROMs and VBHC ^c , aiming to extend reach to extramural parties	N2. Communication [47]
Visualized PROMs in a dashboard and integrated this dashboard into the EHR ^d	12. Change record systems
Facilitated patients to take the initiative to discuss PROMs	50. Prepare patients to be active participants
Facilitated quick actions on PROMs outcomes and streamlined other care processes	12. Change record systems. N3. Assess and redesign workflow [45]
Implemented a reminder for PROMs in the EHR	12. Change record systems. 58. Remind clinicians

Table 3. Continued.

COM-B construct targeted by the strategy and strategies by the CST^a, except otherwise noted	ERIC strategies^e (except when referenced and noted with N)
Motivation	
The executive board verbally expressed commitment to achieving VBHC and included it as a hospital aim.	40. Involve executive boards. 44. Mandate change. N2. Communication [47]
The executive board monitored departments' implementation status and complimented the departments excelling in VBHC.	56. Purposely re-examine the implementation. N2. Communication [47]
Clinicians participated in the steering committee.	64. Use advisory boards and workgroups.
The CST communicated about VBHC to achieve and sustain clinicians' interest.	N2. Communication [47] 41. Involve patients and consumers and family members. 7. Capture and share local knowledge. 35. Identify and prepare champions. 36. Identify early adopters.
Provided tailored education and held discussions with each subdepartment on PROMs and VBHC	15. Conduct educational meetings
Enabled subdepartments to try PROMs with a subset of patients	14. Conduct cyclical small tests of change
Aimed to demonstrate the impact of PROMs	N4. Plan for outcome evaluation [46] 24. Develop academic partnerships
Gave tailored feedback on subdepartments and clinicians' use of PROMs	56. Purposely reexamine the implementation. 27. Develop and organize quality monitoring systems. 48. Organize clinician implementation team meetings
Enabled clinicians to adapt PROMs and their uses	51. Promote adaptability
Extended the use cases of PROMs	51. Promote adaptability
Adapted patient information to alleviate clinicians' concerns about accountability	N2. Communication [47]
Generic	
Conducted formal and informal evaluations and used the obtained insights to adjust the implementation plan	N5. Obtain worker feedback about the implementation plan [46]

^aCST: central support team.^bPROM: patient-reported outcome measure.^cVBHC: value-based health care.^dEHR: electronic health record.^eNumbered strategies as per Waltz et al [40].

Strategies were drawn from 8 (89%) out of 9 strategy clusters, including using evaluative and iterative strategies, providing interactive assistance, adapting and tailoring to the context, developing stakeholder interrelationships, training and educating stakeholders, supporting clinicians, engaging consumers, and changing infrastructure. No strategies from the cluster financial strategies were used. Qualitatively, it appears that clinicians who used PROMs more extensively rated the supportiveness of the initiated strategies higher than those who used PROMs less. A few strategies were found to be missing, leaving barriers unaddressed or facilitators not leveraged.

Tracking and generalizing strategy specifications, such as temporality and dose, for all strategies was challenging due to the organic and pragmatic application of strategies tailored to specific subdepartment needs and the lack of a comprehensive documented program theory. Having been developed during preceding pilot phases and, most of the strategies were available from the onset of the hospital-wide implementation program in 2020 and refined in the course of time.

Capability-associated strategies

To enhance clinicians' knowledge and skills in using PROMs, the CST organized kick-off presentations at each department when PROMs were installed. Clinicians received written instructions on using the PROMs dashboard and interpreting outcomes via email, which were later supplemented with video instructions. In 2022, a pocket guide, with exemplary sentences to discuss PROMs was cocreated with clinicians (internal document dated July 14, 2022). Training possibilities, both internal and external, were highlighted. Internal training was often conducted in collaboration with the person-centered care group, focusing on using PROMs in shared decision-making and among patients with limited literacy. The latter aimed to address limitations from clinicians believing that *"[...] PROMs cannot be discussed with the patient in question"* (internal document, July 14, 2022). Flexible learning resources, such as e-trainings, were developed in response to time constraints:

Attending a conference for half a day can already be challenging, let alone undertaking a lengthy training. [Interviewee 19]

In addition, efforts were made to align trainings with clinicians' accreditation requirements. However, Interviewee 19 noted that training had not been an essential component of the program since 2020; Interviewee 10 emphasized a tailored approach that addressed the specific needs of individual subdepartments. The CST increasingly reached out to subdepartments with low use of PROMs. They addressed barriers in perceived capability. One such barrier is clinicians feeling unable to influence certain PROMs outcomes that are affected by external factors, such as divorces impacting the quality of life. This perception led some clinicians to disregard these data (internal document, July 14, 2022). In response,

the CST emphasized the importance of empathic listening and referring patients with critical PROMs outcomes to other physicians. Furthermore, since 2022, they provided on-the-job coaching, which proved valuable:

You must take them [a substantial portion of clinicians] by the hand for a moment. Where do you click? [Interviewee 19]

They also organized a few peer-to-peer discussion events each year, which Interviewee 20 recognized as more impactful than traditional theoretical instruction. However, attendance issues arose with clinicians not always able to participate in these sessions. While survey results indicated that around 60% (26/43) of respondents were dissatisfied with the training or coaching received, skill issues were not a prominent factor impeding their use of PROMs (Table 4).

Opportunity-associated strategies

Another set of strategies targeted clinicians' social and physical environments to create opportunities for using PROMs. Regarding clinicians' social context, the CST aimed to create legitimacy and enable clinicians to discuss PROMs data during multidisciplinary consultations, even with colleagues who had not yet initiated PROMs. They focused on raising hospital-wide awareness about PROMs and VBHC through mass communication via email, intranet, and marketing in public spaces. One clinician described a challenge in this endeavor:

Emails get buried under more important ones, and newsletters go unread. However, too little communication also doesn't seem to work (you never do it right). [Internal document, August 31, 2020; clinician].

Interviewee 14 also noted difficulties arising from the organization's size, with hard-to-reach *islands*. Anticipated future strategies include providing information about PROMs to general practitioners and external providers involved in patient care. Clinicians requested this strategy to facilitate communication with external health care professionals, such as making them aware of possible referrals on the basis of PROMs scores. However, this strategy was deemed feasible once PROMs were used among all patients, as partial implementation would require excessive manual effort (internal document, November 23, 2020; Interviewee 19). Furthermore, a dashboard enabling patients to review their own outcomes will be developed to increase patient initiative in discussing PROMs:

If patients can see their outcomes, they'll probably ask more questions about it. So, it will get used more by clinicals, both intentionally and unintentionally. [Interviewee 2]

Currently, to encourage patient initiative, patients are provided with resources such as an animated video explaining how to discuss PROMs during consultations.

Regarding the physical environment, several clinicians experienced or assumed PROMs use in outpatient care as incompatible with their workload:

It takes far too much time, and we don't get any extra. [Survey respondent 8]

To mitigate this issue, the hospital sought to streamline the care process and simplify PROMs use, as extending available consultation time was not feasible. Interviewee 10 explained as follows:

Small adjustments can make a real difference for a doctor who may not necessarily be receptive to changing their practice.

As per Interviewee 15, integration of the PROMs dashboard into the EHR was considered a major improvement. Two other features reduced the registration burden: quick copying of PROMs scores into patient notes and a referral template for easily referring patients needing further attention on the basis of PROM outcomes (internal document, May 11, 2023). However, 79% (33/42) of the survey respondents had no opinion on the usefulness of the referral letter, possibly indicating unawareness of this feature. In addition, the CST implemented a reminder by prominently displaying the PROMs completion status on the patients' EHR front page. This also eased the workflow by eliminating the need to open the PROMs dashboard to verify completion. More than one-third (15/42, 36%) of the survey respondents perceived this feature as helpful.

Moreover, to save time, PROMs data were used in triage and the developed PROMs-IT infrastructure was used to have patients report their medication and lifestyle. This extension reduced the necessity for discussions on these topics during consultations (internal document, May 11, 2023). Despite these efforts, perceived time constraints remained the most frequently cited barrier among clinicians as of early 2023 (Table 4). Loading time delays of the PROMs dashboard exacerbated these constraints, resulting in decreased commitment and temporary cessation of PROMs use. These delays were resolved, and a dedicated campaign was organized to encourage the reuptake of PROMs.

Motivation-associated strategies

The use of PROMs remained nonobligatory, focusing on genuine engagement rather than mere compliance. The inclusion of clinicians in the steering committee aimed to create “*visible standard-bearers from within the healthcare sector*” (internal document, May 20, 2019) to enhance buy-in. The CST frequently communicated about PROMs and VBHC to achieve and

sustain interest. They shared stories highlighting the benefits of PROMs from both patients and clinicians via a monthly newsletter and intranet. One of the ideas was that *"if it's beneficial for the patient, it usually has added value for the clinician as well"* (internal document, July 14, 2022). Stories of championing clinicians were noted as a key facilitator in documents and interviews (internal document, August 31, 2020; Interviewee 3). However, approximately half (21/43, 49%) of the survey respondents did not feel that the stories of other health care professionals positively influenced their attitude toward working with PROMs, with only 16% (7/43)—primarily consistent PROMs users—reporting that they did. In communication, the CST also emphasized the importance of clinicians' discussion of PROMs on patient adherence to complete subsequent PROMs, supported by local evidence (internal document, June 7, 2023). Sometimes, the CST chose not to overtly reference VBHC, focusing instead on visible outcomes for clinicians, such as PROMs enhancing the patient-clinician conversation. Interviewee 3 explained as follows:

Sometimes your sales pitches need to be much flatter than what's underneath it all.

This adjusted framing aimed to address resistance among clinicians who viewed VBHC skeptically, perceiving it, for example, as a *"dull, container concept"* (Interviewee 6) and *"a hype"* (Survey respondent 11). As another reason, terminology shifts in the national policy created confusion and was overwhelming (Interviewee 3). Nonetheless, some clinicians perceived the hospital's communication efforts negatively. Survey respondent 60 mentioned, *"extremely selective advertising,"* and Survey respondent 11 noted that *"a hallelujah story is being told that overlooks the differences in patient populations."*

Concurrently, formal pressures increased: the executive board verbally committed to achieving VBHC, supported by video messages and integration into hospital aims. Externally, government programs supported PROMs and VBHC [48,49], and external audits increasingly evaluated PROMs use (internal document, July 14, 2022). These factors directly motivated clinicians and empowered department heads to prioritize PROMs use among their employees, according to Interviewee 14. Since 2022, the executive board requested subdepartments to report on their VBHC implementation status thrice yearly and complimented high-performing departments (internal document, July 14, 2022). The CST proposed that the executive board explicitly request information on clinicians' use of PROMs rather than merely their inquiries among outpatients (Interviewee 19). However, this proposal has not been implemented thus far, and the reasons for this remain unknown to the CST. Survey respondent 11 expressed concerns about such an approach:

My biggest fear is that it [PROMs] becomes an outcome, that the departments that use it are deemed 'better' than those that do not.

This fear may have stemmed from clinicians' belief that PROMs do not suit all patient groups or consultations equally (internal document, July 14, 2022).

To facilitate adoption, subdepartments were enabled to try PROMs with a subset of patients. Interviewee 19 highlights the importance of clinicians developing direct experience with PROMs:

[...] the true impact of PROMs data becomes evident when you experience it.

However, implementing PROMs among a subset of patients had an unintended consequence:

If we decide, 'We'll do it for X and Y but not for Z'... well, then you forget about it. [Interviewee 7]

Forgetting to use PROMs was the second-most cited barrier by clinicians (Table 4). To stimulate sufficient PROM survey volume, several strategies aimed to enhance patient response rates to PROMs. Furthermore, the CST aimed to evidence the benefits of PROMs and their impact on professionals' work experience, including time investment. Interviewee 6 stated the following:

The key question is, do you have proof? That is the ultimate killer question.

However, these efforts were hindered by limitations in defining measurable outcome measures, data availability, and difficulties in consolidating local evidence and making it convincing to other disciplines. Moreover, the hospital conducted both formal and informal evaluations of PROMs among clinicians to gain insights into their experiences, motivations, and needs, subsequently adapting implementation plans on the basis of these findings. This included prioritizing disease-specific PROMs, extending training opportunities, and expanding PROMs data use to areas beyond outpatient care, such as triage, research, and care pathway improvements, tapping into different clinician motivations (Interviewee 17). In addition, the CST alleviated clinicians' concerns about accountability by adapting patient communication to clarify patients' responsibility for timely contact in critical situations via traditional means.

To achieve and maintain effective implementation, the CST provided feedback on PROMs use to subdepartments. The frequency and format of feedback was tailored to departmental preferences, with some favoring nonanonymous feedback, such as *"[clinician's name] has accessed this many PROMs"* (Interviewee 19), for a competitive aspect, while others preferred anonymity. However, nearly half of the survey respondents (20/43, 47%) experienced infrequent feedback. Furthermore, local departments were increasingly empowered to adapt PROMs and their application to their context, addressing limitations of uniform solutions on

buy-in, perceived ownership, and local fit (Interviewee 18). Subdepartments could incorporate disease-specific items that were deemed critical:

[a generic PROMs] is excellent for (big) data collection but lacks clinical value; it's too general. [Internal document, August 31, 2020]

Moreover, they could determine patient eligibility criteria, adjust inquiry frequency, and choose from multiple dashboard layouts (internal document, May 11, 2023). Individual clinicians were also enabled to manually exclude patients from PROMs if needed, aiming to mitigate challenges from upset patients:

The feeling of incompetence [to complete a PROM] among the less literate population takes a huge toll on their outpatient visits. [Survey respondent 60]

Even the son of one of my patients complains about it. [Survey respondent 7]

Moreover, it aimed to overcome a specific drawback noted by Survey respondent 4:

[Patient] inclusion in studies is less due to PROMs, so that irritates me.

Overall, Interviewee 20 perceived the following:

Once you give a team the feeling of autonomy or autonomy itself, then you already win 80% of the battle to get them to use it.

Missing strategies

Unaddressed barriers also appeared in relation to clinicians' capability, opportunity, and motivation. Various interviewees highlighted shortcomings in contemporary education, noting a lack of emphasis on developing the professional attitudes necessary for effectively using PROMs in VBHC. This includes insufficient focus on understanding the impact of disease on the individual, their social environment, and work (Interviewee 20), as well as limitations in shared decision-making, inclusive care, and data-driven improvement work (Interviewee 19). Interviewee 14 pointed out that VBHC requires clinicians to take shared responsibility for patient outcomes rather than dismissing certain issues as outside their scope, observing that this attitude is *"only really embraced by a few people."* Interviewee 18 emphasized another limitation in education, stating the following:

It has become checkbox medicine. [...]. [Residents are] afraid to color outside the lines of those protocols, guidelines, and contractual agreements.

In addition, there seem to be limitations in clinicians' capacity for change and medical leadership (internal document, July 13, 2020). Interviewee 11 noted that clinicians are typically *"quite conservative"* and find changing behavior *"very difficult."* Interviewee 20 observed that PROMs resonate more with nurses, who focus more on caring and benefit from longer consultation times, while physicians typically focus on curing. The CST found that departments with a dedicated nurse specialist or physician assistant achieved higher use of PROMs compared to those without such staff. Some subdepartments tasked these nurses with discussing patients' PROMs data and flagging any issues for the medical specialist who would see the patient next (internal document, May 11, 2023). However, the CST struggled to leverage this facilitator across the hospital due to budget constraints in local subdepartments to hire nurse specialists or physician assistants and the nonbillability of PROMs discussions by nurses. Overall, the CST believes that patients' experiences of symptoms, functioning, and quality of life should be a central focus in all care activities rather than being narrowed to nurse consultations alone.

There also appeared limitations in the structural integration of PROMs for VBHC into the onboarding of new staff. Survey respondent 39 noted the following:

I started working here a year ago, there hasn't been a structured introduction to this topic, I have no experience with it.

Interviewee 19 explained that despite 2 attempts by the program team to include PROMs in onboarding, these efforts faced rejection due to PROMs not yet being uniformly adopted across all departments.

Behavior change was further hindered by limitations in opportunity and motivation. Clinicians' contemporary feelings of work pressure and well-being were considered to have a negative impact:

People feel exhausted, like stretched rubber bands nearing their breaking point. [...] They think: 'What now again? Will this add further strain to me?' [Interviewee 6]

Interviewee 19 noted the challenge of change fatigue alongside *"a pervasive aversion to any form of registration and data handling."* A fine line existed between meeting data needs and experiencing an overwhelming availability of data. Interviewee 11 noted a lack of tension and urgency to use PROMs:

There is no fire. There are no patients dying if you don't use PROMs.

Interviewee 18 noted the challenge from the ongoing volume-based rather than value-based payment, impeding clinicians' opportunity to use PROMs to make value-based decisions:

We ask people to play a different game of soccer without changing the rules. Resultantly, no one ends up playing differently.

3.3 Objective 3: key factors influencing clinicians' use of PROMs from early 2023

Overview

Despite implementing numerous strategies (objective 2), the hospital continued to face limitations in clinicians' use of PROMs (objective 1). Therefore, as the third objective, we aimed to broaden our understanding of the key factors influencing clinicians' use of PROMs in early 2023. We first highlight the primary motivations driving clinicians to use PROMs, followed by the key factors contributing to suboptimal use.

Reasons to use PROMs

Survey respondents, excluding those who never attempted using PROMs, were asked to select the most prominent reasons for using (or having used) PROMs. Response options were identified from document analysis. Respondents had the opportunity to add additional factors, but this option was not used.

Among all survey respondents, 38% (16/42) reported using PROMs primarily because of patient benefits and 36% (15/42) reported using it because of personal benefits (Table 4). Nearly one-third (12/42, 29%) experienced both types of benefits. In addition, 45% (19/42) of respondents used PROMs because they felt it was expected of them, with 31% (13/42) citing this expectation as the sole reason for using PROMs. Only 12% (5/42) used PROMs because of patient requests.

Table 4 also shows responses among 3 user profiles: *nonusers*, *occasional users*, and *frequent users* (Methods section). Perceived benefits were the primary driver for frequent users, while feeling expected to use PROMs was the most frequently selected reason among occasional users and those who ceased use. Frequent PROM users selected more factors compared to less frequent users, suggesting that they perceived more reasons to use PROMs.

Table 4. Prominent reasons for clinicians to use patient-reported outcome measures (PROMs), both in total and as per 3 user profiles

Item and post hoc categories		Answer options	All respondents who used PROMs at least once (n=42)	User profiles		
				Nonusers (n=7) ^a	Occasional users (n=17)	Frequent users (n=18)
Most prominent factors or reasons for why I used PROMs, n (%)	Motivation	Benefits for the patient	16 (38)	0 (0)	5 (29)	11 (61)
		Benefits for myself	15 (36)	0 (0)	5 (29)	10 (56)
	Opportunity	It is expected from me	19 (45)	3 (43)	9 (53)	7 (39)
		Patient requests	5 (12)	2 (29)	3 (18)	0 (0)
Calculation	Number of factors selected, mean (SD)		1.3 (0.9)	0.7 (0.5)	1.3 (1.0)	1.6 (0.9)

^aThere are lower sample population values compared to the total population value because this question was posed to ceased users only (n=7), excluding those who never attempted PROMs (n=5).

Barriers and satisfaction

Survey respondents were also asked to select the most prominent factors that impeded their use of PROMs, if experienced, in a multiple-choice question. Among all respondents, key issues were time constraints (24/44, 55%) alongside dashboard functioning limitations (24/44, 55%), followed by forgetting (22/44, 50%; Table 5). Limitations in reinforcement and believing to have a limited impact on improving PROMs domains were rarely selected as reasons impeding PROMs use.

Disaggregating into the 3 user profiles, we found that dashboard functioning limitations impeded all groups. While all nonusers perceived time constraints, this factor was less frequently selected among the other profiles. Nonusers often cited a misalignment between PROMs and how they preferred to work as a substantial factor. Among occasional users, forgetting to use PROMs was a critical issue, a challenge also faced by current nonusers. The frequent PROM users felt impeded by the low volume of completed PROMs. Overall, those who used PROMs less frequently or not at all selected more factors compared to more frequent users.

Respondents were also asked to grade the outcomes of implementing PROMs in outpatient care and the implementation process; respectively, average scores were 4.9 and 5.4, both out of 10. Clinicians who used PROMs more frequently were more satisfied (Table 5).

Table 5. Prominent factors that contribute to suboptimal use of patient-reported outcome measures (PROMs), if experienced, both in total and as per 3 user profiles

Item and post hoc categories		Answer options	All respondents (n=44 ^a)	User profiles			
				Nonusers (n=11 ^a)	Occasional users (n=15 ^a)	Frequent users (n=18)	
Most prominent factors contributing to suboptimal use of PROMs, if experienced; n (%)	Capability	Finding it difficult or perceiving not to possess necessary skills	8 (18)	3 (27)	4 (27)	1 (6)	
		Opportunity	Dashboard functioning issues	24 (55)	8 (73)	8 (53)	8 (44)
			Not enough time	24 (55)	11 (100)	8 (53)	5 (28)
			Low volume of completed PROMs	17 (39)	4 (36)	5 (33)	8 (44)
			A colleague discusses PROMs ^b	2 (5)	0 (0)	2 (13)	0 (0)
	Motivation	Not in my routine, I forget it	22 (50)	8 (73)	10 (67)	4 (22)	
		Misalignment with how I prefer to work	12 (27)	6 (55)	5 (33)	1 (6)	
		No added benefits for patients or myself	11 (25)	3 (27)	5 (33)	3 (17)	
		PROMs do not fit my patient population	7 (16)	3 (27)	2 (13)	2 (11)	
		I have limited influence on improving PROM domains	4 (9)	0 (0)	3 (20)	1 (6)	
		Too little reinforcement	2 (5)	(18)	0 (0)	0 (0)	
Calculation	Number of factors selected, mean (SD)	3.0 (1.7)	4.4 (1.3)	3.5 (1.6)	1.8 (1.1)		
Average grade from 1 to 10	PROMs implementation process (SD, range)	5.4 (2.4, 1-9)	2.7 (1.7, 1-6)	5.3 (1.8, 3-8)	7.1 (1.6, 4-9)		
	PROMs implementation outcomes (SD, range)	4.9 (2.3, 1-9)	2.7 (1.9, 1-6)	4.8 (1.6, 2-8)	6.2 (1.9, 3-9)		

^aThere are lower sample population values compared to the total population value due to missing data from incomplete responses.

^bSome local departments adapted professional roles and workflows (strategy addition [45]) so that physician assistants or nurses were responsible for discussing patients' PROMs data and signaling any issues that require attention to the medical specialist who sees the patient next (internal document, May 11, 2023).

4 DISCUSSION

4.1 Overview

Clinicians' effective use of PROMs data is crucial for maximizing the benefits of PROMs and ensuring their ongoing use [13-17]; however, it remains challenging to achieve [3,9,10]. This study aimed to (1) explore how clinicians use individual patients' PROMs data for value-based outpatient specialty care in a Dutch university hospital, (2) identify organizational strategies used to enhance PROMs data use, and (3) uncover key motivations and barriers that persist.

Our findings indicate that clinicians' use of PROMs data remains suboptimal despite numerous strategies aimed at enhancing their capability, opportunity, and motivation. We identified shortcomings in the execution quality and comprehensiveness of applied strategies. Factors that influenced PROMs use varied among clinicians, and some strategies were hindered or controversial, adding to the complexity of effective change facilitation.

4.2 Clinicians' use of PROMs

On average, between early 2023 and 2024, clinicians accessed PROMs data for nearly 3 (14%) out of 20 patient responders on the day of the patient's consultation, serving as a proxy for discussing outcomes during the consultation. We find clinicians not trying PROMs (an adoption issue), using PROMs inconsistently (an implementation issue), and quitting to use PROMs (a maintenance issue), underscoring the inherent challenges in altering clinicians' practices and the need for multifaceted strategies. The persistent challenges in PROMs use rates, both in our study and others [3], contrast with a study reporting higher self-reported use rates [24] and clinicians prioritizing discussions about PROMs in outpatient consultations [17].

4.3 Strategies to enhance PROMs use

The hospital used 27 (37%) out of 73 ERIC strategies [39] to enhance clinicians' use of PROMs, with the only category not used being financial strategies [40]. Our study also confirmed 5 strategies that scholars proposed as additions to ERIC: communication [47], providing stakeholders with the possibility to attend educational meetings [44], assessing and redesigning workflow [45], obtaining employee's feedback about the implementation plan [46], and planning for outcome evaluation [46].

Strategies appeared to address clinicians' capability, opportunity, and motivation to use PROMs, aligning with the crucial constructs in the COM-B model.

Regarding *capability*, the results of this study confirmed that training clinicians in using PROMs for VBHC is crucial [27]. This underscores the need for integration into (interprofessional) education and ongoing training efforts for current staff as well as effective onboarding for new employees. Effective use of PROMs appears to require more substantial and impactful

changes than initially anticipated, requiring a shift in clinicians' roles, professional attitudes, and ingrained practices. These changes include extending accountability and collaboration as well as focusing on care in addition to cure. There appears need for attention to professionalization [50,51], including the development of change capability [52] and nurse or medical leadership [51,53-55]. For training current staff, individualized approaches such as coaching on the job appeared helpful. Moreover, attention should be given to providing clinicians with opportunities for training, considering their busy schedules [44].

Regarding *opportunity*, strategies were directed at creating both social and physical opportunities to use PROMs. The hospital made substantial efforts to simplify and streamline the use of PROMs by adopting strategies identified by other scholars as supportive, such as integrating PROMs into the EHR with graphical interpretation support [10,15,25,56,57], quick copy of PROMs outcomes into patient notes [57], and using PROMs to collect pre-visit information on medication and lifestyle [56]. Nevertheless, more than half (24/44, 55%) of the clinicians surveyed in early 2023 cited time constraints as a barrier to using PROMs, alongside a temporary issue of long loading times of the PROMs dashboard. Time has been reported as a barrier to PROMs use previously [7,24,27]. While PROMs may take more time due to inexperience [31,58], research has also shown that PROMs do not lengthen consultation time [59,60] and some clinicians experience time savings [7,58]. These discrepancies warrant attention. Possibly, emphasis may be needed to manage clinicians' assumptions and perceptions of time. Moreover, it is critical that PROMs and associated dashboarding function as needed, representing a cornerstone. In addition, the current payment system hinders the use of PROMs, requiring clinicians to focus on outcomes while reimbursing based on volume of health services. Moreover, it restricts the roles nurses can assume regarding PROMs, as their PROMs discussions are not always reimbursable.

Regarding *motivation*, most clinicians were driven by the perceived benefits of PROMs for both themselves and their patients. Smaller groups were motivated to use PROMs due to role expectations and patient-initiated discussions, making these potential levers that hospitals could tap on. This may be particularly important to address, as prior research suggests that professionals may expect patients to initiate discussions about PROMs, while patients believe this responsibility lies with the professionals [26]. We recommend that hospitals clarify key motivations for implementing PROMs in outpatient care and encourage professionals to explore and be driven by their own motivations. Conversely, we found that a quarter (12/44, 27%) of clinicians, especially those who have now quit using PROMs, did not perceive PROMs to align with how they prefer to work. This highlights a potential area for further research.

Challenges also seem to stem from local circumstances, with staff feeling pressured and lacking the tension and evidence needed to change. By measuring patient and professional outcomes and experiences, such as the quality of conversations, pre-PROMs implementation

and post-PROMs implementation [61], hospitals could instill a sense of urgency for change and provide the requested evidence.

The positioning of PROMs as either a voluntary tool or a core element of care impacts the range of strategies that can be used. In the observed case, PROMs use remained voluntary to prevent their ceremonial use [62]. However, there was an increase in formal pressures, both internally and externally, including government focus on outcomes and the value of care [48,49]. To address limitations related to clinicians viewing PROMs and VBHC as supplementary rather than integral to their work, hospitals may consider embedding these practices into their core operations. To exemplify, integrating PROMs and VBHC into hospital strategy, communications, education, career development discussions, control cycles, and mainstream IT could facilitate institutionalization [50,63].

4.4 Challenges in strategy selection and implementation

The hospital selected and implemented strategies to enhance the use of PROM use in a pragmatic and organic manner without a comprehensive and detailed documented program theory. They did not evaluate the effectiveness of the strategies used. However, finding linear and singular cause-and-effect linkages may be unfeasible given the complexities of change [64]. Complex change typically includes multiple and interacting factors influencing behavior as well as characteristics of nonlinearity and path dependency [64-66].

Challenges in effective change facilitation included unfeasible strategies due to limitations in manpower and budget as well as constraints inherent in the staged implementation approach. For example, the latter necessitated a simultaneous focus on adoption, implementation, and maintenance. Moreover, certain strategies had unintended consequences. For example, initially implementing PROMs for a subset of patients facilitated adoption but ultimately led to infrequent use. Half (22/44, 50%) of the clinicians cited forgetting to use PROMs because it is not a part of their routine, which echoes prior findings [27] and presents a substantial risk to maintaining PROMs use [67]. Scheduling consultations for which PROMs are sent together may be a potential solution worth investigating further.

Furthermore, we identified challenges stemming from the diffusing nature of factors influencing clinicians' use of PROMs. We identified variations in critical factors among frequent users, occasional users, and those who have never attempted or have quit using PROMs. For instance, nonusers more often cited perceived time constraints as a prominent barrier compared to frequent users and felt that PROMs did not align with their preferred way of working. Consequently, increased understanding and tailoring of strategies on the basis of behavioral determinants appears promising. In addition, we anticipate that the hospital's approach could benefit from increased focus on achieving higher levels of workforce activation [68]. Above all, a CST can only facilitate and encourage but not manage clinicians'

use of PROMs; each individual clinician should ultimately be engaged and take leadership in using PROMs.

4.5 Future research

Future research could explore the factors contributing to differences in the adoption, implementation, and maintenance of PROMs across subdepartments. Conducting interviews could help delve deeper into specific findings, particularly in areas such as routines, time perceptions, and professionalization. Investigating the association between clinicians' characteristics and their use of PROMs would be valuable. Deeper exploration of specific strategies, including their adaptations over time, for example, using Justin Smith's Longitudinal Implementation Strategy Tracking System [69], could also provide valuable insights.

4.6 Limitations and strengths

Regarding the scope of the study, we focused on clinicians' use of PROMs data, but their role is broader and likely includes motivating nonresponding patients to complete subsequent PROMs. We focused on reporting whether strategies were used rather than evaluating their execution and effectiveness. Our emphasis on organizational-level strategies led us to overlook decentralized strategies and their potential interactions. Regarding our data sources, the low survey response rate necessitates cautious interpretation. However, survey respondents reported varying frequencies of PROMs use and satisfaction, which suggests the inclusion of a diverse range of perspectives. The timing of the survey followed a period of limited dashboard functioning, which likely influenced the results. Interview data were collected as part of a broader research question, so not all respondents systematically provided input on strategies and challenges associated with PROMs use. This limitation hindered our ability to quantify the percentage of interviewees supporting specific arguments and potentially limited completeness. In addition, there may be missing documents that were not captured by the screening keywords. The specification of strategies and the application of ERIC coding may be open to interpretation and hence introduce bias. However, we aimed to enhance rigor by using a coding manual.

Despite these limitations, our study is a pioneering effort to investigate the underuse of PROMs and document practice-developed strategies to enhance their use among clinicians. Furthermore, our study uniquely highlights how implementation factors impact clinicians differently in a hospital setting, suggesting the potential benefit of tailored strategies.

4.7 Conclusions

Achieving clinicians' use of PROMs in value-based outpatient care has remained challenging despite various strategies aimed at enhancing their capability, opportunity, and motivation. Their experienced barriers and motivations were diverse and sometimes difficult to address, adding to the complexity of effective facilitation. PROMs use may require more substantial

changes than initially expected, necessitating a shift in clinicians' professional attitudes and practices. Hospitals can facilitate and encourage rather than manage clinicians' genuine use of PROMs. They must prioritize efforts to engage clinicians with PROMs for value-based outpatient care. Specific attention to their professionalization is warranted. Tailored strategies designed to address differences in clinicians' needs and motivation hold promise for future efforts and could also facilitate the successful implementation of other eHealth initiatives.

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AIM 2



Reaching consensus on what constitutes a value-based outpatient consultation



CHAPTER 5

Identifying consensus on activities that underpin value-based healthcare in outpatient specialty consultations, among clinicians

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ABSTRACT

Objective: To find a consensus on clinicians' and patients' activities that underpin an ideal value-based outpatient specialty consultation, among clinicians.

Methods: A three-round online Delphi study was conducted. A purposive sample of nineteen clinicians from a Dutch university hospital judged activities on importance. Consensus was defined at 80% agreement. Activities were thematically analyzed to derive conceptual themes.

Results: The expert panel agreed on 63 activities as being important for an ideal value-based outpatient specialty consultation and two activities as being unimportant. They failed to reach a consensus on 11 activities. Conceptual themes for activities that were considered important regard: 1) empowerment, 2) patient-reported biopsychosocial outcomes, 3) the patient as a person, 4) the patient's kin, 5) shared power and responsibility, 6) optimization, 7) coordination, 8) therapeutic relationships, and 9) resource-consciousness.

Conclusion: A value-based outpatient specialty consultation requires contextual decision-making, is person-centered, and focusses attention on care optimization and intelligent resource allocation. No importance is attributed to healthcare's societal burden and climate footprint. Disparities existed in various areas including the role of patient reported experience measures, 'patient-like-me' data, and healthcare costs.

Practice implications: This study contributes a toolbox to guide and evaluate clinicians' and patients' behaviors in value-based outpatient specialty consultations and reveals opportunities to enhance facilitation.

1 INTRODUCTION

Value-based HealthCare (VBHC) aims to organize healthcare around the multidimensional concept of 'value' [1]. Value has been defined differently across healthcare systems. The US-based authors Porter and Teisberg define value as health outcomes achieved per dollar spent [1,2]. The European definition, which is adopted in this study, considers personal, technical, allocative, and societal value dimensions [3,4]. Moreover, it focuses on costs and resource allocation in their broadest sense rather than only financial costs. Overall, VBHC is about the equitable provision of healthcare that matters to patients when sustainably using scarce resources.

Earlier research has operationalized VBHC in its totality [5] and developed a high-value care rounding tool for application at the bedside [6]. When introducing principles of VBHC in the consultation room, research found that clinicians acknowledge their role to improve patient outcomes but question their role in controlling resources [7]. Notably, VBHC has not yet been operationalized for outpatient setting while outpatient care may lend itself well for VBHC as here most decisions about diagnosis and treatment are made [8] and patient-clinician interaction is paramount [9]. Moreover, consultation models, such as the worldwide recognized Calgary-Cambridge model [10], have not been reviewed in the context of VBHC as to the authors' knowledge, despite the call for clearly defined and well-articulated dimensions of clinical encounters [11].

The aim of this study is, through a systematic approach, to seek a consensus on the activities that underpin a value-based outpatient specialty consultation. This is achieved through a Delphi study among clinicians in a Dutch university hospital. Outcomes of this study are expected to support clinicians and patients in value-based outpatient specialty care. Providing an explicit understanding of the activities that clinicians believe to underpin outpatient specialty consultations in the era of VBHC could enhance VBHC implementation, facilitation, delivery, and evaluation. Further, attention for clinicians' viewpoint may benefit their work experience and wellbeing [12]. Last, a broad agreement on these activities may also contribute to a reduction in unwarranted care variations, one of VBHC's objectives [1].

2 METHOD

An online Delphi study was conducted. The Delphi methodology relies on expert judgments during a multiple-round process with controlled group feedback regarding panelists' previous opinions (see Table 3). This study followed methodological recommendations such as adherence to the 'Guidance on Conducting and Reporting Delphi Studies' (CREDES) [13–15].

2.1 Setting

The study was conducted in the Erasmus Medical Center (Erasmus MC) in Rotterdam, a Dutch University Hospital, between March 2022 and June 2022. Table 1 provides further information about the setting and their VBHC program.

Table 1. Information about Erasmus MC and their VBHC program [16]

Topic	Data
Erasmus MC in numbers (data from 2021 [16])	<ul style="list-style-type: none">• > 10,000 FTEs; around 950 medical specialists• > 173,000 unique patients• > 1200 beds• Almost 660,000 outpatient specialty consultations per year
Erasmus MC's definition of VBHC	<i>"Working together with patients to deliver better care and improve patient outcomes at the lowest possible cost"</i> [17]. Sometimes this definition is extended with 'energy' becoming <i>"cost and energy."</i>
VBHC implementation approach	<ul style="list-style-type: none">• In 2013, the first pacesetting disease-specific teams started to apply VBHC (see Table 5 for their activities).• In 2019, the hospital agreed to a phased hospital-wide VBHC implementation, starting with hospital-wide implementation of Patient Reported Outcome Measures (PROMs).
VBHC implementation outcomes	<p>The hospital considers itself to be at the forefront regarding VBHC [18].</p> <ul style="list-style-type: none">• In the autumn of 2022, 16 pacesetting disease-specific teams are working on VBHC. Further, 27 subdepartments joined the hospital-wide VBHC program.• These teams and departments together collect Patient Reported Outcomes (PROs) for more than 30% of the total population of unique patients in outpatient specialty care, i.e., these patients are inquired to complete a PROM prior to their visit to outpatient specialty care.• Efforts of pacesetting disease teams also resulted in various healthcare improvement including redesigned care paths and new collaborations (see Table 5 for more information about these teams and their activities).

2.2 Item development for the Delphi study

The Delphi study involved structured rounds, such that already in the first round the experts were responding to a pre-established list of suggested activities rather than to an open question. Table 2 describes the two-step approach used to collate the list of activity items.

Table 2. Two-step approach to collating the item list

Topic	Step 1	Step 2
Objective	To establish a preliminary but comprehensive list with current and forthcoming activities executed by the patient and/or the clinician that may contribute to VBHC in outpatient specialty consultations in the Erasmus MC.	To derive a final list of activities that contribute to value-based outpatient specialty care by refining the preliminary list from Step 1.

Table 2. Continued.

Topic	Step 1	Step 2
Method and materials/ participants	Content analysis [19] of internal documents (n=10) and recorded panel discussions with internal stakeholders (n=5). The documents were made available by the Erasmus MC VBHC program team. Both clinicians and non-clinicians were represented in the panel discussions. The non-clinicians included a representative from the patient council, the IT department, and the Director of 'Quality & Patient Care'.	Sequential co-reflection on the list of items derived in Step 1 with eight internal participants, which conforms with recommendations regarding sample size [20]. Four provided written responses and four participated in an interview. The participants were purposively nominated by the Erasmus MC VBHC program team to reflect a variety of viewpoints. The participants included VBHC champions who had featured in national VBHC discussions and an organization advisor. These stakeholders were not involved as experts in the Delphi study.
Procedure	<p>First, sources were fully screened and were included if they described a current or forthcoming feature, action, or practice of VBHC that may have consequences for outpatient specialty care. These features, actions, or practices were extracted from the source to derive a preliminary list.</p> <p>Second, items were phrased as a full sentence describing an action with consistent use of terminology. For example, the extracted feature "<i>care at the right place</i>" was modified into "<i>the healthcare professional ensures that the patient receives care at the right place in the care chain.</i>"</p> <p>Third, the preliminary list of items was reviewed by three members of the research team. Items were merged or modified to prevent repetition or equivalence. Modifications were kept to a minimum to stay close to the hospital's vocabulary such that the Delphi expert panel can understand and relate to the terminology used.</p>	<p>Written feedback: participants received the preliminary list of items. First, they were requested to comment on the listed items (e.g., lack of clarity, improved formulations). Second, they were asked to formulate additional items these considered to be missing.</p> <p>Interview: first, participants were asked to describe from scratch activities for an ideal value-based outpatient specialty consultation. Next, items from the current list were discussed one-by-one. Third, participants were invited to propose new items. Finally, the researcher discussed with them the formulation of the research question.</p> <p>All suggestions by the participants were noted and led to reformulations and/or extensions of the list. Removing listed items was not permitted.</p>
Result	The preliminary list comprised 44 items.	The resultant list comprised 55 items (Additional file 7).

2.3 The Delphi study

2.3.1 The expert panel

Twenty-seven clinicians were informed about the study and were invited to participate by email. Experts were selected through purposive sampling. The two selection criteria ensured content validity: the professional should 1) work in outpatient specialty care and 2) be a member of a pacesetting VBHC disease-specific team. During 2013 - 2018, these teams initiated and shaped their own VBHC activities (see Table 5), eventually with support from a VBHC-program team. This implies that these clinicians predominantly acquired VBHC knowledge and skills by their own efforts, i.e., without formal instruction by the hospital. Hence, their operationalization of VBHC is not a replica of training. To avoid framing effects, no definition or explanation of VBHC was provided. To reduce social desirability bias, participants were notified about the pseudonymization of their personal data and that they remained anonymous to each other.

2.3.2 Instrument, question, and response options

The Delphi instrument was built in Qualtrics software [21]. Items were presented in a constant and logical order. In each of the rounds, the question posed was: *“For each of the activities listed below, do you consider this activity important or unimportant for an ideal value-based outpatient specialty consultation?”*. Three reminders were sent in each Delphi round. Table 3 provides information on the panelists’ tasks in each of the three rounds.

Table 3. Panelists’ tasks in each of the three Delphi rounds

Topic	Delphi round(s)	Content
Provided introduction	1,2, and 3	Participants received information on the purpose of each round, the applicable decision rules, and a characterization of the consultation that they should focus on, namely an outpatient specialty consultation with a Dutch-speaking adult patient with a diagnosed disease and who is accompanied by a partner, family member, carer, or friend.
Question posed	1,2, and 3	<p>The question posed was: <i>“For each of the activities listed below, do you consider this activity important or unimportant for an ideal value-based outpatient specialty consultation?”</i>.</p> <p>Experts were requested to focus on their idea of an ideal consultation to avoid reports on actual outpatient practices as the latter may not reflect VBHC to its full extent due to impediments such as Covid19, VBHC implementation challenges, or a lack of resources. Furthermore, experts were asked to provide an integral overview of all activities that are important rather than indicating what activities are new or of increased importance in the era of VBHC to account for baseline differences in care activities.</p>

Table 3. Continued.

Topic	Delphi round(s)	Content
Tasks	1	<ol style="list-style-type: none"> 1. Judge new activities (i.e., as being important or unimportant) and/or to provide a comment. 2. Suggest activities that they perceived as missing from the current list.
	2 and 3	<ol style="list-style-type: none"> 1. Judge activities that lacked consensus (i.e., as being important or unimportant) and/or to provide a comment. 2. Judge new activities (i.e., as being important or unimportant) and/or to provide a comment. 3. Suggest activities that they perceived as missing from the current list. 4. Review items that the expert panel had reached consensus on in the previous round(s). These items were listed at the end of the survey. Experts could request reintroduction or share reflections. 5. Qualitatively describe how VBHC has changed outpatient specialty care in terms of activities (Delphi round 3 only).
Material for tasks	1	<ul style="list-style-type: none"> • Pre-established list of activities (see 2.2.).
	2 and 3	<ul style="list-style-type: none"> • List of modified activities that did not achieve agreement among the experts in the previous round(s). These activities were improved and presented with controlled feedback through a process of content analysis and group discussion within the research team [19]. Feedback entailed the scoring from the previous round and a summary of comments. • List of new activities derived from experts' comments. • List of activities that achieved consensus among the expert panel. • 19 sub-items that specified three generic terms used in activity statements, namely 'PROMs', a 'consultation room dashboard' and 'extending consultation time' (see Table 6).

2.3.3 Definition of consensus and process guidelines

This study applied four decision rules in advancing from round to round (see Table 4). These were adapted from a methodological paper on Delphi studies [13].

Table 4. Decision rules used in this Delphi study

Topic	Rule that was applied in this study	Modification to original
Declaration of consensus	Consensus is declared once 80% agreement is achieved.	Increased from 70% to 80% to increase validity [14].
Expert comments on items under investigation	Every remark or suggestion for a change or an addition is expected to result, after careful discussion within the research team, in an adjustment that is to be shared with participants in the subsequent round (with controlled feedback) regardless of consensus reached.	All individual remarks or suggestions were evaluated to prevent loss of relevant but unique suggestions, rather than requiring two similar remarks or suggestions to consider a change.

Table 4. Continued.

Topic	Rule that was applied in this study	Modification to original
Expert comments on consensus-declared items	Two similar requests to reopen a discussion warranted re-introduction of a consensus-declared item (with controlled feedback).	No change: threshold left at two experts to prevent single opiniated experts re-opening discussions.
Study termination	An item with no consensus after four rounds is accepted as non-consensual when: 1) there are no suggestions for change and 2) the items that lacked group agreement and did not receive new arguments for debate were deemed stable according to the McNemar Test [22]. This test was performed using Excel [23]. If the computed McNemar Chi-square value was less than 3.841 ($p<0.05$), the null hypothesis, i.e., no change in the panel's opinion between two subsequent rounds, was not rejected. Consequently, the item was not re-appraised in later rounds.	We more rigorously assessed the original criteria of 'no major shifts in opinion' by applying the McNemar Test [22].

2.3.4 Thematic analysis of the final Delphi results

A thematic analysis was carried out to inductively analyze the final set of activities to derive overarching themes [24]. First, each activity was given an initial code that closely reflected the content. Second, codes were clustered to generate sub-themes underlying the codes. Third, the sub-themes were clustered into themes that represented conceptual dimensions that underpinned an ideal value-based outpatient specialty consultation. ATLAS.ti software was used to facilitate this process [25]. Two researchers independently double coded the entire activity-set using the coding scheme [26]. Inter-coder reliability (ICR) was measured using Cohen's kappa. The ICR was 88.6%, which indicates an almost perfect agreement [27]. Codes that initially lacked agreement were iteratively discussed within the research team to reach a consensus.

3 RESULTS

3.1 Response rate

From the 27 clinicians who were invited to participate, 19 clinicians provided written consent and completed the first Delphi questionnaire. Response rates of 100% in the second Delphi round and nearly 90% (17 experts) in the third round were achieved. This conforms to sample size recommendations for Delphi studies [13,14]. The expert panel was heterogeneous in terms of job function and specialism. Table 5 provides further details regarding the participants and those who refused to participate.

Table 5. Descriptive statistics of the expert panel and those who refused to participate

Sample	Theme	Information
Clinicians participating	Job function	Medical specialist (n = 7), psychologist (n=1), physician assistant (n=1), nurse specialist (n=8), oncology nurse (n=2)
	Gender	Male (n=5), female (n=14)
	Age, mean (SD)	44.05 years (SD=8.52)
	Disease-specific teams	Liver tumors (n=2), bladder cancer (n=2), cervical cancer (n=2), multiple myeloma (n=2), breast cancer (n=1), brain tumors (n=1), stroke (n=2), Familial hypercholesterolemia (n=1), primary ovarian insufficiency (n=3), pregnancy and birth care (n=1), endometriosis (n=1), cleft lip (n=1)
	Work experience, mean (SD)	20.37 years (SD=5.56)
	VBHC experience, mean (SD)	4.37 years (SD=2.03)
	Role in disease-specific teams	17 of the 19 experts were leading their VBHC disease-specific team
	VBHC activities	<ul style="list-style-type: none"> • Establishment of multidisciplinary teams around particular diseases • Reorganization of care pathways, if appropriate. • Routine measurement of patient-reported outcomes. These PROMs have a triple function: 1) as a basis for discussion during outpatient specialty consultations, if appropriate using a dashboard, 2) for systemic quality improvement, e.g., care pathway improvements, and 3) for research. Alongside this, patient experiences are yearly assessed using questionnaires. • Participation in numerous national and international benchmarks (some teams). • Piloting of bundled payments and organizing care in networks (some teams).
Clinicians who refused to participate	Job function	Medical specialist (n=4), nurse specialist (n= 2), oncology nurse (n=1), nurse consultant (n=1)
	Gender	Male (n=4), female (n=4)
	Reason for non-participation	No time (n=4), out-of-office (n=1), no consent (n=1), unknown (n=2)

3.2 Delphi flow

The study started with a list of 55 activities and concluded with 63 activities that the expert panel agreed on as being important for an ideal value-based outpatient specialty consultation, two activities that the group agreed were unimportant and 11 activities on which the panelists could not agree. The results from the three Delphi rounds are summarized in Figure 1. In line with the decision rules (see 2.3.3), the study terminated after three rounds.

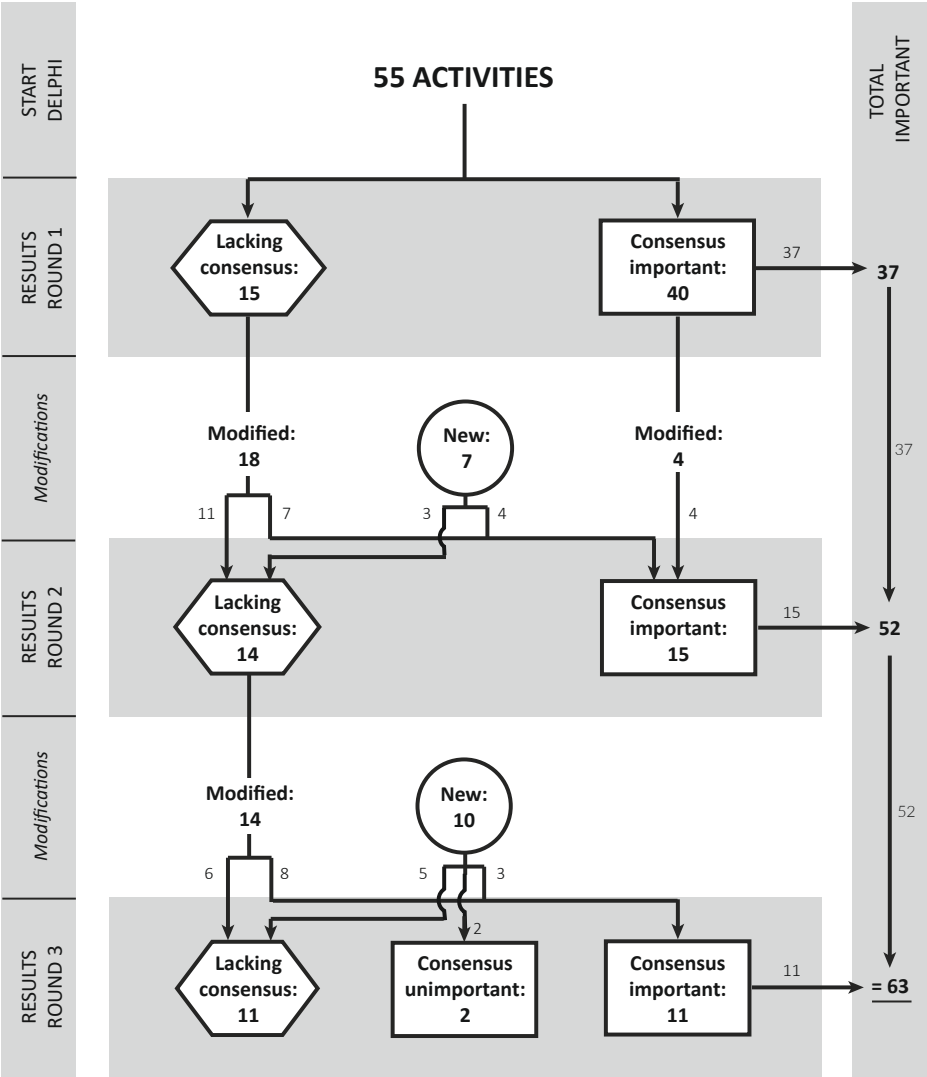


Figure 1. The stages of the Delphi process, including each round’s outcomes and results of data processing and analysis, excluding sub-questions

Figure 1 and Table 6 specify the changes made between the rounds. In total, the changes involved 32 modifications of items and the introduction of 17 new activities. No re-introductions of items were requested. In the second round, 19 sub-questions were posed to investigate three generic terms in greater depth.

Table 6. A classification of changes that were made in between the Delphi rounds

Category	Specification	Explanation and/or examples
Introduction of new activity items (17 in total)	Explicit suggestions by experts (10 activities)	Experts explicitly suggested new activities that they considered were missing. These activities were associated with, or necessary for, other listed activities. For example, an expert suggested complementing the statement about involving the patient's kin in decision-making with the activity of inquiring about their wellbeing.
	Implicit cues by experts (7 activities)	As a response to panelists' ambiguous use of the word 'costs' and notable underrepresentation of cost-related activities in the study thus far, seven cost-focused questions were added. These covered consideration of: 1) the burdens of treatment for the patient; 2) the burdens of treatment for the patient's kin; 3) costs of treatment and diagnostics, i.e., material and personnel; 4) costs across the entire cycle of care; 5) cost-effectiveness; 6) societal costs; and 7) costs to the climate, i.e., deterioration of natural resources, in decision making (4).
Modifications	Change in content	For example, one item was changed from stating that clinicians base their actions on available 'evidence from medical literature' to stating that they integrate medical literature, clinical expertise, and patient values.
	Additions that attenuate an item or provide conditions	Additions such as 'if appropriate', 'when available', and 'if needed'.
	Clarifications	For example, the term 'aggregated PROMs' was replaced by a description.
	Splitting or subdividing items	For example, instead of an activity describing that the clinician informs on the patient's care experiences, this activity was subdivided to focus on 1) care experiences in the clinician's own department and 2) in the patient's entire care path.
Introduction of sub-items	To specify terms used in the current list of activities	Sub-items were used to specify three generic terms used in activity statements: 'PROMs', 'consultation room dashboard' and 'extending consultation time' The sub-items investigated the expert panel's perception of the importance of 1) different types of PROMs, 2) the content of the consultation room dashboard, and 3) ways to extend consultation duration (see final part of Additional file 7).

3.3 Analysis of the panelists' final judgments

Consensus: important

A thematic analysis of the 63 activities that achieved group agreement on their importance for an ideal value-based outpatient specialty consultation revealed nine themes (see left column in Table 7). The full list of activities is presented in Additional file 7.

Table 7. A summary of the thematic analysis results of the 63 activities that achieved group agreement

Theme	Theme description	Sub-theme	# of activities	Activity example
Empowering voices	Supporting and preparing the patient and clinician for active and effective participation in the care process.	Preparing for the consultation	5	<i>If requested, the patient completes an online questionnaire prior to the consultation.</i>
		Managing patient expectations	4	<i>The clinician explains that the aim is to tailor care to what really matters to the patient.</i>
		Providing medical insight	2	<i>For each desired goal or health problem that matters to the patient, the clinician explains the relevant treatment options and their advantages and disadvantages (including, if appropriate, the option to do less or nothing).</i>
Discussing the biopsychosocial health outcomes as reported by the patient	Recognizing the patient's experiences and expertise as a 'whole person', encompassing their physical, mental, and social wellbeing.	Communicating effectively	7	<i>The clinician takes the patient's health literacy, communication skills, and digital skills into account.</i>
		Discussing patient-reported outcomes	7	<i>The clinician discusses any concerns and/or fears the patient may have.</i>
		Considering outcomes over time	2	<i>The clinician discusses how the patient's perceived health and wellbeing changes over time.</i>
		Considering the patient within their living context	3	<i>The clinician carefully develops a broad understanding of relevant matters concerning the person behind the patient (including their daily activities, living situation, and background).</i>
Building and maintaining a therapeutic relationship	Being familiar and involved with the patient's story and values.	Speaking to the heart of the patient	1	<i>The clinician includes what really matters to the patient in the conversation.</i>

Table 7. Continued.

Theme	Theme description	Sub-theme	# of activities	Activity example
Involving the patient's kin	Involving the patient's partner, family, or carers in decisions and acknowledging the impact of their health condition on the patient's health and treatment.	Involving the patient's kin in decisions regarding the treatment plan	1	<i>If appropriate, the clinician discusses the opinion, needs, and/or wishes of the patient's kin regarding the treatment plan.</i>
		Inquiring about the wellbeing of the patient's kin	1	<i>If appropriate, the clinician discusses the wellbeing of the patient's kin.</i>
Sharing power and responsibility	The patient and clinician collaboratively contribute to the care process with shared power and responsibilities.	Setting a shared agenda	3	<i>The patient indicates what he/she wants to discuss with the clinician (on their own initiative or at the invitation of the clinician).</i>
		Sharing in the decision-making process	3	<i>During decision-making, the clinician considers the patient's preferences regarding the treatment plan insofar as possible.</i>
Optimizing care for the individual patient	Seeking optimal care tailored to the patient.	Learning from the patient's experiences and values	3	<i>The clinician asks the patient about their experience(s) with the care received across the entire care path.</i>
		Optimizing care	6	<i>The clinician continually and actively strives for optimal outcomes that really matter to the patient.</i>
		Following guidelines and diverting from them when appropriate	3	<i>The clinician considers for each patient whether it is necessary to deviate from care pathways and/or guidelines.</i>

Table 7. Continued.

Theme	Theme description	Sub-theme	# of activities	Activity example
Coordinating care	Ensuring that the appropriate professionals work together or are involved in the care process in a timely and complementary way.	Collaborating in the full care chain and considering continuity of care	5	The clinician consults and/or refers to another (healthcare) professional if necessary and in consultation with the patient.
		Documenting data transparently	2	The clinician clearly documents relevant VBHC matters that the patient reported during the consultation in the electronic patient file (e.g., regarding the patient's values, functioning, quality of life, and private situation).
Dealing wisely with available resources	Allocating resources wisely by making informed value- judgements to prevent waste.	Efficiently allocating resources resulting in similar or improved patient outcomes	3	The clinician prevents unnecessary medical investigation and treatment (e.g. duplication, repetition or surplus medications).
		Weighing financial costs	1	Whenever possible, the clinician opts for cheaper care alternatives with similar or greater benefits for the patient (such as generic instead of patented medication).
		Refusing low-value care	1	If a patient and/or the patient's kin request health services lacking a clinical indication, the clinician will discuss this issue with the patient and/or the patient's kin to determine the extent to which the requested service is of real added value for the patient and/or the patient's kin. If necessary, the clinician will refuse the request.

Consensus: unimportant

The two items that the group agreed were not important for value-based outpatient specialty care covered consideration of healthcare's societal burden and the climate footprint (see Additional file 7).

Lack of consensus

The expert panel failed to reach a consensus on 11 activities (see Additional file 7). These include four cost-focused activities. Further, no group agreement was established on clinician autonomy in using Patient Reported Outcome Measures (PROMs), the use of Patient Reported Experience Measures (PREMs) and 'patient-like-me' data, and the need for additional time post-consultation.

Sub-items

Responses to the 19 sub-items indicate that the expert panel reached consensus on the importance of including domain and disease-specific PROMs in the patient's questionnaire as well as including an open question to elicit what patients want to discuss. Disagreements remained regarding the importance of generic PROMs and PREMs. Other outcomes resulting from the sub-questions are presented towards the end of Additional file 7.

3.4 Analysis of panelists' comments

In total, 18 experts provided more than 400 comments related to specific items and nine broader, overarching comments. A quarter of all comments concerned activities involving PROMs.

3.4.1 Theory does not equal practice

Comments revealed that clinicians will consciously not bring all the activities that were deemed to enhance value into every consultation. Experts provided two reasons for this. First, they indicated that VBHC necessitates contextual decision-making, implying that the context defines which activities will be brought into practice and which will be omitted. Relevant contextual factors included the patient's disease stage, the course of the conversation, and personal factors such as the age, health literacy, preferences, and state of mind of a patient.

A second and more concerning reason is that almost half the expert panel spontaneously mentioned time constraints, sometimes in combination with the rigidity of the consultation system, and challenges regarding supporting tools as barriers to successfully pursuing value during outpatient specialty care. To exemplify, one expert mentioned *"meanwhile it became clear that shared decision making is not the same as presenting options. Unfortunately, consultation time did not change accordingly"*. Seven experts mentioned time as a decisive factor in not putting value-enhancing activities into practice. Although one expert believed that PROMs, if properly facilitated, could reduce consultation time and another expert mentioned

a reduction of the number of consultations needed, other experts indicated that value-based patient interaction using PROMs prolonged consultations. They mentioned that patients wanted to tell their story despite having already provided similar insights in the survey.

Simply extending the consultation if needed might not be the solution as multiple experts noted that this may lead to friction with the current rigid organization of consultations, capacity, patient equity, and one expert mentioned the pleasure they obtain from their work. Finally, an expert mentioned feeling restricted in aiming to personalize care trajectories as part of VBHC given the VBHC's seemingly contradictory emphasis on standardized care paths.

3.4.2 Perspectives on the use of PROMs

With regards to the hospital's implementation of PROMs, clinicians shed different lights on the following topics: 1) the frequency of inquiry, 2) function differentiation regarding who is responsible for discussing PROMs with patients, and 3) large-scale and standardized versus on-demand use. One expert explained that PROMs are used for two distinct purposes, each introducing a different set of requirements. First, using PROMs for research necessitates standardization and a large, representative sample, which could be achieved by involving all patients. Some experts experienced this large-scale approach, which is the hospital's current approach, as *"an overkill of questionnaires"* and as not appropriate for certain patient groups and an impediment to their personal research activities. From their perspective, the primary purpose of PROMs should be to support the individual patient. Consequently, they seek the possibility to personalize inquiries. Aggregated PROM data, i.e., 'patient-like-me' data, were considered to complicate the consultation and only be of value in specific cases. Further, one expert cautioned against neglecting patient complaints by considering them as 'normal' based on aggregated PROMs.

3.4.3 Perspectives on resource-consciousness

Analysis revealed that resource-consciousness in outpatient specialty care may be experienced as difficult and that it may conflict with patient preferences. Five different perspectives among clinicians regarding the importance of resource-consciousness as well as their role therein are described in Table 10.

Table 10. Clinician perspectives on resource-consciousness

Clinician perspectives on resource-consciousness	Supportive quotes
Issue: taking resource stewardship is difficult and may conflict with patient preferences	<p>"Discussions about money inside the consultation room are very unpleasant and difficult" (medical specialist)</p> <p>"Every medical specialist who has been working here for a considerable time has a handful of patients who, medically speaking, do not need to come back, but who really appreciate being 'checked' every now and then" (medical specialist)</p> <p>"We can't do all the diagnostic tests that patients want [...] patients want total body scans etc." (nurse specialist)</p>
Perspective 1: being resource-conscious is not important	<p>"My job is not about costs, but about care. I do everything I can offer" (nurse specialist)</p>
Perspective 2: patient outcomes and experiences should be prioritized over resource-consciousness	<p>"[Considering costs over the full care path] is of course important but, for now, I will not let that stop me from providing all the care I deem necessary in consultation with the patient of course" (nurse specialist)</p> <p>"[I consider costs of diagnostics] unless other interests are in play: if an ultrasound will take three weeks and a CT scan can be done the same day and the issue is important, then the patient will get the expensive CT" (medical specialist)</p>
Perspective 3: we should aim for wise resource allocation that simultaneously reinforces patient outcomes and their experiences, or at least does not impact them negatively	<p>"Less is more for some of our patients" (nurse specialist)</p> <p>"I am surprised about how often I can tell patients that they are taking unnecessary medication" (medical specialist)</p>
Perspective 4: resource-consciousness is important, but lack of transparency inhibits this behavior	<p>"In my private sphere, I think that it [considering the climate footprint] is important, but I can't oversee it in the hospital" (nurse specialist)</p> <p>"But we lack transparency about this [total cost of the patient's entire care path]" (medical specialist)</p>
Perspective 5: patient values determine the importance of resource-consciousness	<p>"In my opinion, VBHC is mainly focused on what matters to the patient. Suppose a patient considers the impact of the treatment on the climate or for society to be an important value, then you can integrate that argument into decisions. [...] I do think that you [the clinician] could ask the patient whether he/she finds a treatment with high monetary costs or a treatment that causes substantial environmental damage objectionable" (medical specialist)</p>

3.4.4 *The contribution of VBHC*

Fifteen experts shared how they perceived VBHC to impact their care processes and outcomes compared to the situation without VBHC. Two experts mentioned that VBHC truly encourages patients to participate with clinicians enacting effective questioning and good listening. This resulted in an enhanced level of mutual preparedness (five experts) and patients setting the agenda (one expert), which, in turn, was perceived to lead to a deeper (one expert) and more efficient (three experts) consultation that is truly focused on the patient's needs and values (four experts) and those of the patient's kin (one expert). Another expert, although not observing any change in the patient-clinician conversation, appreciated that VBHC automatically registers data regarding symptoms, functioning, and quality of life. This registration was more widely appreciated because it led to an instantaneous and enhanced overview of patient outcomes (two experts), better insights into how outcomes change over time (one expert) with sometimes unexpected discoveries of important issues (one expert). One expert mentioned that access to patient-reported data allowed a quick intervention if needed and led to efforts to improve care processes and outcomes. Another expert mentioned that aggregated data allowed comparisons with similar patients. As a result of the abovementioned outcomes, one expert had experienced an increased satisfaction of patients and their kin with the care trajectory.

4 DISCUSSION AND CONCLUSION

4.1 Discussion

This is the first study to our knowledge to determine a consensus on which activities executed by the patient and/or the clinician are important for an ideal value-based outpatient specialty consultation from the perspective of clinicians. A three-round Delphi study resulted in 63 activities that reached group consensus as being important and two activities that the expert panel considered to be unimportant. There were a further 11 activities on which the clinicians could not agree.

A thematic analysis of the activities that were considered important revealed the following nine themes: 'Empowering voices', 'Discussing the biopsychosocial health outcomes as reported by the patient', 'Considering the patient as a person within a context', 'Involving the patient's kin', 'Sharing power and responsibility', 'Optimizing care for the individual patient', 'Coordinating care', 'Dealing wisely with available resources', and 'Building and maintaining a therapeutic relationship'. The results are consistent with results from earlier research on value-enhancing activities during inpatient care [6]. However, our study is more detailed, with six times as many activities identified, and contributes new angles such as considering the biopsychosocial perspective and care coordination. Further, our study found that VBHC requires contextual decision-making: that not all activities should and can be included in every

consultation. Hence, context defines the definition and use of VBHC [28]. Resultantly, the final list of activities should be seen as a toolbox rather than a checklist. Continued reflection on the list is necessary as the attributed importance to activities may change with the evolvement of the spirit of the age, technology, and health system.

4.1.1 VBHC in relation to other concepts and models

There is substantial similarity between the nine themes derived in this study, previous research on person-centered care (PCC) [29] and other types of centeredness in care [30], and the model of healthcare quality [31]. Resemblances include attention for the patient as a person, a holistic focus, shared power and responsibility, attention for the patient's kin, a therapeutic relationship, care coordination, and continuity of care. These resemblances suggests that PCC is an essential part of an ideal value-based consultation. Further, it proves that VBHC aligns to the criteria for high-quality healthcare. Our study explicitly distinguishes between the acts of 'empowering' and 'sharing power' as VBHC seems to emphasize activities that prepare patients for taking power. Indeed, VBHC seems to bring new momentum to the use of PROMs [32].

Three domains from aforementioned literature that were not mentioned in our study concern healthcare accessibility, safety and the clinician as a person. In our understanding, care accessibility primarily plays a role prior to the consultation. During counseling, clinicians contribute to good access to future care through efforts in care coordination. Absence of activities regarding safety and clinicians' self-reflectivity in our findings may be because these are seen as norm or occur on the periphery of one's attention. Two themes considered important in VBHC that are not, or only to a lesser degree, described in PCC are care optimization and responsiveness to scarcity. Strikingly, these themes were not mentioned by the expert panel to be new in VBHC compared to care without VBHC (see 3.4.4). All in all, this comparison confirms that VBHC overlaps with earlier care concepts and tools [33]. To pursue value in outpatient consultations, clinicians may need to focus on strengthening PCC behaviors in combination with optimizing care and taking resource stewardship. This finding supports the establishment of the overarching concept of 'Person-Centered, Value-Based HealthCare' (PCVBHC) [34].

To explore how this study can benefit outpatient care, for instance through the education of clinicians, the results of this study are compared to the Calgary-Cambridge consultation model (C-C model) [10]. This comparison reveals several resemblances and some differences. The similarities include preparing for the consultation, considering the patient perspective, and SDM. It is notable that the C-C model does not explicitly include resource stewardship, despite this objective being addressed in previous consultation models [35]. Conversely, while the physical examination is a core element in the C-C model, none of the activities in our study relate to this. From this, we conclude that VBHC places more emphasis on the conversation,

and perhaps views the physical examination as just one of the ways to gather information for informed decision making. Further, VBHC seems to emphasize preparation prior to the consultation and the need for continued attention to patient outcomes, experiences, and resources over the full multidisciplinary care path. The comparison of this study's results with the C-C model suggests that the C-C model indeed provides a solid base for VBHC but also points towards potential developments regarding resource-consciousness, care optimization, and a longitudinal multidisciplinary focus.

4.1.2 Findings compared to the patient perspective

Although patients were not included in our expert panel, literature on patients' perspectives on what constitutes healthcare quality [36,37] and literature on patient values [38] suggests that patients do appreciate most of the activities identified in this study as important for an ideal value-based outpatient specialty consultation. For example, patients value being seen as a person and being empowered [38]. Further, patients and kin mainly approved the model of healthcare quality that we previously declared to be compatible with our findings (see 4.1.1.) [37]. A notable exception is that none of the patients in aforementioned study discussed an attribute directly connected to the model's domain 'eco-friendliness'. This corresponds with our finding that clinicians found it unimportant to consider the climate footprint in value-based outpatient specialty care. Nonetheless, both the clinicians in our study and literature on the patient perspective did attribute importance to more indirect mechanisms that benefit healthcare sustainability such as reduction of healthcare overuse. Overall, based on literature, we cautiously expect that patients will agree with the activities that our expert panel considered important for VBHC in outpatient specialty care. Conversely, patients may hold different opinions regarding the activities that did not achieve consensus among the expert panel. For example, we imagine that certain patients will attribute importance to having a clinician who, if available, shares information from 'patients-like-me', especially with the knowledge that patients value transparency [31,37].

4.1.3 Values at odds

In 1984, Mishler introduced '*the voice of lifeworld*' and '*the voice of medicine*' as two ways to approach a patient-clinician conversation [39]. Respectively, these relate to 'personal value', i.e., considering the patients' experiences, needs, preferences and goals, and 'technical value', i.e. achievement of the best possible outcomes with available resources [4]. VBHC seems especially to draw attention to personal value with activities such as discussing patients' fears and SDM. However, in VBHC, not only must clinicians be attentive to the patient's lifeworld and be technically skilled, their accountability is extended to include resource stewardship in order to achieve 'allocative value', i.e. equitable resource distribution across all patient groups [4]. On this basis, we suggest that VBHC introduces a new voice: 'the voice of scarcity'.

The results from this study suggest that resource stewardship is easiest to pursue when resource-conscious decisions at the same time benefit the patient or at least do not harm their outcomes and/or experiences, thereby creating a win-win situation. Experts mentioned to also consider 'allocative value' by being cautious to extend consultation duration in favor of one patient when this reduces available time for another patient. It becomes more difficult when patients' preferences oppose resource-conscious decisions. Despite agreement among the expert panel regarding the need to refuse medically unnecessary care, some indicated to be unsuccessful in this for social reasons (see the second supportive quote in Table 10 as an example). This implies that clinicians sometimes prioritize 'patient value' over the other types of value. This finding resonates with findings from previous work [7,40]. Overall, our findings suggest that clinicians do see opportunity to expand their professional role to include some forms of resource stewardship, especially those efforts that also benefit the patient.

4.2 Limitations

This study may have limited generalizability due to the single-center design and its focus on clinicians in pacesetter VBHC teams. This is first because university hospitals cater for a more complex case mix of patients, requiring multidisciplinary care which might involve different interactions during a consultation. Moreover, implementation choices by the hospital studied may have colored the experts' opinions, for example regarding the use of PROMs and PREMS. Further, clinicians in pacesetter teams may be more knowledgeable about VBHC and hence consider more activities as important. Despite these reservations, the involvement of clinicians from pacesetter teams can be seen as a strength of this study as they have the greatest VBHC expertise and experience. A second limitation concerns an element of the methodology [13] in that only dichotomous responses were allowed, i.e., important/unimportant, which made it impossible to distinguish between different levels of importance attached to activities. Last, social desirability bias cannot be ruled out despite efforts to reduce this.

4.3 Future research

Further multi-site and/or longitudinal evaluations may be done to test and refine the outcomes of this study and to clarify contextual influences. Researchers may wish to evaluate to what extent and how value-enhancing activities are brought into practice and study associated facilitators and barriers. As the success of VBHC may depend on local facilities and how care is organized, thought should be given to what contextual conditions are necessary for value-based interventions to succeed, and how these conditions can be achieved.

Future research could also usefully study the patient's perspective on value-based outpatient specialty care and extend the focus to other settings in a patient's cycle of care, e.g., primary care. Furthermore, implementation choices with regards to VBHC seek further investigation.

Last, the results of this research could be used to study the impact of value-enhancing outpatient specialty care activities on patient and clinician experience and outcomes.

4.4 Conclusions

This study has revealed that a value-based outpatient specialty consultation embraces a multitude of activities. Context determines which activities are enacted. Although contextual decision-making allows clinicians to adopt activities that are appropriate for an individual patient, contextual conditions such as a lack of time may dissuade clinicians from carrying out some of the activities that they deem value-enhancing. Comparing this study's results with earlier care concepts emphasizes the person-centeredness of a value-based outpatient specialty consultation. This indicates that clinicians can build upon their PCC behaviors in pursuing value, supporting the 'Person-Centered, Value-Based HealthCare' (PCVBHC) concept [34]. VBHC also expects clinicians to pay attention to both improving the care of the individual patient and to allocating resources wisely to benefit patient care as a whole. Clinicians especially see opportunity to allocate resources wisely when this simultaneously benefits the patient. Clinicians attributed no importance to healthcare's societal burden and climate footprint for value-based outpatient specialty care. They disagreed on some activities regarding PREMs, 'patient-like-me' data, and healthcare costs.

4.5 Practice implications

The results of this study offer a toolbox to guide and evaluate clinicians' and patients' activities in outpatient specialty care. Ongoing attention is required to account for, and adapt to, context as value depends on the appropriateness of the selected activities as well as the quality of their performance rather than the number of activities undertaken. Second, our study contributes to the discussion on resource-consciousness in the consultation room. It shows that resource-stewardship and patient-preferences can go hand-in-hand, which has implications for framing. Education may focus on dealing with values that are at odds, e.g., when patient preferences conflict with resource-consciousness. Furthermore, to unleash the potential of VBHC, managers may give thought to giving clinicians increased control over consultation timings and structure. Facilitative tools should be designed to fit into the rapid pace of clinical work. Finally, VBHC implementers should acknowledge the multidimensionality of VBHC and question to what extent it is realistic to 'implement' VBHC in its totality, or whether the approach should be designed to strengthen value-enhancing behaviors.

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AIM 3



Examining the perceived impact of value-based healthcare on healthcare professionals



CHAPTER 6

Value-based healthcare from the perspective of the healthcare professional: a systematic literature review

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ABSTRACT

Introduction: Healthcare systems increasingly move toward ‘value-based healthcare’ (VBHC), aiming to further improve quality and performance of care as well as the sustainable use of resources. Evidence about healthcare professionals’ contributions to VBHC, experienced job demands and resources as well as employee well-being in VBHC is scattered. This systematic review synthesizes this evidence by exploring how VBHC relates to the healthcare professional, and vice versa.

Method: Seven databases were systematically searched for relevant studies. The search yielded 3,782 records, of which 45 were eligible for inclusion based on a two-step screening process using exclusion criteria performed by two authors independently. The quality of the included studies was appraised using the Mixed Methods Appraisal Tool (MMAT). Based on inductive thematic analysis, the Job Demands-Resources (JD-R) model was modified. Subsequently, this modified model was applied deductively for a second round of thematic analysis.

Results: Ten behaviors of healthcare professionals to enhance value in care were identified. These behaviors and associated changes in professionals’ work content and work environment impacted the experienced job demands and resources and, in turn, employee well-being and job strain. This review revealed 16 constructs as job demand and/or job resource. Examples of these include role strain, workload and meaning in work. Four constructs related to employee well-being, including engagement and job satisfaction, and five constructs related to job strain, including exhaustion and concerns, were identified. A distinction was made between job demands and resources that were a pure characteristic of VBHC, and job demands and resources that resulted from environmental factors such as how care organizations shaped VBHC.

Conclusion and Discussion: This review shows that professionals experience substantial job demands and resources resulting from the move toward VBHC and their active role therein. Several job demands are triggered by an unsupportive organizational environment. Hence, increased organizational support may contribute to mitigating or avoiding adverse psychosocial factors and enhance positive psychosocial factors in a VBHC context. Further research to estimate the effects of VBHC on healthcare professionals is warranted.

1 INTRODUCTION

Healthcare systems increasingly move toward 'value-based healthcare' (VBHC) [1], aiming to further improve quality and performance of care as well as the equitable, sustainable, and transparent use of resources [1–3]. Thus far, a globally shared definition of VBHC is lacking [4]. Yet, a characteristic shared by most VBHC programs is the multifaceted approach that, on top of clinical outcomes, provides a prominent place to patient-reported quality and performance indicators. Examples of these include 'Patient Reported Outcome Measures' (PROMs) and 'Patient Reported Experience Measures' (PREMs) [2].

The early initiators of VBHC state that, in addition to improving health value, employee well-being should be part of healthcare organizations' imperatives since healthcare professionals play a central role in VBHC [1]. This aligns to the quadruple aim of (1) improving health outcomes for patients, (2) enhancing patient experience, (3) enhancing healthcare professional experience, and (4) reducing cost (5). In comparison to traditional care practices, VBHC may change professionals' work by introducing new, or shifting emphasis toward, value-promoting care activities and team-based care (6). Such activities include discussing value with patients, making a shared decision, learning, and improving based on quality and performance indicators and providing care in pathways (7–9). Although these activities may not all be completely new [10], the difference is that each activity is now used as a means to generate value rather than being an end-goal in itself. VBHC is different from current care and requires new competencies of professionals [11]. Psychosocial factors at work describe how work factors, such as the work environment and job content, interact with personal factors, such as a person's competence and expectations, to impact employee experience and well-being [12, 13]. Hence, we may expect changes in professionals' well-being with VBHC currently gaining traction.

However, to date, evidence from studies taking a psychosocial perspective on VBHC, with insights about how professionals contribute to VBHC and how VBHC influences their well-being, is scattered. Most studies on VBHC understandably focus on patients and clinical results [14–16] and build on insights from implementation science (e.g., [17–19]). Earlier reviews focusing on healthcare professionals and VBHC studied education [20] and interventions to reduce low-value behavior [21]. Current literature suggests that VBHC meets the interest of professionals i.e., to deliver value for patients [1] and positively contributes to their work experience [22]. However, the relation between VBHC and professionals' interests nor the contribution of VBHC to their work experience has been convincingly established. Current literature hints at a relation between VBHC and various job demands and resources including work pressure, emotional demands, and autonomy [23]. The literature further suggests both positive and negative relations between VBHC and professionals' well-being, such as improved engagement [24] and potential fears concerning among others accountability and value-based competition on results [1].

This systematic literature review synthesizes empirical findings centering around the question ‘how does VBHC relate to the healthcare professional and vice versa?’. The review aims to provide a comprehensive overview of professionals’ roles in VBHC, experienced job demands and resources as well as the impact that value-based work can have on professionals’ well-being. This work may contribute to mitigating or avoiding adverse psychosocial factors at work for healthcare professionals in VBHC and enhance positive psychosocial factors.

2 METHODS

This systematic review followed the PRISMA2020 guidelines (Preferred Reporting Items for Systematic Reviews and Meta- Analyses) [25].

2.1 Search Strategy

An extensive three-armed search strategy was developed in consultation with the Erasmus Medical Center’s Medical Library. The search string followed the PICO statement by including keywords that describe (1) the population, i.e., healthcare professionals, their teams or specific occupations, (2) the intervention, i.e., VBHC, and (3) outcomes, i.e., how the population impacts VBHC or vice versa (see Additional file 8). The comparator is not applicable in this work.

The first part of the search string included generic descriptions of professionals or care teams, such as ‘professional,’ ‘staff,’ ‘nurse,’ and ‘clinician,’ as well as specific occupations derived from the International Standard Classification of Occupations ISCO-08 [26]. Occupations both in hospital and other healthcare settings were included.

In line with terminology used by Porter and Teisberg [1], we included ‘high-value care’ and ‘value driven care’ in the search string as synonyms for VBHC. In the second arm of the search strategy, we searched for the use of ‘value-based’ OR ‘valuebased’ OR ‘high-value’ OR ‘value-driven’ mentioned within three words-distance of the word ‘care’ OR ‘healthcare’ since a Medical Subject Heading (MeSH) term for VBHC is missing. Studies only reporting on value-based payment methods were excluded, as these are beyond the scope of our work.

Third, we searched for keywords describing a relation, a characteristic or action of a professional or an outcome relevant to professionals. Examples of keywords describing a relation were ‘affect,’ ‘cause,’ and ‘benefit.’ Keywords describing a characteristic or action of a professional included, among others, ‘attitude,’ ‘knowledge,’ and ‘behavior.’ Keywords describing an outcome relevant to professionals were abstracted from relevant literature and lists of human values [27, 28] and included, among others, ‘workload,’ ‘autonomy,’ and ‘engagement.’

The search string was piloted by checking whether a pre-selected set of 10 relevant studies was indeed retrieved when conducting the search, which was the case for all 10 studies. Additional file 8 contains the full search string and further explanation. The search was performed on December 21, 2020 in seven databases, being Embase.com, Medline ALL Ovid., PsycINFO ALL Ovid, Web of Science (SCI-EXPANDED & SSCI), CINAHL EBSCOhost, Business Source Premier EBSCOhost and EconLit ProQuest. Conference papers were excluded.

2.2 Selection Process

A two-step screening process, comprising title and abstract screening and full-text assessment, was performed by two of the authors independently. Titles and abstracts screening resulted in eligible studies for full-text assessment. In both steps, studies were subjected to pre-defined eligibility criteria. Papers with inconsistent screening outcomes between the first- and second- screener during title and abstract screening were included for full-text assessment. In case of inconsistent screening outcomes in full-text assessment, authors discussed the paper and when no consensus was reached full-text assessment by the last author was decisive. This was the case for three papers.

2.3 Eligibility Criteria

The exclusion criteria for all yielded studies were 'not a peer-reviewed paper and/or journal,' 'no empirical data,' 'not part of/contributing to VBHC or synonym,' 'no relation to the healthcare professional,' 'only about VBHC education,' 'only about value-based payment or synonym,' and 'non-English.' In absence of consensus on a VBHC definition [4], we relied on the authors' judgement i.e., any study in which the original author identified the intervention as 'value-based healthcare' or its synonyms was assumed to be about VBHC. We identified a healthcare professional as anyone caring for, or aiming to cure, patients or clients with a formal training to do so. Consequently, consultants, administrative staff and data analyst, among others, were not considered as healthcare professionals.

2.4 Data Extraction

Data extraction comprised two steps. First, general study characteristics were extracted. This was followed by data extraction on the relation between VBHC and the healthcare professional.

General Study Characteristics

Elements for generic data extraction were informed by discussion among all authors and included year of publication, country, study aim, study design, healthcare setting, profession, healthcare discipline, VBHC terminology, VBHC components applied, and the degree of professionals' involvement in VBHC. Data were abstracted by the first author.

The Relation Between VBHC and the Healthcare Professional

First, an inductive approach was applied to analyze the relation between VBHC and the healthcare professional using thematic analysis [28]. This started with familiarization with the 'Results' sections in the included studies and selection of relevant quotes. Afterwards, semantic codes that closely reflected the original authors wording were attached to the selected quotes. Subsequently, repeated patterns of meaning in these codes were clustered to generate latent themes describing the underlying codes. Last, the themes were revised and possible interconnectivity between themes was indicated to derive a thematic map. Atlas.TI software was used to facilitate this process.

The resulting thematic map showed various similarities with the Job Demands-Resources (JD-R) conceptual model [12]. JD-R is a recognized psychosocial model applied to explore and design the interaction between 'the job' and 'the professional.' More specifically, JD-R describes that work has certain characteristics that make professionals feel engaged or strained, depending on whether these are perceived to give energy, i.e., job resources, or take energy, i.e., job demands. The level of engagement and job strain can subsequently be used to predict performance. Since JD-R allows flexible use and tailoring to fit specific contexts [29], we iteratively adapted the JD-R model by including all abstracted data regarding the relation between VBHC and the professional. Use of JD-R as an underlying conceptual model allowed for our findings to be compared to earlier scholarly work on job demands and resources.

Subsequently, the resulting modified JD-R model was used for deductive analysis. Quotes from the 'Results' sections in the included studies were selected and attached to one or multiple components of the modified JD-R model using Atlas.TI software. Consistent with the eligibility criteria, data about value-based payment and VBHC education were omitted. The resulting quotes were analyzed at both a latent and semantic level. The latent approach was applied to define whether experiences were a job resource or demand as this was often not explicitly mentioned. Next, we worked from the wording as used by the original author to inductively cluster similar data within the JD-R components to form codes. The resulting codes included among others 'workload' and 'joy in practice.' Overall, the analysis process was iterative and evolved from description to interpretation. Throughout this process the descriptive evidence and interpretations were discussed with all co-authors to validate line of reasoning, comprehensiveness and adequate representation of the included studies.

2.5 Quality Appraisal

Quality appraisal of the included studies was performed using the Mixed Methods Appraisal Tool (MMAT) [30], which is applicable to qualitative, quantitative, and mixed methods studies. For each study design, MMAT provides a set of five quality criteria. Mixed methods studies were assessed on both the qualitative and quantitative set of criteria and a complementary set that specifically appraises the quality of the mixed methods design. The scores resulted

in a classification of each study into 'high,' 'medium,' or 'low' research quality. Additional file 9 provides details on the scoring methodology and MMAT scores for each included study. Quality appraisal was used to provide an overall impression of the study quality. No studies were excluded based on the MMAT scores.

3 RESULTS

3.1 Selected Studies

The search yielded 3,782 records. Duplicates and literature published earlier than the introduction of VBHC in 2006 [1] were removed, resulting in 1,775 papers for title and abstract screening. Finally, backward citation searching of the included studies resulted in inclusion of six additional papers. Based on the assessment using the exclusion criteria, 45 studies were eligible for inclusion. Figure 1 displays the corresponding PRISMA diagram.

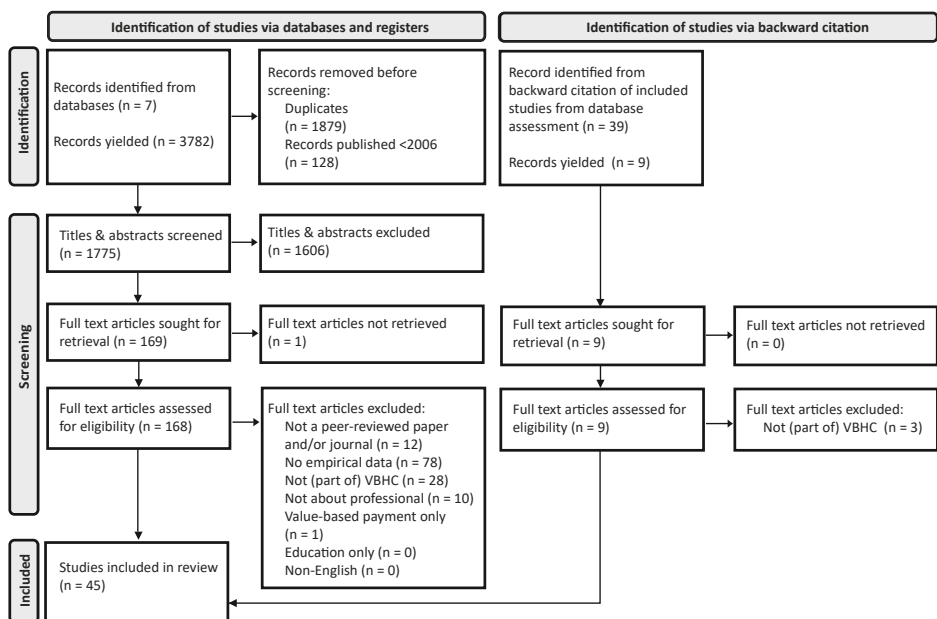


Figure 1. The PRISMA flow diagram following PRISMA2020 guidelines [25]

Study Characteristics

Of the 45 included studies, 23 had a qualitative study design, 14 were quantitative and 8 applied mixed methods. Additional file 10 contains the full list of included studies and a summary table.

Study Setting

Healthcare professionals from the USA ($n = 23$), Sweden ($n = 8$), and The Netherlands ($n = 7$) were most frequently studied. No studies were performed in low-income countries. Four Swedish studies reported on the same intervention and population [24, 31–33]. Hence, from the 45 studies included in this review 42 are unique.

From all studies, 24 took place in a hospital. The other studies focused on ‘accountable care organizations’ (ACOs) ($n = 2$), primary care ($n = 2$), ambulatory care ($n = 2$), medical laboratory ($n = 1$), oral healthcare ($n = 1$), home care ($n = 1$), not applicable/specified ($n = 3$), or different combinations of care settings ($n = 9$), which included the above and new settings such as elderly care, maternity care, midwifery practice, and physiotherapy. The included studies focused on various medical specialties such as internal medicine, orthopedics and cardiovascular care. The studied populations were trained healthcare professionals ($n = 31$), residents ($n = 7$), or a combination of both ($n = 2$). Five studies focused on other healthcare actors or did not specify the composition of professionals involved.

Defining VBHC

‘Value-based healthcare’ (VBHC) has been used as term by 27 studies, followed by ‘high-value care’ (HVC) ($n = 12$) and ‘high-value, cost-conscious care’ (HVCCC) ($n = 4$). Two studies used terms interchangeably. For the readability of this review, the term VBHC will be used in the remainder of this text to refer to all of the previous.

VBHC in general, without specification of the value-enhancing interventions, was studied in 11 studies. The other studies primarily reported on team-based care models, outcome measures, quality improvement, discussing value in the clinical encounter, cost-consciousness, and care coordination within the organization’s walls as specific components of VBHC. Less frequently studied VBHC components included population health, prevention, collaboration in the full care chain and redesign of pathways and workflows. In 24 studies the population actively participated in a VBHC intervention. In 19 studies it was uncertain to what degree participants were involved in VBHC, for example studies evaluating VBHC awareness and beliefs. Two studies did not collect data directly from professionals. These studies focused on open workforce positions in VBHC and development of a framework regarding professionals’ roles in VBHC.

Research Design and Quality

Whereas few studies explicitly investigated the implementation process of VBHC (e.g., [24, 34, 35]), the majority of studies did not clarify the time frame between VBHC implementation and data collection for scholarly work. Other than one study deploying the JD-R model [23], none of the included studies built on existing conceptual models. Five validated research instruments to study VBHC in relation to the healthcare professionals were used, containing three full-scales [36–38], one sub-scale [39], and one observer-based instrument [40].

Quality appraisal showed that 22 studies were rated as high quality, 12 studies medium quality, and 11 studies low quality. Additional file 9 provides details. Overall, qualitative studies scored highest and mixed methods studies had the lowest scores.

3.2 The Modified JD-R Model

Figure 2 presents the modified JD-R model that the authors developed based on inductive analysis, subsequently applied for deductive analysis. Two modifications were made to the original JD-R model [12]. First, an additional column was added on the left-side with elements specific to VBHC. These included the ‘professional,’ the ‘job’ of pursuing value in care and the ‘environment’ in which VBHC takes place. This additional column allowed studying antecedents of job demands and resources. The column in the middle reflected the demands and resources that professionals experienced when providing VBHC. These demands and resources were connected to the right column comprising the constructs of employee well-being and job strain.

Second, as outcomes of employee well-being and job strain, we distinguished between ‘day-to-day’ performance and long-term performance. The JD-R construct ‘performance’ at the end of the conceptual model was omitted as it suggests a long-term focus. Although work can impact professionals’ long-term performance, such as absence and intention to leave practice [41, 42], we concluded from the analysis of the included studies that VBHC needs to mature before it is possible to observe long-term effects of VBHC on professionals’ performance. Hence, outcomes related to employee well-being and job strain were linked back to the left column that described the professionals’ day-to-day performance in value-based work. Patient performance, such as health outcomes [18, 43], and organizational performance, such as operational and performance metrics [44, 45], have been studied. However, these were omitted as they are not the scope of this study.

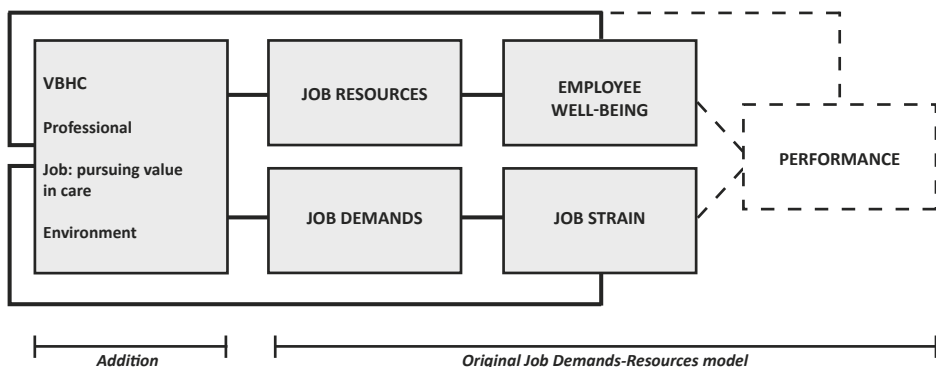


Figure 2. The modified JD-R model that was informed by inductive analysis and subsequently used for deductive analysis

3.3 Thematic Analysis

Over 800 quotes that resulted from the 45 included studies were thematically analyzed using the modified JD-R model. Figure 3 shows that VBHC was associated with specific job demands and resources. Besides providing an overview of these factors, we distinguished between two types of job demands and resources. Namely, job demands and resources that were purely informed by the characteristics of the job, in this case pursuing VBHC, and job demands and resources that stemmed from characteristics of the environment. These characteristics of the environment included among others organizational structures, culture, and resources, as well as how actors, such as healthcare organizations and policy makers, facilitated, and shaped the job. For example, when a professional experienced that VBHC took more effort than traditional care, this was considered a demand that resulted from the nature of VBHC. When a professional felt pressured by the pace of implementation, this was considered a demand triggered by a characteristic of the environment. Connecting lines in Figure 3 were based on the studies included in the review and hence differ from the original JD-R model. Except for an arrow describing the moderating effect that job demands may have on the relationship between job resources and employee well-being, arrows in the model were omitted to reflect possible bidirectionality.

3.4 Summary of the VBHC Specific Elements

For conciseness, the findings of the VBHC specific elements (left column in Figure 3) are summarized below. Details are provided in Additional file 11. The VBHC specific elements comprised ‘the professional,’ ‘the job,’ and ‘the environment’ as described from the professional’s perspective.

3.4.1 *The Professional*

We identified three topics related to the healthcare professional, namely (1) personal and professional characteristics, (2) conceptual awareness and understanding, and (3) attitudes toward VBHC. Regarding ‘personal and professional characteristics’ studies investigated, among others, age, job function, and professional values in relation to VBHC awareness [46, 47]. Other studies showed mixed results regarding gender and job function in relation to VBHC attitudes and scores [23, 48, 49]. Second, scholars investigated professionals’ conceptual awareness [33, 46, 47, 50] and understanding [24, 31, 33, 35, 46, 49, 51–55] of VBHC, which revealed variation and possible prioritization of either patient outcomes or resource consciousness. Last, professionals’ attitudes to VBHC were shown to be positive [14, 23, 24, 31, 33–35, 46, 48, 53–58] and/or negative [23, 24, 31, 33–35, 38, 47, 50–53, 55, 57–59].

Positive attitudes included professionals mentioning that VBHC was received with hope [35], convincement [24], excitement and enthusiasm [33], and with suggested readiness [58]. Negative attitudes included critique [53], perceived drawbacks [23] and resistance [24, 47, 51, 55], especially in the light of considering costs [38, 52, 55, 57] and discussing costs with patients [57, 58].



Figure 3. Psychosocial factors identified from thematic analysis using the modified JD-R model

3.4.2 The Job of Pursuing Value in Care

Related to professionals' roles and behaviors, studies described VBHC as a bottom-up initiative [14, 24, 31, 32, 34, 47, 53, 54] that expanded roles and established new roles such as the 'contact nurse' function [14, 24, 32, 56, 60–66]. Engaged leadership was studied in

terms of necessity, leadership approaches, competence, personal characteristics, as well as professions that were suggested to take up leadership roles [33, 34, 54, 66, 67]. Analysis revealed 10 specific behaviors that professionals pursued in VBHC, next to acting upon their professional standards [68]. These interconnected and mutually reinforcing behaviors, as visualized in Figure 4, are to (1) focus on what matters to patients and adopt other VBHC mindsets [24, 31–33, 47, 50, 52, 53, 61, 62], (2) measure outcomes [14, 24, 31–35, 44, 56, 68], (3) learn and improve care [14, 24, 31–34, 47, 53, 62, 66, 68–70], (4) organize care around the full cycle of disease [24, 32, 44, 45, 54, 60, 61, 64, 66, 70–73], (5) participate in population health and prevention [24, 62, 66, 70, 72], (6) discuss value in the clinical encounter [31, 47, 50, 55, 56, 58, 63, 64, 74, 75], (7) involve patient representatives [24, 31–33, 50], (8) take accountability for patients and resources [31, 33, 38, 44, 47, 48, 54–57, 60, 64, 68, 69, 74, 75], (9) practice bottom-up engagement [14, 24, 31–35, 47], and above all (10) work in teams and collaborate [31, 34, 50, 61, 62, 66, 68, 72, 76].

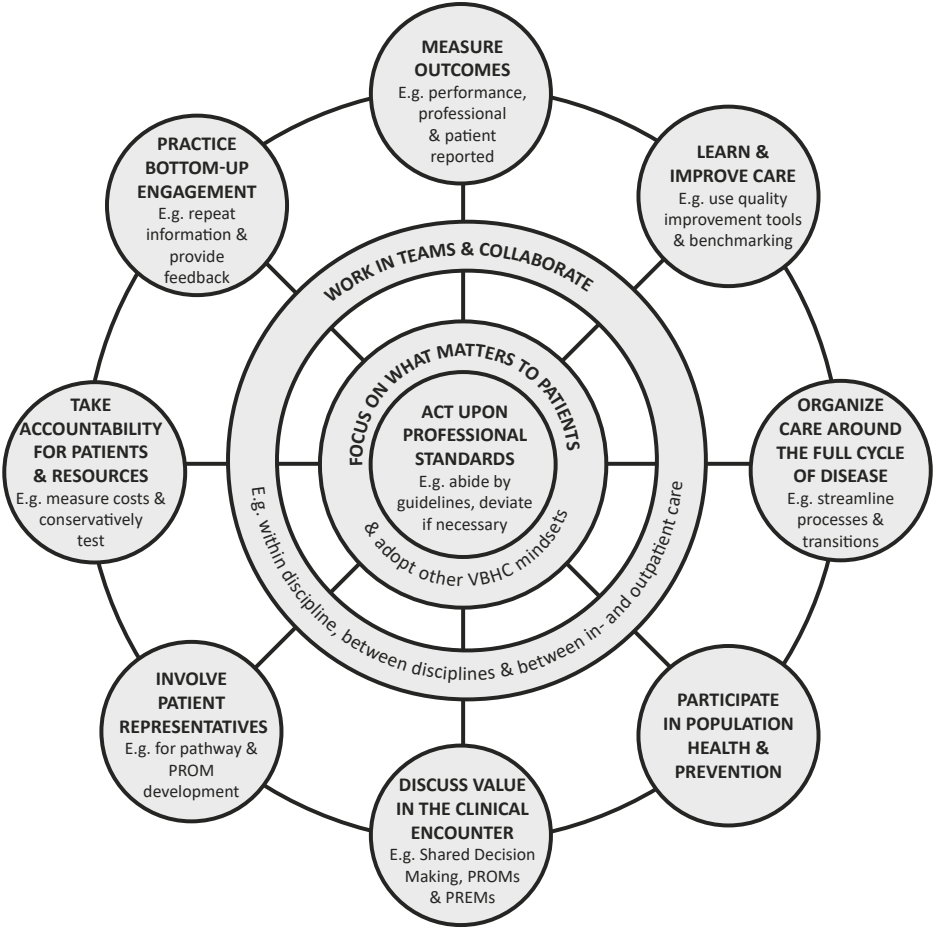


Figure 4. Professionals’ behaviors to pursue value in care identified from thematic analysis

3.4.3 *The Environment*

Related to the perceived VBHC environment, six factors were identified, namely (1) employer characteristics, (2) culture, (3) Human Resources (HR) and capacity, (4) organizational facilities and approaches, (5) meso- and macro-level obstacles, and (6) the time era. First, studied employer characteristics included hospital type, region, health-care intensity, and number of clinicians. These factors were related to, among others, self-reported knowledge, perceived barriers, behaviors, and performance in VBHC [23, 48, 55, 63, 64, 69, 70, 74, 75, 77]. Concerning culture, participants called for culture change [24, 31, 47, 56] and mentioned the need for specific cultures, particularly cultures that are transparent and blame-free [14, 31, 48, 53, 56, 66, 69, 72]. Related to HR and capacity, studies discussed staffing constraints [33, 49, 59, 61], the importance of staff stability [24, 59, 66], staff composition including the use of alternative providers and medical assistants (e.g., [14, 24, 33, 35, 60, 64–66, 71, 72, 76]) and specific open job positions [33, 34, 62, 72, 78]. Remarks made about organizational facilities and approaches involved professionals' desire for dedicated VBHC time [14, 59, 66], step-by-step implementation [34, 35, 56, 72, 76], and an overall supportive environment [24, 31, 53, 54, 56, 57, 59, 62, 65, 66, 72, 73] with specific attention for engaged leadership [14, 33, 35, 54, 66]. Analysis revealed several meso- and macro-level impediments to VBHC [24, 35, 49, 54, 76] such as current waitlists to access specialists. Last, related to the time era, one study reported on the expected progressive impact of Covid-19 on VBHC [72].

3.4.4 *Job Demands and Job Resources*

One study specifically investigated job resources and job demands in relation to professionals' attitudes toward high-value care, cost incorporation and perceived drawbacks using JD-R [23]. Associations, both positively and negatively, were found for the following job demands and resources: autonomy, work pressure, opportunities for development, supervisory coaching, cognitive demands, and emotional demands.

In combination with the remaining studies, thematic analysis identified 16 job demands and resources (see Figure 3), namely: role fit or role strain, workload and time investment, competence, task complexity, work method, meaning in work, improved or more challenging patient contact, teamwork and communication, comfort and confidence, feedback and opportunities for personal development, pace of change and time availability, data and IT, authority and say, autonomy, organizational support and legitimacy, and lastly, pride. Most of these constructs can both be a demand and resource depending on whether they give or take energy. All aforementioned constructs are discussed below. An overview is provided in Table 1.

Table 1. Overview and illustrative quotes on job demands and resources in VBHC

Job resources & demands	Specification	Studies	Exemplifying quote
Role (fit & strain)	VBHC resource	[24,31,35,54, 55,66,72]	<i>'It seems that VBHC appeals to healthcare professionals' closest sphere of interest' [31]</i>
	VBHC demand	[14,24,32,34, 51,55,60,69, 74]	<i>'Another problem was that team leaders found it difficult to prioritize their implementation work because they felt that their patients were their first priority' [33]</i>
	Environment demand	[33,38,55]	<i>'Adding to the complexity of learning to provide HV3C were the mixed messages that residents received at the workplace level regarding their role in HV3C' [55]</i>
Workload & time investment	VBHC resource	[60,66,72]	<i>'[...] medical assistants would room patients, ensure all paperwork was printed and complete, and act as scribes entering most of the information into the EHR. This allowed physicians to focus on patients, not the HER [electronic health record]. As one physician stated, 'I got to practice medicine again!'" [66]</i>
	VBHC demand	[31–33,51,62, 66,71,73]	<i>[The most common barriers to high-value care Included:] 'increased time and effort' [51]</i>
	Environment demand	[33]	<i>'However, the difficulties of accessing data, especially from the internal IT system, took too much time and energy because it required so much manual work' [33]</i>
Competence	Environment resource	[75,77,79]	<i>'The highest measured mean scores were found in the competence areas 'Value-based nursing care' and [...]' [79]</i>
	Environment demand	[31,33,38,49, 50,55,57,59, 60,62,75]	<i>'Our experts did have the concern that [...] many lack the skills and training to take advantage of those data, whether the data were 'mined' by themselves or by a data scientist' [62]</i>
Task complexity	VBHC demand	[60,73]	<i>'Participants shared another disadvantage of CPW [clinical pathways] is 'information overload,' where the number and length of pathways are perceived to be increasing over time. Providers find it challenging to remain up-to-date on which pathways exist and are unable to educate oneself on the content' [73]</i>
Work method	VBHC resource	[24,31,32,49, 50]	<i>'Participants stated that VBHC includes improved working methods and organization of the work' [31]</i>
	VBHC demand	[14,49]	<i>'A systematic approach for the identification of improvement potential, and the selection and implementation of improvement initiatives is lacking. Physicians explicitly mentioned that they struggle with this.' [14]</i>
	Environment demand	[24]	<i>'This organizational structure was frustrating as this contributed to difficulties in tracking and following patients during the course of the disease when they crossed boundaries between departments' [24]</i>

Table 1. Continued.

Job resources & demands	Specification	Studies	Exemplifying quote
Meaning in work	VBHC resource	[24,31,32,35, 56,60,61,66, 73]	<i>'The presence of medical assistants, care coordinators, and other team members, in conjunction with population management tools, created the opportunity to better understand, manage, and care for individual patients and different populations' [66]</i>
	VBHC demand	[24,31]	<i>'Engagement for VBHC also decreased when participants did not see any actual activity or result of their implementation work' [24]</i>
	Environment demand	[24]	<i>'Being forced to make cancellations caused frustration among participants. They then lost their confidence in working with VBHC and found it meaningless trying to make smaller changes in the process when the great problem was lack of capacity' [24]</i>
Patient contact (productive & challenging)	VBHC resource	[50,61,73]	<i>'CPW [clinical pathways] not only improve communication among team members but facilitate conversations with patients and families regarding plans of care' [73]</i>
	VBHC demand	[49–51,55,57, 69,73–75]	<i>'Nearly 40% reported that clinicians are uncomfortable discussing the costs of tests or treatments with patients and reported that clinicians do not feel that physicians should discuss costs with patients' [57]</i>
Teamwork & communication	VBHC resource	[24,44,53,61, 66,73]	<i>'Planning the production also included improvements in the communication between in- and outpatient wards' [32]</i>
	VBHC demand	[24]	<i>'People get confused when we have to start working between silos according to the principle of value for the patients' [24]</i>
	Environment demand	[33,47,49,51, 73]	<i>'This pressure to comply results in providers describing feelings of guilt when nonadherent, which can prevent high-quality care and create conflict within a team' [73]</i>
Comfort & confidence	VBHC resource	[73]	<i>'CPW [clinical pathways] offer the additional benefit of providing practice validation, fostering confidence, and affirming clinical decision-making skills' [73]</i>
	VBHC demand	[48,51,55,60, 69,75]	<i>[Certified Medical Assistants mention] 'a lack of comfort with the complexity of the new tasks' [60]</i>
	Environment demand	[33]	<i>'The participants were also uncertain as to whether or not this manual work could negatively influence the validity of the data' [33]</i>
Feedback & opportunities for personal development	VBHC resource	[9,56,57,73]	<i>'Measuring outcomes and discussing them at an OCN [obstetric collaborative networks] level was considered to have the potential to stimulate learning' [56]</i>
	VBHC demand	[57,73]	<i>'In the absence of such tools, participants perceived a lack of insight into their own care delivery, which was considered a real hindrance to critical reflection on HV3C delivery and their ability to train residents in such behavior' [57]</i>

Table 1. Continued.

Job resources & demands	Specification	Studies	Exemplifying quote
Pace of change & time availability	Environment demand	[14,24,33,49, 50,55,60,74]	<i>'[They] expressed the view that they were burdened by the pressure of time. Participants did not have time to anchor changes in work outside the pilot project team. It was more important to uphold the consultants' time plan than actually to allow enough time for related health personnel' [24]</i>
Data & IT	VBHC resource	[32,50]	<i>'Experienced facilitators focus on the availability of individual, N = 1, PROMs scores, that could prepare both patients and professionals for discussion of patient values' [50]</i>
	Environment resource	[50,61]	<i>'Advanced visualization of the bars and graphs of the PROMs scores (N = 1) [as facilitator]' [50]</i>
	VBHC demand	[50]	<i>'Lack of overview of all existing options for the specific patient groups, for example, regarding transmurial care, rehabilitation, and primary care' [50]</i>
	Environment demand	[14,24,31–33, 35,48–50,62, 66,69,72,76]	<i>'They also reported poor access to both quality data and cost data' [48]</i>
Authority & say	Environment demand	[14,24,33,55, 76]	<i>'The lack of power within the implementation team to drive change' [76]</i>
Autonomy	VBHC demand	[73]	<i>'Physicians reported pressure to abide by CPW [clinical pathways] [...] Participants expressed concern that CPW encourage providers to adhere to an algorithm or an outlined plan, which can stifle one's education by limiting critical-thinking skills and autonomy. CPW lead to 'prescriptive medicine' where care may be simplified too much' [73]</i>
	Environment demand	[24]	<i>'The high tempo during the first three months deprived the participants of their own autonomy' [24]</i>
Organizational support & legitimacy	VBHC resource	[24]	<i>'Even if it was impossible to make use of all the patient representatives' opinions and experiences, participants were proud of their cooperation with the representatives as this contributed to the legitimacy of their implementation work' [24]</i>
	Environment resource	[24,33,48,50, 69]	<i>'Over time, participants came to understand the importance of the hospital director's unequivocal standpoint that VBHC was to be used as a management tool. This standpoint gave legitimacy to decisions within the teams' [33]</i>
	Environment demand	[24,32,33,35, 55,72,76]	<i>'Participants felt they had been thrown into the deep end when it came to implementation work' [33]</i>

Table 1. Continued.

Job resources & demands	Specification	Studies	Exemplifying quote
Pride	VBHC resource	[24]	<i>'[...] participants were proud of their cooperation with the representatives as this contributed to the legitimacy of their implementation work' [24]</i>

Role

VBHC itself and how organizations shaped VBHC impacted professionals' roles and interests both positively and negatively. VBHC can be considered a job resource as healthcare professionals mentioned that VBHC aligned with their interest, ethics, and nature of their work and reconnected them with their true role [24, 31, 35, 54, 55, 66, 72]. Within VBHC, teams and workflows were reconfigured to allow everyone to utilize their competences to the full extent. However, when the reconfiguration was inadequate, professionals were concerned to become IT-specialists and were hindered to use their competences optimally [66]. Consequently, professionals experienced job demands when their work environment did not support them to practice their role [33, 38, 55]. VBHC itself also introduced role strain [14, 24, 32, 34, 51, 55, 60, 69, 74]. For example, professionals found it hard to balance patient care and implementation work [33], questioned their role in discussing costs with patients [69], and experienced role unclarity due to new responsibilities in VBHC that were not yet formalized [14, 32]. Residents in particular experienced specific strains related to priority-setting between VBHC and learning goals and felt uncertain about their contribution to VBHC [51, 55, 60, 74].

Workload and Time Investment

VBHC was suggested to take more time and effort than providing lower-value care and hence was considered a job demand [31–33, 51, 62, 66, 71, 73]. Among others, providing preoperative services and continuous work on pathways were considered time consuming. Related to organizational facilities and resources in the work environment, inadequate data- systems were suggested to increase work burden by demanding more manual work [33]. However, when workflow and team compositions were adequately shaped, professionals experienced reduced administrative workload [60, 66, 72]. This suggests that VBHC can also turn into a job resource.

Competence

Although residents reported adequate VBHC knowledge [75] and nurses mentioned VBHC as one of their best competences [77, 79], the majority of studies revealed knowledge, skill, and experience deficits [31, 33, 38, 49, 50, 55, 57, 59, 60, 62, 75]. These deficits related to, among others, tailoring care, managing case complexity, care integration and coordination, IT and data, quality improvement, interpretation and use of PROMs scores, exploring treatment

options, benchmarking, knowledge about healthcare costs, and overall maintenance of knowledge.

Task Complexity

Two studies reported on increased task complexity in VBHC. One study mentioned that nurses experienced complexity with new tasks in VBHC as a result of task expansion [60]. The second study suggested information overload due to working with care pathways [73].

Work Method

Professionals appreciated VBHC's contribution to easier, more effective and better structured ways of working [24, 31, 32, 49, 50]. VBHC was mentioned to make patient follow-up easier, to bring more focus, specific tasks, and better insight in care processes. Moreover, VBHC was considered a tool for well-founded decisions and documentation [31, 32]. However, professionals mentioned to lack an approach to quality improvement and felt hindered by pathways and guidelines that were inexplicit and difficult to access and interpret [14, 49, 73]. Organizational structure and division of financial responsibilities were environmental factors experienced to obstruct care processes [24].

Meaning in Work

Participants experienced successes from their value-based efforts and increased sense of purpose and mission [24, 31, 32, 35, 56, 60, 61, 66, 73]. Examples of successes were better care transitions, achievement of the Triple aim, reduction of low- value care, elimination of care variation, and overall improved care in favor of the patient. Visible effects were mentioned to be motivating, and when invisible this had negative impact on engagement [24, 31]. Remarkably, one study reported that only half of the participants saw success from their efforts to promote quality care at lower cost [69]. Furthermore, one study described that implementation work was seen as an 'obligation' and considered meaningless in light of persisting root-cause problems in the organization [24]. This experience was characterized as a job demand that stemmed from characteristics of the environment.

Patient Contact

Both beneficial and adverse outcomes of VBHC on patient contact were reported. On the one hand, VBHC was experienced to improve patient contact. In particular, PROMs prepared patients and professionals for discussing patient values [50], care pathways facilitated conversations with patients and families regarding plans of care [73], and patients perceived their professionals to be better informed as result from strengthened team-based care [61]. On the other hand, professionals seemingly faced more challenges in value-based patient contact [49–51, 55, 57, 69, 73–75]. Professionals reported difficulties, reluctance and discomfort when discussing VBHC with patients, specifically costs [48, 55, 57, 69], and the choice of non-treatment [50]. Professionals also mentioned to face demanding patients and patients with

wrong expectations, which hindered or even prevented them to provide VBHC [49, 51, 55, 75]. Last, concern was expressed about pathways limiting patient discussions by creating 'tunnel vision' [73].

Teamwork and Communication

VBHC created organizational imperative for professionals to cooperate and was considered to facilitate cooperation by providing a shared language. This resulted in the perception of more and better teamwork [24, 32, 44, 53, 61, 66, 73]. However, collaboration between silos was mentioned to cause confusion [24]. Prompted by the environment, participants felt it was difficult to maintain staff engagement, faced adverse behavior of colleagues, and reported on being tangled up in discussions about (im)possibilities regarding data collection [33, 47, 49, 51, 73].

Comfort and Confidence

While pathways enhanced confidence by affirming clinical decision-making [73], professionals also experienced lack of comfort and uncertainty in VBHC [48, 51, 55, 60, 69, 73, 75]. Among others, professionals felt lack of comfort with the complexity of new tasks [60] and comfort with cost conversations varied [48, 51]. Diagnostic uncertainty and concerns about inadequate patient follow-up were identified as reasons why professionals overuse resources [75]. Professionals also felt insecure when they had to capture data manually due to IT limitations [33], being an environment-specific factor.

Feedback and Opportunities for Personal Development

VBHC education and training, as environmental factors, have not been included in this study. However, it is of interest to note that professionals reported on learning potential being stimulated by outcome information [9, 56], feedback tools [57], and pathways [73]. However, professionals also recognized that pathways possibly limit learnings [73]. Feedback tools were considered useful and when absent professionals experienced this as hindering [57].

Pace of Change and Time Availability

Participants felt pressured by time, especially due to the absence of dedicated time for VBHC activities and rapid pace of implementation [14, 24, 33, 49, 50, 55, 60, 74]. Due to this pressure, participants felt deprived of their autonomy [24] and reported losing focus [55]. They regretted not working up to their best [33] and fell back into care of lower value [74].

Data and IT

Professionals valued that VBHC provided access to PROMs scores of individual patients and patient codes [32, 50]. Professionals appreciated work environments that provided advanced PROMs score visualizations and adequate access to the electronic health record [50, 61]. Hindrance was experienced as a result of not having access to aggregated PROMs data

and lacking overview of treatments options [50]. Furthermore, various deficiencies related to data, IT, data collection routines, and infrastructure hindered professionals in pursuing VBHC [14, 24, 31–33, 35, 48–50, 62, 66, 69, 72, 76]. These demanding situations were triggered by inadequate organizational structures and resources in the professional's work environment.

Authority and Say

Some professionals felt obstructed to participate in VBHC and drive VBHC as a team leader [14, 24, 33, 55, 76]. This was caused by a lack of authority and say within their work environment. This lack was considered problematic as it hindered decision-making.

Autonomy

As a characteristic of VBHC, professionals experienced reduced autonomy due to the felt pressure to abide by pathways [73]. As an environmental demand, professionals described being deprived of their autonomy due to rapid implementation of VBHC [24]. Additionally, two studies reported on autonomy of professionals being purposefully adjusted in VBHC. One study increased professionals' autonomy to advance VBHC. In this study professionals were authorized to select their own performance metrics [23]. In another study, autonomy of junior residents was reduced as they were seen as potential providers of lower value care and hence in need of guidance and limits [57].

Organizational Support and Legitimacy

Professionals experienced legitimacy in value-based work as a result of involving patient representatives [24], which was consequently considered a resource stemming from VBHC. There was variation to what extent professionals felt supported in their work environment. On the positive side, professionals described, among others, support from managers, leadership, and champions as role model [24, 33, 48, 50, 69]. On the negative side, professionals described, among others, disinterest of managers, skepticism in IT departments and lack of, and unclear, policy [24, 32, 33, 35, 55, 72, 76]. VBHC consultants and guidelines were mentioned to potentially be helpful but also risked to cause drawbacks when utilized inappropriately [24, 55].

Pride

A single study reported that the involvement of patient representatives made professionals experience pride [24].

3.4.5 Employee Well-Being and Job Strain

Positive and negative outcomes of VBHC for professionals were reported. These, as discussed below, related to employee well-being and job strain. Table 2 provides an overview.

Table 2. Overview and illustrative quotes on employee wellbeing and job strain in VBHC

Employee wellbeing	Studies	Exemplifying quote
Engagement	[24,35,44,60,61]	<i>'The focus on value for the patient, emphasized by the hospital management team, contributed to their feelings of 'enthusiasm for the concept and strong engagement in implementation work' [24]</i>
Engagement being moderated by demands	[24]	<i>'These hindrances contributed to decreasing engagement in carrying the process forward. [...] Engagement for VBHC also decreased when participants did not see any actual activity or result of their implementation work' [24]</i>
Being energized	[24,66]	<i>'I think even greater sense of meaning that we're all working towards the greater good of patient health and well-being, and I think that genuinely energized people' [66]</i>
Having joy in practice	[66]	<i>'All but one of the practices indicated that their transformation efforts led to increased joy of practice' [66]</i>
Joy in practice being moderated by demands	[66]	<i>'The one outlier practice indicated increased sense of purpose and mission and did not indicate decrease in joy or well-being, but did acknowledge that increased work necessary for practice transformation moderated increased joy of practice' [66]</i>
Increased Job Satisfaction	[24,32,44,60,66]	<i>'All participants in the structured interviews noted improved job satisfaction after the transition period, given the new sense of employee engagement and accountability' [44]</i>
Job strain	Studies	Exemplifying quote
Exhaustion and energy drain	[24,32,33]	<i>'This was experienced as a long and energy-draining process' [32]</i>
Negative emotions	[24,33,47,55,73]	<i>'Participants expressed both their colleagues and their nonadherence to CPW [clinical pathways] can result in a range of emotions from fear to frustration' [73]</i>
Losing focus and getting stuck	[24,33]	<i>'In all, these residents sometimes let time pressure, demanding patients, concerns over supervisors potentially overruling them, their wish to develop or maintain a patient–resident relationship, and fears of claims make them lose their focus on HV3C delivery' [55]</i>
Concerns	[24,31,73–76, 32,48,50,51,53, 55,56,69]	<i>'Nearly 50% reported that the clinicians' fear of legal repercussions affects their frequency of ordering unneeded tests or procedures, and 30% reported that individual clinicians are blamed for complications' [69]</i>
Burnout	[38]	<i>'Those who felt burned out at the completion of training ($\beta=-0.52$, 95% CI $-1.00-0.04$, $p=0.03$) were more likely to score lower on the [Residency High Value Care] scale' [38]</i>

Employee Well-Being

Related to employee well-being in VBHC, positive outcomes included professionals who were engaged [24, 35, 44, 60, 61], felt energized [24, 66], experienced joy in practice [66], and experienced improved job satisfaction [24, 32, 44, 60, 66]. These outcomes were suggested to positively impact subsequent VBHC behaviors [24, 35, 61].

Job resources associated with aforementioned positive outcomes were 'role fit,' 'work method,' and 'meaning in work.' Professionals valued being able to focus on what matters to patients, working on specific tasks, seeing effects of their efforts, having outcomes to demonstrate, and meeting the Triple aim [24, 66]. Positive outcomes also resulted from working in line with standard care plans [32], team-based care [66], redesigned workflows [60], multidisciplinary rounds with an experienced physician as coach [61], and practice transformation [44, 66].

Of interest, two studies reported that engagement and joy in practice were moderated or reduced by job demands. Job demands that decreased engagement were 'role strain,' i.e., professionals who felt divided between different obligations, and 'lack of meaning,' i.e., professional who did not see visible results from their VBHC efforts [24]. The job demand that decreased joy in practice was increased 'workload' [66].

Job Strain

Concerning job strain in VBHC, professionals experienced four negative outcomes, namely: exhaustion and energy drain [24, 32, 33], negative emotions [24, 33, 47, 55, 73], losing focus and getting stuck [24, 33], and several concerns [24, 31, 32, 48, 50, 51, 53, 55, 56, 69, 73–76]. Negative emotions comprised frustration, fear, and feelings of guilt. Concerns related to care quality, VBHC continuity, pathways use, legal repercussions in combination with use of outcomes, hierarchy, and sustainability of the care system. A single study investigated burn-out as an input variable, showing that residents who felt burned out after their education scored lower on the 'high-value care culture' scale [38].

Exhaustion and energy drain was associated with the job demand inadequate 'data and IT.' Negative emotions were triggered by the job demands lack of 'available time,' 'teamwork' challenges, 'role strain,' and inadequate 'data and IT' including professionals' inability to change the IT system. Negative emotions also resulted from staffing constraints, hindering organizational structures and were associated with possible adverse consequences of pathways. Participants lost their focus and mentioned to risk not being able to uphold VBHC due the job demands 'role strain,' insufficient 'organizational support,' inadequate 'pace of change and time availability,' challenging 'patient contact,' meso-level obstacles and because of various concerns professionals had concerning VBHC.

4 DISCUSSION

The founders of VBHC state that professionals play a crucial role in VBHC and hence argue that employee well-being should be part of organizations' imperatives in addition to improving health value [1]. However, to date, knowledge about what VBHC means for healthcare professionals is scattered. This review synthesizes insights from 45 included studies about how VBHC relates to the healthcare professional, and vice versa.

This review shows that the term VBHC is used for a variety of value-enhancing activities. Consequently, behaviors of professionals in VBHC may be specific to the type of activity performed. Thematic analysis reveals 10 specific behaviors that healthcare professionals pursue in VBHC, next to acting upon their professional standards. These interconnected and mutually reinforcing behaviors, as visualized in Figure 4, are to (1) focus on what matters to patients & adopt other VBHC mindsets, (2) measure outcomes, (3) learn and improve care, (4) organize care around the full cycle of disease, (5) participate in population health and prevention, (6) discuss value in the clinical encounter, (7) involve patient representatives, (8) take accountability for patients and resources, (9) practice bottom-up engagement, and above all (10) work in teams and collaborate.

4.1 Job Demands-Resources in VBHC

This review confirms that VBHC *"brings change to the current landscape by introducing new or different roles for people, different workflows or processes, and new tools or existing ones that have been used in other settings or all the above"* [65]. These changes impact the job demands and resources professionals experience in VBHC and, in turn, their well-being and job strain. More specifically, this review reveals that healthcare professionals in VBHC may experience 16 job resources and/or job demands, four constructs related to their well-being, and five constructs related to job strain. Figure 3 visualizes these outcomes in a modified Job Demands-Resources (JD-R) model.

Among others, the identified job resources suggest that VBHC connects professionals with their role and interest, making them appreciate VBHC as an approach to caring. Professionals report on increased meaning in their work and improved patient contact, teamwork, and communication. However, implementation of VBHC also takes energy from professionals. Although some studies report on reduced administrative workload in VBHC, other studies suggest that VBHC increases workload. This difference, as well as how other work factors are evaluated, may be partly explained by variety in professionals' work environments such as the level of organizational support, as elaborated below. Other job demands professionals may experience are role strain, teething problems with the transformation to VBHC and overall challenges evoked by change. Furthermore, within their organization, professionals seem to experience paucity of adequate IT resources, authority to implement VBHC and time to

become acquainted with VBHC. Professionals also report on difficulties in discussing costs with patients. The latter is striking as we do not find literature that advises professionals to discuss costs with patients as part of VBHC besides themselves taking accountability for adequate use of resources. Hence, this disparity may suggest that the job demand that relates to discussing costs with patients is redundant.

This review reveals that increased job resources resulting from the adoption of VBHC may increase professionals' engagement, energy, joy in practice, and job satisfaction, which corresponds to findings from research on clinician engagement during organizational change [80]. Respectively, job demands professionals experience in VBHC can make them feel exhausted and evoke negative emotions, loss of focus and concerns. This review reveals that job demands may moderate employee engagement and joy in practice, as has also been suggested in JD-R literature [81]. The positive effect of job resources on job strain that this literature describes is not explicitly mentioned in the included studies of this review. Remarkably, the included studies only qualitatively investigate employee well-being and exhaustion while quantitative measurement instruments exist, for example as part of the JD-R questionnaire [82].

Altogether, the aforementioned job demands, job resources and outcomes related to employee well-being and job strain show similarities with earlier research on job demands and resources in healthcare setting [41, 80] albeit sometimes in slightly different wording. This may imply that VBHC involves various established psychosocial factors at work and not so much radically introduces new factors that seek our attention. However, the results from this review may be too rosy as VBHC projects to date possibly focused on low-hanging fruits. Moreover, the identified factors may apply to specific VBHC components and be partly environment specific. This implies that the results from this review are not expected to apply to all professionals and hence should be interpreted with care.

4.2 Organizational Support as Enabler

The strength of this review is that it distinguishes between job resources and job demands that stem from (1) VBHC in terms of content and (2) the environment in which VBHC takes place. For example, professionals who experience that VBHC takes more effort is considered a demand that stems from VBHC. Professionals who feel pressure from the pace of implementation is considered a demand that stems from the work environment, as it depends on how organizations shape and facilitate VBHC. This distinction is in line with the concept of psychosocial factors at work, which explicitly distinguishes between job content, work environment, and organizational conditions as factors that impact employee well-being [13].

Strikingly, this review finds that several job demands stem from organizations' inadequate management of VBHC, i.e., speeded VBHC implementation, suboptimal workforce composition

connected to care pathways and insufficient organizational resources and capacity. This observation underlines the need for organizations to better support their employees by providing the necessary resources and designing appropriate organizational structures and interventions to mitigate or avoid job demands and enhance job resources. Subsequently, this may sustainably improve professionals' contributions to VBHC via improved employee well-being. This is especially relevant in the light of research relating employee experience and well-being to organizational performance measures [83, 84] such as workforce engagement in healthcare development [85]. In other words, just personal engagement of professionals is insufficient as is illustrated by the following quote: *"[They] recognize that HV3C [high-value, cost-conscious care] practices depend in part on the patient population, available resources, and organizational structure [. . .] Although they initially aimed to provide HV3C, under external pressure their pro-HV3C aspirations waned"* [55].

The view that VBHC is a shared responsibility and requires multi-level support is supported by the adapted JOINT model [42]. This model defines five layers, being the (1) individual layer, (2) interpersonal layer, (3) job level layer, (4) organizational layer, and (5) national layer. Each of these layers has been suggested to impact nurse absenteeism and turnover [42]. Not only can multi-layered support help us reduce negative psychosocial work factors in VBHC and hence prevent disease and dysfunction in the workforce, but also can this layered support contribute positive psychosocial work factors in VBHC and hence support professionals to flourish. On the organizational level, support may be best shown to advantage as part of a 'top-guided bottom-up' approach. In a top-guided bottom-up approach efforts of professionals, primarily teams, are orchestrated centrally [86]. Within this approach organizations provide their employees supportive infrastructure, tools and resources including protected time, relevant data, staff training, and administrative and analytic support.

4.3 Limitations

This study has five biases. First, the identified outcomes of VBHC on professionals' experiences and their well-being may not be generalizable to all professionals working in a VBHC context for three reasons. Namely, scholars may use different criteria for judging whether their intervention is part of VBHC, studies report on different combinations of VBHC activities and – as this review concludes – experiences may be partly work environment specific. A second bias is that studies reporting on high-value care and high-value, cost-conscious care are generalized while there may be subtle differences between these care models. Hence, we may expect professionals to pursue slightly different behaviors in each of these care models, which, in turn, may evoke slightly different experiences and outcomes. Third, this review does not distinguish between the type of healthcare professional and her educational status. Clinicians, nurses, and residents, who form the main populations in the included studies, may fulfill different roles in VBHC and hence can be expected to have different experiences and encounter different personal outcomes. Consequently, based on

this review, it is not possible to target focused interventions to specific populations. Fourth, the temporality of the findings is uncertain as some experiences and outcomes may be connected to implementation efforts more than being a lasting characteristic of VBHC. However, judging whether VBHC has become part of the normal work is complicated as this perception is suggested to vary from professional to professional [24]. Last, assessing whether a job demand or resource is a characteristic of VBHC or a characteristic of the environment is a delicate task and requires certain interpretability as all care activities take place in an environment. This implies that different takes on the resulting overview of job demands and resources are possible.

4.4 Practical Implications

Prompted by the insight that healthcare professionals may experience paucity of competence to optimally pursue value in care, we identify the need for more guidance for professionals. Providing adequate guidance is especially relevant as professionals play a prominent role in VBHC [1], which aligns with our findings. Moreover, value-enhancing behaviors of professionals, such as shared decision making, increasingly become legal requirements [87, 88]. The 10 behaviors this review describes (see Figure 4) may serve as a base for this guidance. While some of these behaviors correspond to Porter's value agenda [89], this review also proposes new behaviors. In line with an earlier proposed extension to Porter's value agenda [7], this review suggests to incorporate behaviors to 'learn and improve care' and to 'discuss value in the clinical encounter' as additional elements. Furthermore, this review focusses attention to the need for professionals to 'adopt appropriate mindsets for VBHC,' in particular by truly focusing on what matters to patients. Other behaviors this review contributes are to 'work in teams and collaborate,' 'involve patient representatives,' 'take accountability for patients and resources,' 'practice bottom-up engagement,' and 'participate in population health and prevention.'

Besides guidance for professionals, this review also supports organizations to better care for their employees and strive for a sustainable VBHC model. This review shows how organizations can use a psychosocial model such as JD-R to manage and improve employee well-being, as has been previously suggested to Human Resource Management as well (HRM) [83, 90]. Caring for employees is besides being morally integer and beneficial for organizational performance also a legal obligation in Europe [91]. In addition to mitigating and avoiding adverse effects of VBHC on the professional, organizations may seek to exploit VBHC to contribute to positive psychosocial factors at work. For example, organizations may amplify job resources such as 'meaning in work' by enhancing the visibility of VBHC outcomes.

As previously mentioned, organizations can consider a top-guided bottom-up approach [86] to optimally support their employees in VBHC. Within this approach, attention should be given to the pre-implementation and delivery phase of VBHC to prevent professionals from having

avoidable adverse experiences. The International Labour Organisation [13] studied frequent omissions and mistakes when implementing changes at the workplace. From this research we derive that technical and psychological preparation is needed prior to implementation. For VBHC this implies that, among others, PROM technologies and care pathways should be adequately established and professionals need to be sufficiently informed and trained. Second, during VBHC delivery, professionals should be offered support depending on their personal needs. Next to the use of PROMs and PREMs, we see opportunity to periodically evaluate psychosocial factors at work and use these results for improvements. Third, organizational should give explicit attention to implementing VBHC at a satisfying pace in the eyes of professionals since professionals reported to feel pressured. Furthermore, organizations need to ensure that professionals have necessary authority to implement and deliver VBHC as professional mentioned lack of authority as impediment to VBHC. Last, by preventing staff shortages, providing professionals dedicated time for VBHC and optimizing team composition, organizations can mitigate or avoid increases in professionals' workload and even exploit VBHC to reduce administrative workload and optimize job resources such as meaning in work, comfort and collaboration.

4.5 Future Work

Contributions of this study to literature are two-fold. First this work contributes to JD-R literature by considering that job demands and resources may both result from the nature of the job and the way actors in the environment facilitate and shape the job. Future work using the JD-R model may want to explicitly research the antecedents of job demands and resources as this allows for focusing interventions at the source. Antecedents identified in prior research on psychosocial factors at work may provide inspiration [13]. Second, this work contributes to VBHC literature by shifting attention toward the professional. This review reveals several behaviors professionals pursue to achieve value in care, job demands and resources professionals experience in VBHC and, in turn, outcomes related to employee well-being and job strain.

Further research to estimate the effects of VBHC on healthcare professionals is warranted. First, application of existing theories and frameworks is recommended as only one of the studies included in this review did so. Second, this review provides an overview of factors that impact the professional and her delivery of VBHC both positively and negatively. Future work may investigate sufficient and necessary conditions to make VBHC work such as strong leadership, a culture of continuous improvement and strengthened team-based care. Third, future work may focus on personal resources in VBHC as these seem understudied. Personal resources, such as optimism and self-efficacy, may affect a person's functioning and are hence integrated in the JD-R model [92]. Another opportunity for future work focuses on pre-existing care practices that gained a new life in VBHC, such as efforts to improve care and working with PROMs. This review builds on the assumption that these care practices

are experienced differently now they are applied as mechanisms to optimize value in care as opposed to satisfying different purposes or being an end-goal in themselves. However, future research is necessary to validate this assumption. Finally, due to the multifaceted nature of VBHC, scholars may attempt to study how, and to what degree, each component of VBHC, as well as possible interactions between components, impacts job experience and employee well-being. Impact evaluations of VBHC implementation programs across different hospitals would allow to generate such insights among healthcare professionals. The ongoing transformation from traditional healthcare delivery to VBHC provides momentum for evaluation of the effectiveness of VBHC in relation to job experience and employee well-being by comparing traditional care practices to value-based care practices.

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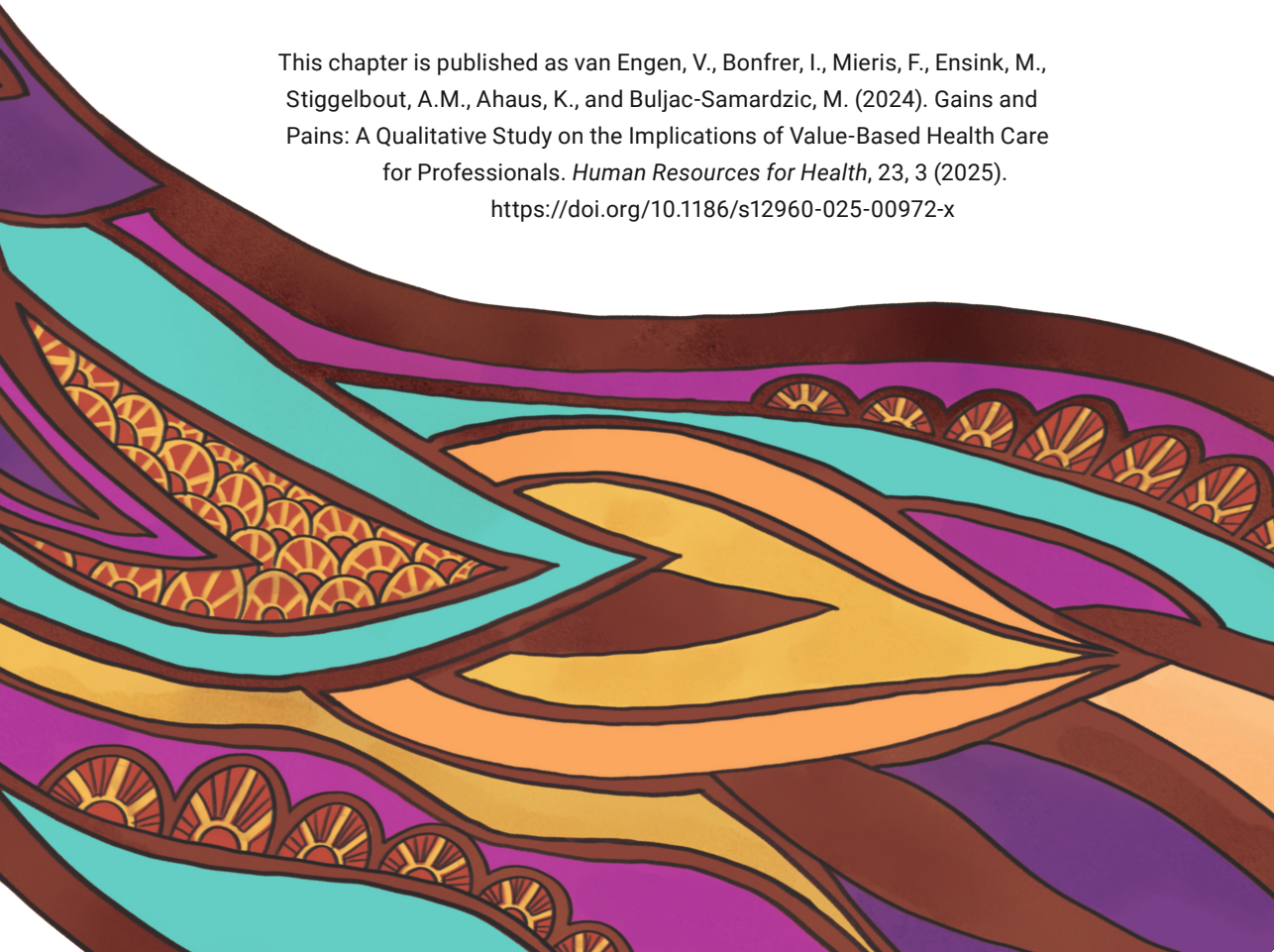


CHAPTER 7

Gains and pains: a qualitative study on the implications of value-based healthcare for professionals

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ABSTRACT

Background: While aiming to optimize patient value, the shift towards Value-Based Health Care (VBHC) in hospitals worldwide has been argued to benefit healthcare professionals as well. However, robust evidence regarding VBHC's workforce implications is lacking. This gap is problematic, as the motivation and health of healthcare professionals are central to the quality of care and crucial amidst contemporary workforce challenges. This study aims to qualitatively examine the implications of VBHC for healthcare professionals' motivation, job strain, and ongoing participation in VBHC. Additionally, it explores how these outcomes are regulated at both the individual and organizational levels.

Method: Semi-structured interviews were conducted with 26 healthcare professionals across six Dutch hospitals. Interviewees engaged in three VBHC activities: 1) value-based outpatient consultations; and/or 2) value-based quality improvement activities; as well as in 3) VBHC implementation. Interview questions and data analysis were guided by the Job Demands-Resources model.

Results: VBHC interacts with four themes perceived to affect professional's motivation (perception of making a positive impact, enjoyability of job activities, personal development, and sense of community and support) and three themes perceived to affect job strain (workload, cognitive demands, and confidence). VBHC creates both gains (primarily increasing motivation; occasionally reducing strain) and pains (primarily increasing strain; sometimes reducing motivation). The perceived impact of VBHC depends on the fit between the individual, one's activities in VBHC, the working conditions, and the pace of VBHC implementation. An observation that warrants attention is that healthcare professionals with a 'do-er' mentality and high ambitions to optimize patient value can become demotivated to continue advancing VBHC with the same intensity, particularly due to perceived slow progress.

Conclusions: While VBHC is centered around patients, our study emphasizes that the needs, experiences and changing role identities of healthcare professionals cannot be overlooked in this transition. VBHC currently presents as a double-edged sword for healthcare professionals: resulting in both gains and pains. In the move to VBHC, it is crucial to maintain alignment between the individual, their job activities, the work environment, and the pace at which VBHC unfolds. This is essential for fostering and retaining motivated individuals, who are not only vital to the workforce but also pivotal in advancing VBHC.

1 BACKGROUND

Health systems are moving to Value-Based Health Care (VBHC) to optimize 'value': patient-relevant outcomes relative to the resources used to achieve these over the full cycle of care [1,2]. VBHC alters healthcare professionals' job activities [3,4], often claimed positively [1,5,6]. However, robust evidence regarding VBHC's workforce implications is lacking [3,4,7–9]. This gap is problematic as healthcare professionals play a pivotal role in VBHC [1,2,10], and the current workforce challenges require their retention [11]. Professionals' motivation and health are linked to patient outcomes and employee retention [12–17]. Consequently, maintaining a motivated and healthy workforce in the move to VBHC is vital for healthcare systems worldwide [18].

VBHC is a multifaceted concept [2,19], and hospitals have thus far implemented it in diverse and partial ways [8,20–23]. Many hospitals focus on integrating value in patient discussions and pursuing value-based quality improvements [3,8,22–24]. Professionals often use data from Patient Reported Outcome Measures (PROMs) [25–27], which are structured surveys that enable patients to self-assess and report on their symptoms, functioning, and well-being [26].

While centered around optimizing patient value, it is also claimed that VBHC benefits the healthcare professional. The founders of VBHC, Porter and Teisberg, suggest that VBHC helps healthcare professionals to *"pursue the aims that led them to the profession in the first place."* [1] (p.479). Teisberg later states: VBHC *"can be a powerful mechanism to counter clinician burnout"* [5] (p.683). Similar messages have been voiced by others: *"VBHC is about [...] reducing the burden on professionals and improving satisfaction with their work"* [6] (p.4). However, these claims lack substantiation, and empirical studies indicate that healthcare professionals also encounter challenges in VBHC [3,28–30]. Given the limited empirical focus on healthcare professionals in VBHC [4,8], the implications for them remain poorly understood [3,4,7,9].

This study aims to examine the perceived implications of moving towards VBHC for healthcare professionals. It focuses on exploring the mechanisms through which VBHC is perceived to affect professionals' motivation and job strain and seeks to understand how these factors affect their participation in VBHC. Additionally, it explores how these outcomes are regulated at both the individual and organizational levels. These insights can help identify opportunities to better support professionals' motivation and well-being in the value movement.

2 METHODS

2.1 Theoretical model

This qualitative study uses the Job-Demands-Resources (JD-R) model, which is widely employed in occupational health psychology [31–34]. The JD-R model is unique in its simultaneous focus on professionals’ motivation and strain [34,35]. Motivation encourages professionals to engage in their work, while strain can hinder their ability to perform by depleting their energy and mental/emotional capacity. The JD-R model examines the mechanisms through which motivation and strain are influenced by demands and resources (Figure 1). These can stem from the job, the individual, and the organization [32]. Resources can foster motivation and mitigate the impact of demands, while demands can increase strain and reduce the positive effects of resources. Additionally, JD-R explores how motivation and strain affect professionals’ performance. Demerouti & Bakker (2023) expanded the JD-R model to include ‘regulation’ [32], which, in this study, refers to organizational and personal efforts aimed at enhancing motivation and mitigating strain for professionals.

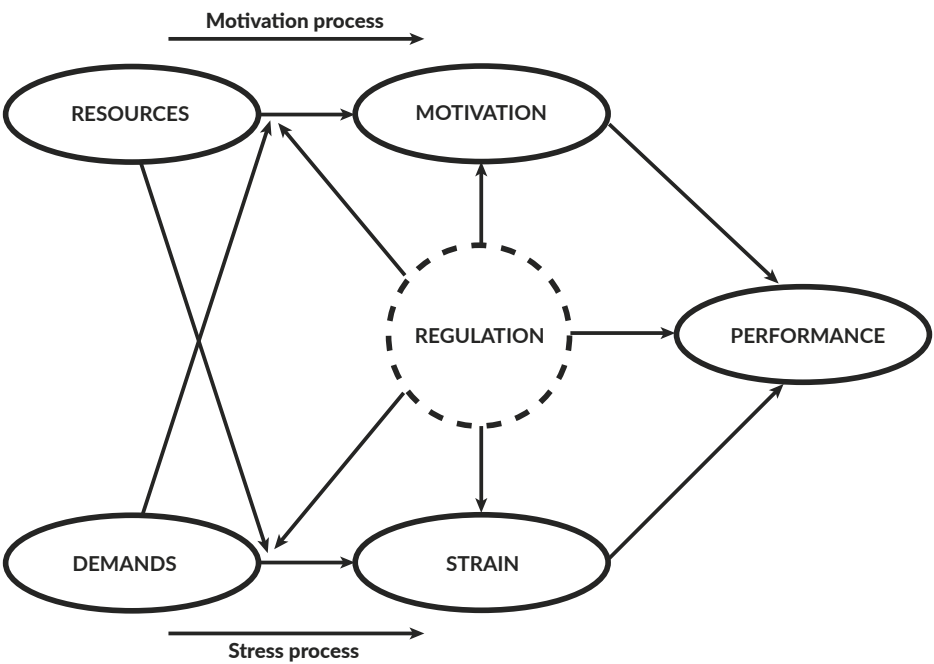


Figure 1. Adaptation from the extended JD-R model [32]

We apply the JD-R model to explore the mechanisms through which VBHC is perceived to affect professionals’ motivation and job strain, and the implications this has for their participation in VBHC [31]. Additionally, using Demerouti & Bakker’s (2023) extended JD-R

model [32], we study how individual and organizational regulation efforts influence these outcomes.

2.2 Operationalizing VBHC

The JD-R model can serve both macro-level job analysis and micro-level examination of specific job activities [36]. In this study, we focus on three common VBHC activities implemented in Dutch hospitals and elsewhere [3,8,22–24]: *value-based outpatient consultations*, typically involving discussions with outpatients about their responses to PROMs to provide appropriate care; *value-based quality improvements*, primarily focusing on optimizing care processes based on outcome indicators such as PROMs, often through benchmarking efforts with other healthcare centers; and *implementation efforts associated with both*, which aim to establish and sustain value-based outpatient consultations and value improvements within departments or for specific patient conditions [37], including establishing Information Technology (IT) and engaging colleagues.

2.3 Data collection

Authors FM, ME, and VvE conducted semi-structured interviews with 26 Dutch healthcare professionals from 6 not-for-profit hospitals, including 2 university hospitals and 4 top-clinical hospitals. Two hospitals are part of the hospital group 'Santeon.' VBHC activities varied across the studied hospitals, with differences in their focus areas. Participants had at least one year of experience in value-based outpatient consultations or value-based quality improvements. In one hospital, a central VBHC coordinator facilitated the identification of potential interviewees, while in other cases, we relied on personal connections and snowball sampling. Purposive selection ensured representation from both nurses and physicians. Interview questions explored both positive and negative aspects of engaging in the selected VBHC-activities, their antecedents and consequences for the professionals themselves and their participation in VBHC. Additionally, the questions explored how healthcare professionals and other stakeholders regulate these experiences to enhance professionals' motivation and well-being. Interviews were recorded and transcribed verbatim.

2.4 Interviewee characteristics

Among the 26 interviewees, 46% were physicians, with the remainder being nurses. They were predominantly female (81%) and represented eight medical disciplines. All interviewees engaged in more than one of the three VBHC activities (20 in *value-based consultations*, 22 in *value-based quality improvements*, and all 26 in *VBHC-implementation*). Most could be considered pioneers and strong supporters of VBHC.

2.5 Data analysis

Transcripts were deductively coded with Atlas.ti [38,39]. A coding scheme was developed iteratively, with authors FM, ME, and VvE each coding eight interviews and discussing the

results with the other authors. Following this, author VvE coded the entire dataset using the developed coding scheme. This final coding process involved two steps, with multiple codes attached to quotes. First, text segments were coded based on their perceived impact on the JD-R outcomes motivation or strain, linked to a specific VBHC-activity and additional relevant codes (Table 1). Additionally, transcripts were coded for basic information, including the hospital pseudonym, gender and function of the interviewee, and their role and level of experience in VBHC.

Second, data coded within motivation and strain were open and then axially coded [40] based on similarity to establish core themes. Resulting themes form the structure of the results and corresponding codes are presented in Table 2 in the respective section.

Table 1. Codes for initial coding

Codes: JD-R outcome category	Code: activity	Optional codes (if applicable)
Motivation (the extent to which professionals are willing and eager to engage in their work) <ul style="list-style-type: none">• Increasing motivation• Decreasing motivation• Motivation unchanged	VBHC activities <ul style="list-style-type: none">• Value-based outpatient consultations• Value-based quality improvements• VBHC implementation• Other activity	Performance <ul style="list-style-type: none">• Value-based consultations• Value-based quality improvement• VBHC implementation• Balance gains/pains
Strain (the physical, mental, and emotional exhaustion that limits professionals' ability to engage in their work) <ul style="list-style-type: none">• Increasing strain• Decreasing strain• Strain unchanged		Interaction with <ul style="list-style-type: none">• Personal resources/characteristics• Organizational resources/characteristics• Ordinary job• Other
Other <ul style="list-style-type: none">• Other outcome		Regulation <ul style="list-style-type: none">• Personal regulation• Team regulation• Organizational regulation
		Other <ul style="list-style-type: none">• Other (generic)

3 RESULTS

3.1 Overview

We identify four themes that predominantly explain how VBHC is perceived to affect professionals' motivation (section 3.2) and three themes that predominantly describe how it is perceived to impact their experienced strain (section 3.3). Table 2 presents these themes, outlines their mechanisms, and summarizes the associated codes. Additional File 1 contains exemplary quotes corresponding to each of the codes. The results conclude with a summary of implications for healthcare professionals' performance in VBHC (section 3.4).

Overall, the results indicate that VBHC has a dual impact, creating both gains and pains. Gains primarily manifest in increased motivation and, occasionally, reduced strain. Conversely, pains are evident in increased strain and, at times, reduced motivation. Throughout the text, we discuss how professionals and organizations have sought to optimize gains and limit pains, indicated by the term ‘regulation.’

Table 2. Overview of results, illustrating the core code tree

Affected JD-R outcome	Theme	Mechanisms
Motivation: the extent to which professionals are willing and eager to engage in their work	Perception of making a positive impact	<div>Increasing motivation<ul style="list-style-type: none">• Genuinely supporting individual patients• Improving care for many patients collectively• Advancing VBHC</div> <div>Decreasing motivation<ul style="list-style-type: none">• Constraints to making a positive impact• Doubting positive contribution of VBHC-efforts• Slow progress in achieving VBHC and optimizing value *</div>
	Enjoyability of tasks	<div>Increasing motivation<ul style="list-style-type: none">• Increased richness and depth in consultations• Increased task diversity• Alignment of tasks with expertise and preferred challenge level</div> <div>Neutral<ul style="list-style-type: none">• No changes in one’s tasks• Work remains equally enjoyable</div> <div>Decreasing motivation<ul style="list-style-type: none">• Reduced time for valued tasks• Discontent with VBHC-related task attributes</div>
	Personal development	<div>Increasing motivation<ul style="list-style-type: none">• Opportunities for personal development• Personal growth</div> <div>Decreasing motivation<ul style="list-style-type: none">• Limitations in feedback</div>
	Sense of community and support	<div>Increasing motivation<ul style="list-style-type: none">• Teamwork (internal)• Collaboration (external)• Organizational support</div> <div>Decreasing motivation<ul style="list-style-type: none">• Unengaged colleagues *• Limitations in organizational support *• Systemic limitations within national healthcare system *</div>

Table 2. Continued.

Affected JD-R outcome	Theme	Mechanisms
Strain: the physical, mental, and emotional exhaustion that limits professionals’ ability to engage in their work	Workload	Increasing strain <ul style="list-style-type: none">• Additional, uncompensated time investment
		Neutral <ul style="list-style-type: none">• Unnoticeable changes in workload
		Decreasing strain <ul style="list-style-type: none">• Efficient, streamlined processes
	Cognitive demands	Increasing strain <ul style="list-style-type: none">• Data overwhelm and scatteredness
		Decreasing strain <ul style="list-style-type: none">• Improved oversight (processual)• Ease from increased information availability
	Confidence	Increasing strain <ul style="list-style-type: none">• Deviating from established standards• Perceived limitations in competence
		Neutral <ul style="list-style-type: none">• Feedback on performance
		Decreasing strain <ul style="list-style-type: none">• Confidence from increased information availability• Evidence of high-quality service delivery**

Legend: * These elements were associated with both decreased motivation and increased strain.
** These elements were associated with both increased motivation and decreased strain.

3.2 Mechanisms affecting motivation

Theme 1: perception of making a positive impact

All interviewees perceived that VBHC supports, or has the potential to support, a positive impact on patients’ lives or healthcare overall, aligning with their professional goals. This gave them a sense of “*meaningfulness*” (interviewee 1), “*joy*” (interviewee 7) and “*fulfillment*” (interviewee 11). Those involved in value-based consultations felt that VBHC helped them genuinely support individual patients. For instance, interviewee 8 reflected: “[Patients] don’t want to hear ‘Your DAS score is 2.8; we need to change your medication.’ They want to talk about ‘I’m very tired,’ and then we address that.” Verbal appreciation from patients and improved patient satisfaction scores reinforced professionals’ motivation.

Professionals involved in value-based quality improvement and VBHC implementation felt they were advancing healthcare and positively impacting many patients. Interviewee 23 stated: “I feel that this approach enables me to have more organizational influence and ultimately make a greater impact, reaching more people than I would with seeing individual patients in the consultation room.” They recognized their contributions through enthusiastic reactions from

colleagues, acknowledgement as pacesetter in VBHC, and seeing materials or processes they developed adopted by other centers.

Conversely, interviewee 25 occasionally felt that her impact on patient-relevant outcomes was limited. She felt insufficiently able to address issues like fatigue or quality of life, which diminished her satisfaction with her work output. Moreover, observing low patient participation in PROMs led some professionals to question the value of PROMs for patients.

Nearly all interviewees expressed frustration with the slow progress of VBHC implementation and the limitations in visible results. This was experienced as both demotivating and energy-draining. Some also perceived value-based quality improvements as unnecessarily slow, characterized by extensive discussion and preparation but limited action. Consequently, interviewee 12 expressed doubt: *"Sometimes you wonder if you are doing the right things because it feels like we are not getting anywhere."* Interviewee 8 suggested that organizational regulation could be enhanced by highlighting progress: *"I think a lot is happening behind the scenes, but we don't see it in the rheumatology clinic."* Several interviewees described the slow pace as conflicting with their nature as "do-ers" with high ambitions, leading to negative emotions. Interviewee 8 articulated feelings of: *"impatience and frustration, thinking, 'Come on, let's move forward,' and also some disappointment, realizing that my expectations of achieving quick results were wrong."* This frustration was compounded by perceived dependencies on others within the organization, which hindered their ability to expedite processes. To cope with the slow pace, interviewees regulated their expectations and emotions by accepting the situation and practicing patience. Moreover, interviewee 8, planned to participate *"very low-profile"* in the future value-based quality improvement activities to focus her scarce time on activities where she can make a greater impact, at times feeling inclined to *"drop out."*

Furthermore, in value-based quality improvement, interviewee 23 had yet to experience any *"eye-openers,"* noting that cross-center differences in performance mostly stemmed from unequal registration rather than disparities in care quality. The lack of extramural use of PROMs and lack of attention to the cost component of VBHC were also seen as constraints to achieving impact.

Theme 2: enjoyability of job activities

Nearly all interviewees enjoyed their activities in VBHC despite facing challenges and setbacks. Many noted an increased richness, both within and across their tasks. In value-based consultations, they appreciated the enhanced depth and comprehensiveness of conversations with patients: *"Talking about more than just their disease gives me more satisfaction"* (interviewee 11).

Several professionals valued increased diversity of tasks, expressing enthusiasm for pioneering, innovating, and enhancing care practices. Interviewee 23 explained: *"I wouldn't enjoy being confined to the consultation room alone. [...]. [Seeking value-based quality] improvements has significantly contributed to my joy at work."* Interviewee 17 added: *"I see something, I have an idea, and VBHC provides me with the opportunity to investigate it."*

Some professionals appreciated how tasks were better aligned with their expertise and the desired level of challenge. Two physicians explained how a VBHC improvement cycle reorganized tasks to optimize the use of each person's expertise and time. This enabled them to focus exclusively on complex patients. While this increased cognitive demands, this reorganization was viewed positively due to extended consultation times, a unique practice in their department (organizational regulation). Resultantly, interviewee 4 noted: *"[it] makes consultations much more interesting, and you don't feel like you have to rush all the time."* Furthermore, interviewee 9 appreciated the challenges associated with innovating: *"A little stress is okay; otherwise, it gets boring."*

However, not all experiences with VBHC activities were uniformly positive. One interviewee described a neutral impact, as she already had high work satisfaction before VBHC. Three others noted limited change, as they felt they were already working in line with VBHC principles before the official implementation.

In addition to the mismatch between VBHC's pace of implementation and professionals' preferred pace, four interviewees reported a negative impact of VBHC on their joy in work. This often stemmed from how VBHC was organized locally. For example, a nurse described being tasked with sending PROMs to patients before their appointments, feeling that this responsibility detracted time from her ability to provide direct patient care. While cognitively understanding the relevance, emotion-wise *"It really grabs me by the throat [...] in that sense I do less of what I like to do"* (interviewee 13). Moreover, two interviewees expressed frustration with the increasing digitalization of their work due to PROMs and data-driven improvement activities. One of them regulated her motivation by intentionally avoiding using PROMs. Additionally, during care pathway improvements, two interviewees regretted the ongoing discussions centered on financial implications and associated inter-departmental competition.

Theme 3: personal development

Interviewees valued the increased opportunities for personal development that VBHC offered. They highlighted valuable feedback on team and individual performance, using aggregated outcome and experience data from their own patients. In one hospital, this was facilitated through a weekly 'scorecard.' This triggered curiosity and motivation: *"The most exciting email is the Monday morning scorecard mail [...] Everyone is curious about it"* (interviewee 4), and *"that*

energy it provides, everyone wants to be the top performer and avoid being the lowest scorer" (interviewee 14). However, motivation was tempered when feedback was infrequent or when outcomes were confusing and difficult to trace back to specific causes.

Additionally, interviewees valued the personal growth they experienced through VBHC. Interviewee 12 described that VBHC's focus on the whole person made her: *"a better, more complete doctor."* Interviewees also reported developing skills in leadership, project management and change management, as well as gaining a deeper understanding of the healthcare system.

Theme 4: sense of community and support

The collaborative nature of VBHC fostered increased teamwork and social support, both within individual hospitals and through inter-hospital collaborations. Interviewees appreciated *"enlarged networks"* (interviewee 6), *"closer connections"* (interviewee 21), *"more mutual understanding"* (interviewees 8), *"inspiration"* (interviewee 7), and the ability *"to rely on each other"* (interviewee 10), amongst others. Achieving desirable results together reinforced positive emotions. Some noted benefits from being part of a hospital group, which eased performance comparison and information exchange.

Beyond peer collaboration, several interviewees emphasized the importance of organizational support (regulation). Valued were training in VBHC activities, committed leadership, PROMs that were integrated into the Electronic Health Record (EHR), dedicated implementation time, and access to a data analyst.

However, challenges arose from unengaged colleagues, limited organizational support, and systemic constraints. These factors not only challenged professionals' motivation but occasionally also increased their stress levels. Disengaged colleagues led to frustration and required significant energy to foster the necessary cooperation for VBHC. For instance, interviewee 8 expressed: *"Sometimes I felt like I was in a bubble, with none of my colleagues understanding what VBHC is."* She described feelings of anger when the communication department inaccurately reported that *"WE do VBHC."* Frequent staff turnover, both on the work floor and in management, intensified these challenges: *"You are constantly explaining and persuading new people"* (interviewee 16).

Additionally, interviewees expressed lowered motivation and increased strain from feeling the need to validate VBHC without sufficient resources. Concerns were raised about the temporary nature of dedicated time for VBHC implementation, as activities like benchmarking will remain time-consuming. Nationally, barriers such as lack of leadership, IT and EHR limitations, and stagnant payment reform compounded these issues. As interviewee 12 put it: *"It feels like we are left in the cold; it doesn't feel like we are doing it together as a nation."*

Another regretted the limited opportunities for innovation due to the financial risks associated with transitioning to VBHC being borne by their hospital.

3.3 Mechanisms affecting strain

Theme 1: workload

While interviewees noted that VBHC increased their overall workload, many found ways to manage it. In the consultation room, discussing PROMs and shared decision-making were seen as time-intensive activities. This posed challenges especially given high workloads and limited consultation times: *"You're already busy, and then there's more to do, which adds to the stress"* (interviewee 3). This challenge was exacerbated by delays in loading PROMs dashboards, the use of separate IT systems, and perceived redundant data entry.

One interviewee observed that potential workload reductions from VBHC, such as patients needing less care, were negated by persistent waiting lists, preventing professionals from experiencing a lighter workload. Interviewee 11 expressed frustration over the lack of focus on triaging patients using clinical and PROMs data: *"Currently, I still see all patients"*, highlighting this as an opportunity for organizational regulation. To regulate their workload, two interviewees chose not to discuss PROMs with patients, while three others only discussed them during calm shifts, making case-by-case decisions. However, one of them reflected that skipping PROMs lowered her satisfaction with care delivery, leading her to view this coping strategy as less than ideal.

Regarding value-based quality improvement, six interviewees reported working on these initiatives during evenings and free time. Identified areas of improvement led to additional work: *"That also causes some unrest. Doctors think, damn, I must arrange this too"* (interviewee 22). To regulate their workload, some interviewees increased their assertiveness and requested dedicated time: *"I stopped doing things in my own time"* (interviewees 19). Another interviewee coped by occasionally extending the workday, which helped her prevent taking work-related pressure home.

During VBHC implementation, key workload contributors included the challenging process of establishing IT, engaging colleagues, patients, and management, as well as conducting scientific research on VBHC. Moreover, success generated more work due to requests to help initiate VBHC for other patient conditions. To regulate their workload, interviewees involved colleagues and delegated tasks. Interviewee 25 coped with workload and change fatigue by becoming more selective in participating in VBHC initiatives: *"I'll wait a bit and then judge: It's nice, I participate. Or: It's not nice, I refuse."*

Conversely, five interviewees experienced time savings through VBHC. Within the consultation room, they noted that both patients and clinicians were better prepared, leading to more

focused discussions: *"One can very specifically see and discuss what the patient wants to talk about instead of the standard routine"* (interviewee 8). Additionally, optimized care pathways and protocols resulting from value-based quality improvement contributed to streamlined processes.

Theme 2: cognitive demands

VBHC introduced additional cognitive demands for some healthcare professionals while alleviating these for others. During both value-based consultations and quality improvement activities, data overload contributed to increased cognitive strain. This overload arose from the multitude of patient and process indicators and a lack of oversight across different IT systems, leaving interviewee 25 feeling *"worn out"* at the end of his shift.

Conversely, interviewees also described how PROMs simplified their work processes, thereby reducing the need for mental effort. They found PROMs helpful in identifying priority areas in patient consultations, guiding discussions to cover all relevant topics, and facilitating conversations about sensitive issues. Two interviewees noted that aggregated PROMs data now assist them in educating patients and making decisions, creating a sense of ease and calm. Furthermore, value improvement activities were appreciated for making protocols and care pathways more transparent and clearer.

Theme 3: confidence

VBHC influenced emotional demands related to accountability in both negative and positive ways. Some interviewees felt insufficiently competent in using PROMs and analyzing data, which affected their confidence. Further, interviewee 21 noted that younger colleagues, trained under a philosophy emphasizing maximal standardization and risk reduction, experienced fear when delivering tailored care that deviates from established standards.

In contrast, interviewee 7 found relief in increased amount of data that VBHC provides. Besides PROMs data, an improvement activity in collaboration with the pharmacy allowed her to see whether patients have collected their medication, which gives her: *"confidence and ammunition for [patient] discussions."* Three others appreciated VBHC's benchmarking feedback, as it confirmed the quality of their care, providing reassurance and a sense of relaxation. Recognition as a best practice also motivated professionals to continue their work.

Some interviewees noted that their hospital effectively regulated a climate of psychosocial safety, making it not stressful to receive feedback on performance. This was established by allowing sufficient time before making data transparent externally, providing opportunities for improvement, and offering personal anonymity if desired.

3.4 Performance: participation in VBHC

Most interviewees believed that the benefits of VBHC outweighed its demands, providing them with the strength and motivation to continue with VBHC. They expressed moderate optimism that future developments will improve the balance between gains and pains.

However, challenges to motivation and strain prompted some professionals to reduce their participation in VBHC. As discussed in the themes 'enjoyability of work activities' and 'workload', six interviewees reported not using PROMs or using them only occasionally in value-based consultations. This was primarily due to their preference for direct, tailored discussions with patients and the time constraints they faced.

Regarding VBHC implementation activities and care improvement efforts, three out of the 26 interviewees began to decrease their involvement. Key factors contributing to this decision included their high ambitions and desire for action, coupled with perceptions of slow progress, limited facilities, and a lack of visible impact from their efforts, as highlighted in the themes 'perception of making a positive impact' and 'workload'.

4 DISCUSSION

This study qualitatively examined how three Value-Based Health Care (VBHC) activities—value-based outpatient consultations, value-based quality improvement, and VBHC implementation efforts—are perceived to affect healthcare professionals' motivation, job strain and ongoing participation in VBHC. Additionally, it explored individual and organizational-level efforts to regulate professionals' experiences, aiming to positively influence the implications of VBHC for them.

4.1 Motivation and strain

We identified four themes that predominantly affect professional's motivation: perception of making a positive impact, enjoyability of job activities, personal development, and sense of community and support. Within these themes, we observed mechanisms through which VBHC either increased, decreased, or left motivation unchanged. Similarly, professionals perceived three key themes—workload, cognitive demands, and confidence—to influence job strain.

It is challenging to make definitive claims about VBHC's workforce implications, as these effects vary depending on the individual, the type of VBHC activity, local conditions, and the pace of implementation. Nevertheless, in broad strokes, all three VBHC activities currently appear to function as a double-edged sword, offering both gains (mainly increasing motivation, occasionally reducing strain) and pains (mainly increasing strain, occasionally reducing motivation).

4.2 Regulation

Regulation efforts were identified at both the individual and organizational levels, aiming to positively influence professionals' perceptions of the implications of VBHC. Professionals primarily employed strategies aimed at finding workarounds for pains and enhancing their emotional and cognitive coping [41]. For instance, some professionals adjusted their expectations to be less affected by the slow pace of progress, and others stopped working on VBHC initiatives during personal time. However, addressing the root causes of pains, such as workload, was often seen as beyond their control. Additionally, professionals crafted their job to enhance aspects of their work they found enjoyable. VBHC appears to diversify professionals' tasks and create opportunities for personal development, allowing them to align their work activities with their strengths and interests. As professionals' roles co-evolve alongside the ongoing development of VBHC and its supporting conditions, liminal space theory may provide a relevant perspective for helping professionals navigate this transitional period [42].

At the organizational level, we found examples of effective regulation aimed at enhancing job resources. These included providing well-functioning IT systems, access to data analysts, training, dedicated time for VBHC activities, and a safe climate. However, gaps in organizational support were also noted, extending to limitations in national leadership and data platforms.

4.3 Performance: participation in VBHC

While professionals generally reported a positive balance of gains over pains, some described their participation in VBHC as suboptimal or intentionally reduced their involvement, highlighting the need for further attention. We found that professionals' self-regulation strategies to cope with VBHC-related strain may sometimes conflict with the intended delivery of VBHC. For example, some professionals chose not to use PROMs to alleviate time pressures and limit the digitalization of their work.

Furthermore, while VBHC initially motivated and energized healthcare professionals with ambitions to work according to the principles of VBHC, maintaining these positive outcomes and avoiding disappointments appeared challenging. Three out of 26 interviewees in our study reported scaling back their efforts in implementing VBHC and value-based quality improvement. This reduction was primarily due to perceptions of slow progress and the belief that they could achieve greater and more immediate impact through alternative activities.

4.4 Advancing professional' motivation and wellbeing in VBHC

Although VBHC primarily centers on patients, our findings highlight the critical need to also consider the professional. Addressing their needs and experiences is essential to prevent disengagement from VBHC or negative responses to future innovations [43,44]. It seems critical to optimize the fit [45,46] between the individual, their job activities, the work environment, and the pace at which VBHC unfolds.

In terms of person-job fit, our findings indicate that VBHC supports certain values typically held by professionals, such as the desire to engage in meaningful work, which is a key driver of motivation [47]. We find evidence that PROMs data, both at the individual patient level and in aggregate, are valuable resources for making positive contributions to patients, as perceived by professionals [48]. However, we also identified instances where VBHC conflicted with personal values, as evidenced by some professionals' aversion to the increasing digitization of their work. VBHC demands specific and often plural skills, including ongoing learning and collaboration with patients, as well as role identities that integrate patient-centeredness with resource stewardship. This necessitates professional development in terms of both skills and identity work [49–51]. Additionally, since VBHC relies on healthcare professionals as 'drivers' of change [10], change motivation, leadership and change capabilities appear essential [51–53].

In terms of the environment, we found significant variation in the facilities and support available to professionals across different sites. This variation seems to reflect their differing perceptions of motivation and strain with regards to VBHC. Some interviewees reported feelings of isolation in their VBHC efforts, particularly when dealing with disengaged colleagues or facing limited organizational and national-level support, echoing findings from previous research [29,30,54]. This suggests a potential over-reliance on pioneering healthcare professionals to drive VBHC without adequate backing. Conversely, being surrounded by enthusiastic peers substantially contributed to motivation and energy, signaling an opportunity for organizations to focus on social dynamics and foster a collective commitment to VBHC [47]. Specific organizational resources valued by professionals are discussed in Section 4.2. Moreover, dashboard tooling could be improved to satisfy professionals' information needs while addressing issues related to data fragmentation and overload [55]. Bottom of Form

Finally, our study confirmed that slow VBHC implementation could pose challenges [54], especially for professionals with a 'do-er' mentality and high ambitions. Strategies such as highlighting achievements and behind-the-scenes efforts, and creating small, visible wins [56] can help manage this challenge. Additionally, providing professionals with information on how complex changes like VBHC typically proceed can help set realistic expectations [57]. However, other literature noted that issues may also arise when implementation is perceived as rushed [4,58], possibly due to differences in readiness and willingness among individuals. Empowering healthcare professionals to establish a suitable pace for themselves may not be a perfect solution, as ensuring alignment among team members is crucial to minimize friction; VBHC inherently requires collaboration.

4.5 Limitations

The results of our study may be skewed due to the inclusion of predominantly VBHC enthusiasts among the interviewees. Enthusiasts are likely more receptive to VBHC's 'gains' but may also experience greater 'pains' if VBHC fails to meet their hopes and expectations. Given the variation in VBHC implementation across local sites, the workforce implications may vary across a broader population. In several instances, value-based efforts focused solely on patient outcomes, neglecting resource considerations, which raises the question of whether these initiatives can truly be considered value-based. Factors related to implementation might diminish over time. Furthermore, physicians were overrepresented in our study compared to the typical ratio between employed physicians and nurses, which could have influenced the results. The predominance of females in our sample aligns with the higher proportion of women in the healthcare sector in the Netherlands [59]. Quantitative studies on the workforce implications of VBHC could usefully complement this qualitative work.

5 CONCLUSION

Value-Based HealthCare (VBHC) initiatives currently create both gains and pains for healthcare professionals. While VBHC is centered around patients, our study emphasizes that the needs, experiences, and evolving role identities of healthcare professionals also deserve attention within the value movement. It is crucial to optimize alignment between the individual, their job activities, the work environment, and the pace at which VBHC unfolds. This is essential for fostering and retaining motivated individuals, who are not only vital to the workforce but also pivotal in advancing VBHC.

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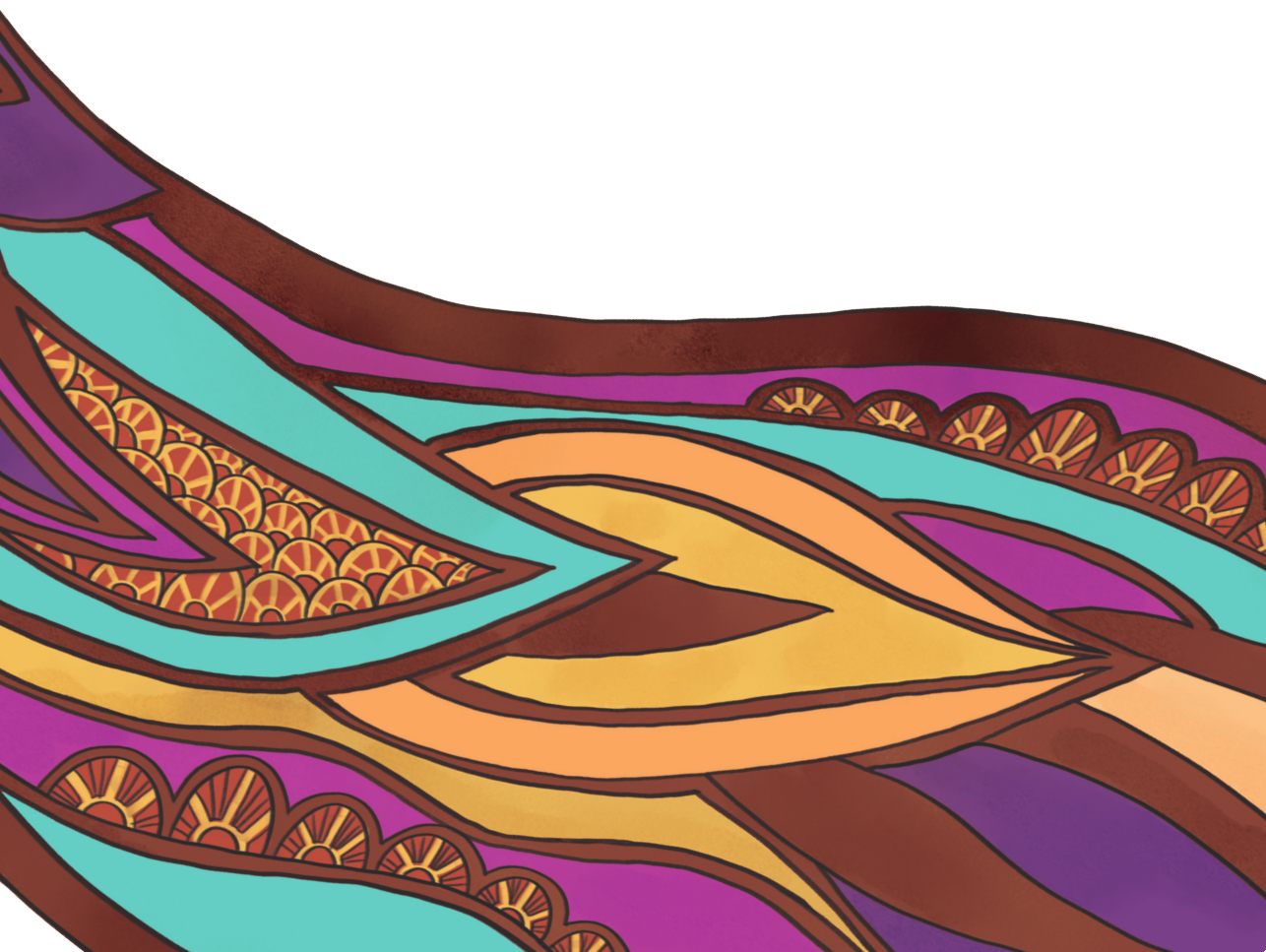
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CHAPTER 8

General discussion



1 INTRODUCTION

1.1 Talking VBHC

To avert a crisis in the United States healthcare, Porter and Teisberg introduced a novel approach in 2006, known as Value-Based Healthcare (VBHC) [1]. This approach focuses on fundamentally improving the healthcare system by adjusting the way care is delivered, organized, measured, and reimbursed. In essence, VBHC aims to prioritize and optimize value for the patient. While there are multiple definitions of the concept of 'value' [2–6], they generally converge on the idea that it refers to outcomes that matter to patients relative to the resources invested, measured across the entire cycle of patient care. In other words, VBHC aims to understand and address the comprehensive care needs of patients with specific conditions in an effective and efficient manner, ensuring that every resource is optimally utilized for the benefit of the patient.

VBHC has spread from the United States to various other countries, including the Netherlands, where optimizing patient value has become part of national policy [7]. Here, VBHC is also expected to help address urgent challenges in healthcare, aiming to ensure that services remain accessible, high-quality, and affordable for everyone [7]. These challenges include rising healthcare demands amidst finite resources and underperforming services, where quality metrics often fail to capture outcomes that matter to patients [1]. Additionally, VBHC is expected to positively impact healthcare professionals' motivation and wellbeing [1,8]. This is crucial given the current workforce challenges [9–11] and their essential role in implementing VBHC [12,13]. However, evidence supporting these benefits remains limited [14,14–17].

1.2 Walking the VBHC talk

To aid healthcare organizations and systems in implementing VBHC, Porter and Lee (2013) outlined six distinct yet interconnected elements for adoption in the so-called 'value agenda' [18]. Over time, Van der Nat (2021) expanded this agenda with four elements [19]. One element of the value agenda is measuring outcomes that matter to patients, typically using structured questionnaires known as Patient-Reported Outcome Measures (PROMs). These questionnaires allow patients to report relevant outcomes, such as symptoms, functioning, and quality of life. This outcome information serves several purposes, including guiding outpatient consultations and optimizing care processes when data from multiple patients are aggregated. Both applications are part of the extended value agenda.

As illustrated by the value agenda, achieving VBHC allows for various courses of action [20,21]. To date, many VBHC initiatives have focused on implementing specific elements of this agenda, often lacking a balanced approach to the concept of value by failing to consider both outcomes and resource use throughout the full cycle of patient care [16,21–26].

1.3 Contributions of this dissertation

Hospitals and healthcare professionals play a crucial role in implementing VBHC. However, three knowledge gaps impede their progress. First, hospitals lack guidance on how they can shape and facilitate the implementation of VBHC [27,28]. Second, there is a lack of clarity and consensus on what VBHC entails in daily practice [29]. Third, there has been limited attention to healthcare professionals within VBHC [16], resulting in a lack of understanding of how VBHC impacts them, for example concerning job strain and motivation. This dissertation aims to help bridge these gaps and further advance the value movement.

1.4 Outline

The remainder of this chapter discusses the main findings related to three research aims (section 2) and shares overarching reflections (section 3). It then continues with implications for practice and research (sections 4 and 5, respectively) and concludes with research limitations and strengths (section 6).

2 MAIN FINDINGS

Aim 1. Unravelling the implementation of VBHC in a leading Dutch university hospital

Research question: *How has a Dutch university hospital implemented VBHC, what outcomes have been achieved, and what factors have influenced both its implementation strategy and outcomes?*

A decade of VBHC implementation

Chapter 2 explored the decade-long (2012–2023) implementation of VBHC at Erasmus Medical Center (Erasmus MC). The hospital's VBHC implementation evolved through three distinct phases, each characterized by a unique strategy. We termed these based on their characteristics as 'depth-first,' 'breadth-first,' and 'hybrid' strategy. Depth refers to the level of transformative change, while breadth pertains to the extent of change across the entire hospital [30–33].

A central support team was established to strategize, facilitate, and coordinate the implementation of VBHC. Throughout the decade, a primary focus was on electronically capturing PROMs from outpatients and discussing their responses during consultations. This focus aligned with the government's emphasis on outcome measurement [34–36] and the hospital's aim to position the patient as partner [37].

During the initial implementation phase (2012–2019), a 'depth-first' strategy was employed. Various multidisciplinary, disease-specific teams of healthcare professionals pursued deep

change by locally implementing several elements of the value agenda. Despite their efforts, these local initiatives remained limited to ‘pilots’. They encountered various obstacles and lacked professionalization, including insufficient support from peers, department heads, and the IT department. Moreover, they faced delays in external developments, such as the development of PROMs and payment reform, and uncertainty regarding continued financial resources. This limited the teams’ ability to achieve the intended depth and fully realize the potential of VBHC, leading to frustration among professionals and perceptions of a negative impact on the change movement. Moreover, this strategy required significant investments for a relatively small audience, and the customized solutions developed were often not scalable, leading to a multitude of different PROMs and IT applications. In short, these efforts yielded valuable insights into VBHC and its implementation, and initial successes strengthened confidence in VBHC’s potential. However, the strategy, in its existing form and level of support, was deemed inadequate to advance VBHC to the desired next level of sustainable, organization-wide change.

Around 2020, following the above conclusions and a shift in leadership, the hospital adopted a ‘*breadth-first*’ strategy. VBHC became a hospital-wide program with more supportive resources, aiming for gradual, sustainable change in the entire hospital over five years. As an initial step, alongside knowledge dissemination, generic PROMs were to be implemented in each disciplinary department, allowing healthcare professionals to enhance their consultations immediately. Once all interested departments were supported, the hospital would progressively deepen the initiative by incorporating domain- and disease-specific PROMs. Subsequent steps would include utilizing PROM data to improve care pathways, integrating cost data as management indicators, organizing around care paths and adapting contracting and costing practices.

Although this strategy laid a stronger foundation for VBHC with structural and technical improvements, the initial changes—such as the introduction of generic PROMs—were too general to engage healthcare professionals. Furthermore, concerns arose about maintaining change momentum over several years. In other words, the centrally driven implementation decisions did not sufficiently align with the diverse motivations and needs of healthcare professionals.

For these reasons, the approach shifted to a ‘*hybrid strategy*’ around 2021, which combined local and hospital-wide changes. The hospital supported teams to further advance VBHC, such as by immediately incorporating domain- and disease-specific PROMs and progressing toward value-based quality improvements. They also responded to bottom-up requests, such as integrating PROMs data into triage. Meanwhile, the hospital maintained a focus on gradual, organization-wide changes and ensuring VBHC’s sustainable integration. They gradually formalized VBHC through its integration into mandatory departmental reporting cycles.

The implementation outcomes revealed substantial achievements in outcome measurement. By 2023, PROMs had been implemented across 68 subdepartments, covering 17% of all outpatients, with more than 10,000 electronic PROMs distributed each month. However, ensuring patient response to PROMs and professionals' engagement with the data during consultations proved challenging. Beyond PROMs, the initial depth-first strategy led to pioneering efforts in care pathway improvement, network care, benchmarking, and bundled payment by select teams. The implementation process proved to be less linear and more time-consuming than originally anticipated, with the 'hybrid' strategy continuing into 2024.

Discussion

Similar to other healthcare organizations transitioning to VBHC [16,20,23–26], Erasmus MC's implementation status was partial in 2024. They made substantial progress over the past decade in measuring patient outcomes and, to a limited extent, using them in consultations. However, there has been little focus on other value-determining elements, such as invested resources and the entire care cycle, which extends beyond hospital care alone.

There are various approaches to VBHC, with timing and context playing a crucial role in determining the most suitable strategy [38]. Overall, however, a combination of local and larger scale change efforts appears beneficial for implementing VBHC. Ultimately, local, deep, well-supported, and harmonized changes integrated into processes and systems could culminate in a large-scale, sustainable transformation to VBHC.

Furthermore, integrating insights from multiple perspectives, including complexity theory, (re)institutionalization, and (re)professionalization, seems essential. Complexity theory [39–41] aligns with the way we observed VBHC to unfold and can thus be used to understand and navigate the value movement. At Erasmus MC, VBHC implementation was non-linear, progressed more slowly than anticipated, and was shaped by internal factors and broader healthcare developments. Hence, it seems important to recognize that the implementation of VBHC cannot be fully centrally managed nor suited to linear planning [39]. Instead, success seems to depend on the commitment and efforts of individual professionals, necessitating tailored and adaptive strategies [33,42,43]. At the same time, VBHC's success depends on a synergistic co-evolution with the broader context. Therefore, professionalization and institutionalization [44] emerge as two focal areas essential to ensure that stakeholders set appropriate expectations and have the necessary capabilities, opportunities, and motivation.

Achieving the use of PROMs in clinical practice

Given the challenges of achieving meaningful engagement from both patients and professionals at Erasmus MC and other hospitals [45–50], chapters 3 and 4 investigated the use of PROMs by patients and professionals at Erasmus MC, respectively. These chapters

also analyzed the strategies the hospital had initiated to improve engagement and explored future opportunities to enhance the use of PROMs.

Results indicate that in 2023, outpatients completed PROMs in over half (56%) of the 46,468 consultations for which a PROM was distributed, reflecting a slight improvement over time (chapter 3). Healthcare professionals opened, on average, only 3 out of 20 completed PROMs on the day of consultation, which serves as a proxy for the discussion of PROMs in practice (chapter 4).

The hospital's strategies to enhance PROMs use targeted the capability, opportunity, and motivation of both patients and healthcare professionals. However, our findings indicate that the quality of execution and completeness of these strategies varied. Challenges to effective facilitation included the infeasibility of certain desired strategies. For example, while the nature of PROM discussions aligned well with the motivation and skills of nurses, these discussions were non-billable, representing an institutional barrier [51]. Other complications arose from reliance on others and unintended consequences. For example, allowing the implementation of PROMs for a subset of a professional's patients facilitated their adoption; however, the low numbers and infrequency of these cases complicated making their discussion a routine behavior.

To inform future strategies, chapter 3 analyzed patient response patterns to PROMs using a multivariate logistic regression model. Results showed that patients of higher or middle socioeconomic status and those attending in-person consultations, i.e. not using telehealth, had significantly higher response rates. Women, patients attending a follow-up visit, or those having their consultation on a Friday were slightly but significantly less likely to complete PROMs. Qualitative findings highlighted persistent challenges in establishing effective feedback mechanisms, such as patient dashboards or feedback through healthcare professionals, and accommodating non-Dutch speaking patients.

Chapter 4 examined the use of PROMs among healthcare professionals. In 2023, 194 healthcare professionals had access to PROM data for their outpatients, of whom 47 agreed to participate in our study. Based on their self-reported use of PROMs, we identified four groups: professionals who made no attempt to use PROMs (an adoption issue; 11%), those who used PROMs inconsistently (an implementation issue; 58%), and those who had discontinued use (a maintenance issue; 15%). Only 17% of healthcare professionals always reviewed completed PROMs. Over half of the professionals cited lack of time and delays in loading the PROM dashboard as substantial barriers. Additionally, more than a quarter of professionals—especially those who had stopped using PROMs—felt that PROMs did not align with how they preferred to work. Qualitative data highlighted limited perceived urgency to use PROMs and insufficient training in PROM-related skills.

Discussion

Enhancing the use of PROMs among patients and professionals at Erasmus MC has proven challenging, despite ongoing efforts to improve their capability, opportunity, and motivation. It seems worthwhile to better understand and address the factors influencing PROM use among both patients and professionals. This could involve designing targeted strategies for specific segments of patients and professionals based on shared characteristics (e.g., gender), consultation types (in-person versus phone or video), and factors related to motivation, perceived opportunity, and capability [52,53]. For professionals specifically, adopting PROMs may require more substantial changes than initially anticipated, including increased accountability and enhanced teamwork. Such changes may necessitate a shift in professional attitudes, role identities and practices, which requires careful consideration.

Aim 2. Reaching consensus on what constitutes a value-based outpatient consultation

Research question: *What activities underpin a value-based outpatient consultation?*

In chapter 5, a Delphi panel of 19 healthcare professionals from Erasmus MC, recognized as pioneers and influencers of VBHC within the hospital, reached consensus on the importance of 63 activities for an ideal value-based consultation. These included discussing the biopsychosocial health outcomes of patients and optimizing care for the individual patient. They also identified several strategies for managing limited resources in healthcare as essential, such as preventing redundant tests.

The panel identified two activities as irrelevant to VBHC: considering societal costs, such as loss of productivity, and assessing the climate footprint of care. Additionally, they failed to reach consensus on 11 activities, including the use of a patient's responses to a survey about their experiences with the care received and insights from aggregated PROMs score, i.e. 'patient-like-me' data. There was also no agreement on whether to consider the financial costs of diagnostics and treatment, as well as their cost-effectiveness.

In their comments, panel members emphasized the importance of contextual decision-making and described varying perspectives on the feasibility and desirability of integrating resource-conscious behaviors. For instance, some panel members prioritized fulfilling patient wishes over efficient resource use, while others noted a lack of insight into the actual costs of interventions.

Discussion

From the perspective of healthcare professionals pioneering VBHC in 2022, an ideal value-based consultation is fundamentally rooted in person-centered care [54] and adapts to the specific characteristics of both the consultation and the patient. Furthermore, according to

the panel, a value-based consultation involves optimizing care for the individual patient and implementing specific measures to judiciously manage limited healthcare resources. These primarily include actions that align with patient needs or have a neutral impact on them. In other cases, institutional complexities [51], such as the challenge of balancing the desire to accommodate patient requests with the necessity of resource stewardship, complicate behaviors.

Aim 3. Examining the perceived impact of VBHC on healthcare professionals

Research question: *How do healthcare professionals perceive the impact of VBHC on themselves?*

In chapters 6 and 7, we examined the experiences of healthcare professionals with VBHC in various (inter)national hospitals, particularly regarding its impact on their motivation, strain, and ongoing participation. Additionally, the chapters identified how healthcare professionals and their employers enhanced positive work experiences with VBHC. These chapters included a systematic literature review and an interview study with professionals involved in at least one of three VBHC activities: discussing value during consultations, pursuing value-based healthcare improvements, and engaging in related implementation activities.

The results indicated that healthcare professionals perceive that VBHC influences their motivation and strain both positively and negatively— in other words: they experience gains and pains. A key gain noted was that VBHC provided professionals with a sense of meaningful contribution to patient care, thereby enhancing their motivation. This gain has been proposed [1,8] but not yet empirically validated. They also observed that VBHC led to greater depth and variety in their tasks, making their work more enjoyable. Furthermore, they appreciated the increased opportunities for personal development that VBHC offered.

However, a recurring pain was the heightened workload associated with VBHC. Several professionals reported limitations in supportive facilities, such as insufficient consultation times and a lack of designated time for VBHC improvement initiatives and implementation. They also pointed out more abstract tensions arising from institutional complexity [51], including delayed payment reforms and the stress of deviating from protocols to prioritize patient values.

Some healthcare professionals indicated that certain aspects of VBHC work conflicted with their personal values. For instance, the rise of digital and data-driven work within VBHC resulted in less time for direct patient contact. A subset of experiences was directly related to the implementation process of VBHC. While committed pioneers in VBHC expressed frustration with the slow pace of change (as noted in chapter 7), those less prepared felt rushed by the movement (chapter 6).

Some aspects of VBHC could act both as a gain and a pain, depending on their presence and quality of local implementation. For instance, professionals were motivated by genuine teamwork and the empowerment that data provided. Yet, professionals also faced difficulties in engaging colleagues, managing data overload, and interpreting complex information. Similarly, while aggregated PROMs data and benchmarking instilled a sense of calm and pride by confirming satisfactory outcomes of care processes, this feedback could also introduce uncertainty and stress when performance was sub optimal and the root cause remained unclear.

We identified various ways in which healthcare professionals and their employers attempted to make VBHC a positive experience. Professionals focused on strategies to maximize perceived gains, developed workarounds for pains, and employed emotional and cognitive coping mechanisms, such as lowering their expectations. Professionals appreciated their employer's efforts to improve facilities and resources, including effective and integrated IT systems, support from data analysts for improvement initiatives, training, additional time for VBHC activities, and fostering a safe environment for feedback on their care delivery.

Although healthcare professionals generally reported a positive gain-pain balance, some viewed their participation in VBHC as suboptimal or consciously chose a more passive role. This led some to reduce or even eliminate the use of PROMs during consultations, as well as to decrease their efforts in implementing VBHC and value-based quality improvement initiatives. These decisions were primarily driven by time constraints, dissatisfaction with the increasing digitalization of their work, and the perception of slow progress, combined with the belief that they could exert greater and more direct influence through other activities to improve healthcare.

Discussion

Healthcare professionals have experienced VBHC initiatives as a double-edged sword. The outcomes appear to depend on the alignment between their personal characteristics, specific VBHC activities, the local work environment, and the implementation process of VBHC. While healthcare professionals generally assessed the balance between gains and pains positively, the experienced pains have led some to participate sub optimally in VBHC. Therefore, there is both an opportunity and a necessity to prioritize the motivation and well-being of healthcare professionals by improving the alignment between the individual, their tasks, the work environment, and the change process, i.e. the 'person-job-environment-change process' fit [55,56].

3 REFLECTIONS

Building on the findings of this dissertation and our research experiences, we provide overarching reflections on both the discourse surrounding VBHC (talking VBHC) and its implementation (walking the VBHC talk).

3.1 Talking VBHC

VBHC has significant interpretive viability [17,27,57–60]. People attribute different meanings to it [58] and there is no established definition for when a health system or organization can claim to deliver VBHC. This ambiguity poses challenges for professionals, change facilitators, and researchers alike. Our studied case presents another example of a partial implementation of the value agenda and an unbalanced focus on the elements that typically define value. In short, VBHC can be likened to a many-headed dragon: adaptable to local contexts yet challenging to present as a clear, consistent, and motivating concept that unites stakeholders and allows for easy generalization of findings [21,28].

Another challenge is that, as noted in chapter 2, related initiatives such as ‘person-centered care’ [54], ‘outcome-based care’ [35], and ‘appropriate care’ [7] may create confusion among professionals and senses of overwhelm and policy competition. This may pull professionals in multiple directions, diminishing their critical role in driving VBHC.

We provide two suggestions to enhance our understanding of VBHC.

Embracing evolving conceptualizations of the value agenda

In our view, it appears important to recognize that VBHC is evolving and not synonymous with Porter and Lee’s value agenda published in 2013 [18]. While their agenda offers valuable steps towards VBHC, it oversimplifies the concept and changes required. Their agenda focuses on organizational and system-level changes, such as measurement and reimbursement, without adequately addressing the role of professionals in achieving patient value [29]. Extensions to the value agenda by Van der Nat (2021) fill this gap [19], expanding the original ‘anatomical’ focus of VBHC to include its ‘physiology.’ This is particularly evident in the extensions: integrating value into patient communication, implementing value-based quality improvement, and investing in a culture of value delivery. In essence, both the ‘anatomy’ (e.g. infrastructure) and ‘physiology’ (e.g. people’s behaviors and practices) of health systems, networks and organizations must evolve [43].

As we keep shaping VBHC and innovating to expand the tools available for optimizing value [61], the journey toward optimal value becomes an ongoing process and the value agenda likely evolving. For instance, as suggested in chapter 6, patient engagement and prevention may be emphasized in a future value agenda.

Viewing VBHC as a goal-means hierarchy

A subsequent value agenda may benefit from explicitly outlining the goal-means hierarchy within VBHC (Figure 1). This could enhance clarity and focus, while illustrating the synergy between separate change initiatives.

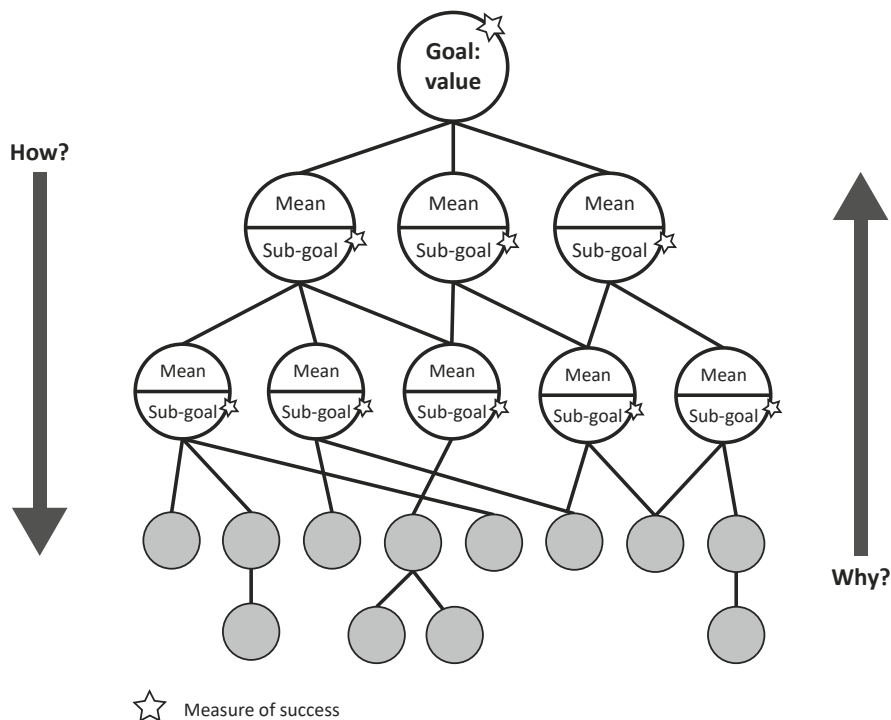


Figure 1. A goals-means hierarchy (inspired by the goal hierarchy [67])

When patient and population value are seen as ultimate goals, they can be achieved through means like integrating value into patient conversations and value-optimized care processes. These means can evolve into sub-goals, requiring means like PROMs data, cost information, patient engagement, value-based incentives, value-based quality improvement, collaboration, person-centered care, prevention, and a thriving and capable workforce. The realization of these means can also depend on other resources, such as enabling IT and learning platforms.

This hierarchy more accurately reflects what is required to achieve value, highlighting different possible courses of action [20,21] and illustrating how diverse sub-goals and means are interconnected. This understanding may help professionals recognize how different change initiatives contribute to and, at times, are essential for achieving the ultimate goal of value. This could potentially alleviate feelings of overwhelm and reduce perceived competition among policies. Furthermore, the hierarchy may assist hospitals in clarifying their priorities within

the value movement. For instance, it illustrates that PROMs serve multiple sub-goals, such as patient discussions, quality reporting, payment, care improvement, and research [62,63]. Given that these sub-goals may require different criteria for PROMs and can conflict [58,64], hospitals may need to prioritize their primary focus.

Moreover, the hierarchy adds nuance to the debate whether PROMs should be considered merely a tool, thus optional, or an integral part of VBHC [65]. Finally, this hierarchy could facilitate evidence generation by guiding progress tracking and identifying success criteria at various levels in the hierarchy. Small wins [32,33,66], defined as “*concrete, completed, implemented outcomes of moderate importance*” [66](p. 43) appear crucial in overcoming the evaluation paradox of complex change and can help maintain momentum [32,33].

3.2 Walking the VBHC talk

There are several controversies and disagreements regarding how to effectively implement VBHC [27]. This dissertation makes two key and interrelated contributions to ‘walking the VBHC talk’: leveraging complexity thinking and ensuring that professionals drive and thrive in VBHC, each accompanied by sub-recommendations.

3.2.1 Leveraging complexity thinking

Our research showed that VBHC unfolds in ways that align with the characteristics of complexity and complex adaptive systems in healthcare [39–41,68,69]. Plsek and Greenhalgh (2001) define complex adaptive systems, like hospitals and the broader health system, as “*a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent’s actions changes the context for other agents*” [68] (p.625). Leveraging theory on complexity seems valuable for understanding and navigating VBHC [39,40]. Based on our research, we derive three key recommendations for navigating complexity in the value movement:

Seeking congruence across all relevant actors

Porter and Lee (2013) highlight the central role of healthcare providers in implementing VBHC “*All stakeholders in health care have essential roles to play [...] Yet providers must take center stage*” [18] (p.19). However, based on the findings in this dissertation, we argue that it is equally important to recognize the interactions among all relevant system actors and their timely synchronization. Achieving congruence within organizations, as well as across networks and the broader system—including those involved in care, cure, prevention, payment, and national policy—is essential for effectively advancing the value movement and maximizing value.

This perspective is informed by observed discrepancies in the pace of change among various system actors, which hinder VBHC progress. For example, as discussed in chapter 2, Erasmus MC’s ambitions advanced faster than (inter)national initiatives, such as the development of

PROMs and payment reforms [70]. Simultaneously, the desired pace of internal implementation sometimes exceeded the readiness of specific individuals and those tasked with facilitating IT resources, resulting in tension.

Furthermore, like the case we studied, it appears that organizations may begin exploring and implementing VBHC within their own structures. While these internal efforts seem to drive substantial improvements, one could question whether an immediate focus on entire care cycles—and thus on care chains and networks—could yield a more significant impact and ease VBHC's full implementation. Above all, the care cycle is integral to the concept of value [18,71]. Without this broader focus, implementation choices may become misaligned among system actors. This increases the risk of incompatible systems, such as divergent choices in PROMs instruments, which complicate collaboration and data exchange. Additionally, as hospitals advance the value movement, it seems important to assess whether prevention, as a critical mechanism for optimizing value, is receiving sufficient attention [72].

Blending local and larger scale change efforts

Chapter 2 concluded that one-sided approaches to implementing VBHC in hospitals seem not viable. Both strategies—focused on tailored, in-depth local pilots or focused on a generic, hospital-wide rollout of VBHC—did not yield the desired results. Instead, we recommend a blended approach that complements local, tailored efforts with larger scale change efforts that create a supportive context, harmonize local changes, and integrate them into core processes and systems. In the end, local, deep, well-supported, and harmonized changes integrated into processes and systems could culminate in a large-scale, sustainable transformation to VBHC.

Acknowledging the lengthy and nonlinear journey

In our work, two other key characteristics of the value movement are evident. As highlighted in chapter 2, the process towards VBHC is both lengthy and nonlinear, with efforts that may not straightforwardly translate into visible outcomes. Comprehensively implementing VBHC's proposed changes in healthcare delivery, organization, and reimbursement likely qualifies as a system transition, typically spanning over 25 years [73]. This reality sharply contrasts with the Erasmus MC's plan to implement VBHC within a couple of years, and with Porter and Teisberg's nearly 20-year-old assertion that *"And all of this could happen sooner than now seems imaginable"* [1] (p. 483). Additionally, it is possible that not everything will be implemented, and it is likely that our implementation efforts will evolve as our understanding of optimal healthcare continues to develop.

An apt analogy for the nonlinear implementation journey of VBHC may be the growth of Chinese bamboo. This takes years developing roots underground, requiring consistent care while remaining invisible, before suddenly growing over 20 meters in just a few weeks. This

analogy underscores that complex change requires sustained effort, even when results are not immediately visible. Regarding our studied case, it is anticipated that the foundation developed for outcome measurement over the past years could accelerate the next steps in VBHC, including improvements in care pathways.

However, the characteristics of complex change stand in stark contrast to the typical linear thinking and the siloed, protocol-driven, and treatment-focused approaches often found in medicine [74,75], as the cover of this dissertation illustrates. This discrepancy risks disengaging stakeholders, including healthcare professionals and key decision-makers. For example, the nonlinear nature of the value movement complicates the evaluation of its performance and effectiveness. At present, VBHC primarily relies more on imagination and storytelling than on solid evidence [14,17], necessitating that professionals independently explore its benefits and effective approaches. This dissertation proposes several strategies to mitigate this risk, including focusing on small wins (see 'Talking VBHC') and cultivating stakeholders who understand the complexities of change and can thrive in such unpredictable, transitional phases, as discussed below.

3.2.2 Ensuring that professionals drive and thrive in VBHC

Healthcare professionals seem overlooked in VBHC, as demonstrated by chapter 6 and Vijverberg et al. (2022) [16]. This oversight is concerning, as capable, motivated and healthy professionals are essential for the success of VBHC (see chapter 1) [1,12,13,18,75]. Based on this dissertation, we assert that to effectively 'walk the VBHC talk,' it is crucial to focus on the professionalization of healthcare professionals and to optimize VBHC as a positive experience, fostering professionals' motivation and well-being.

Professionalization

It seems crucial to empower professionals both in delivering VBHC and driving its implementation, drawing attention to their professionalization [44]. Delivering VBHC is likely to change the nature of professionals' work, requiring new capabilities and a re-evaluation of established professional norms and identities, potentially accelerating ongoing shifts in the field [76]. For instance, VBHC requires professionals to view patients as whole individuals within their life context, rather than merely focusing on diseases and symptoms. This shift broadens professionals' accountability. Furthermore, VBHC necessitates recognizing patients as active partners in their care and may increase the demand for interdisciplinary teamwork, including collaboration with partners outside the hospital setting. Additionally, VBHC asks for resource stewardship and efforts to optimizing care services. This may require different skills, such as communication, collaboration, and data interpretation.

To empower professionals in driving the shift towards VBHC, developing change capability and leadership is crucial [13,40,75,77]. As depicted on the cover of this dissertation, VBHC calls on

professionals to engage with the complexity that lies ahead, stepping beyond a world often dominated by linear thinking and siloed, protocol-driven, and treatment-focused approaches to medicine [74,75]. An understanding of complex adaptive systems [68] and complexity-thinking [39–41,69] can help professionals set appropriate expectations and adopt effective approaches. Greenhalgh and Papoutsi (2018) particularly advise professionals to cultivate *“the capability and capacity to handle the unknown, the uncertain, the unpredictable, and the emergent”*[40] (p.5). The concept of liminal space may also provide valuable insights for understanding and effectively navigating the transitional phase we are currently experiencing [78].

Professionals’ motivation and wellbeing in VBHC

Chapters 6 and 7 revealed that VBHC acts as a double-edged sword for healthcare professionals, presenting both gains and pains. Therefore, it is both an opportunity and a necessity to enhance professionals’ experiences with VBHC, particularly in an era where their well-being and motivation are under pressure [9,79–81]. Encouragingly, the health and well-being of professionals are increasingly recognized as essential in policy [82,83].

Improvement can be achieved by optimizing the alignment between personal characteristics, specific VBHC activities, the local work environment, and the implementation process of VBHC, which also necessitates support for (re)professionalization (see above). Furthermore, addressing institutional complexities or assisting professionals in managing these challenges [51], such as care practices that prioritize volume and adherence to protocols, which contrast with the principles of VBHC, could support healthcare professionals. Finally, professionals should not be viewed merely as passive recipients of change or providers of care. Instead, they must actively co-participate in shaping VBHC and the supporting structures. This approach could help align VBHC and the organization’s resources with professionals’ motivations and needs.

4 IMPLICATIONS FOR PRACTICE

Based on the reflection above, we identify three key implications for practice.

First, it is crucial to acknowledge and address the conceptual challenges surrounding VBHC. We suggest embracing evolving conceptualizations of the value agenda, such as by Van der Nat (2021) [19], and framing VBHC as a goal-means hierarchy (see Figure 1). While achieving full implementation of the value agenda is a gradual process and may not be feasible or appropriate in every context, we encourage organizations to uphold the concept of value by considering both outcomes and resource use throughout the entire patient care cycle. Moreover, the behaviors of professionals and patients should receive close attention, as they

substantially influence value. Furthermore, it seems advisable to fully integrate VBHC into all aspects of healthcare management and organization—such as control cycles, decision-making, and daily operations—rather than treating it as a standalone initiative or an additional task alongside routine duties. This approach can help prevent limitations stemming from change fatigue and overwhelmed professionals.

Second, we recommend viewing the value movement as a complex change within a complex adaptive system, among others characterized by unpredictability and co-evolution with the broader healthcare landscape. Explaining and navigating change through the principles of complexity science [39–41,68,69] can help stakeholders set realistic expectations and take appropriate actions. Specifically, VBHC is unlikely to be implemented and scaled through a straightforward, generic, linear process—moving from mission and vision to strategy, policy, execution, and results. Instead, it requires collective, experiential, and adaptive efforts. Recognizing the interactions among all relevant system actors—internally, including professionals, IT, and management, and externally, including those involved in care, prevention, payment, and national policy—is crucial. Aligning these efforts in a timely manner is essential.

While VBHC implementation relies on the commitment and efforts of individual professionals and teams, which requires tailored strategies to meet diverse needs and motivations, these local changes must also be well-facilitated, harmonized, and embedded within the broader system. Only then can these efforts culminate in sustainable, large-scale transformation. Therefore, our findings also underscore the importance of blending local and larger scale changes at both individual and organizational levels.

Third, it is essential to foster professionals who can both drive and thrive within VBHC by ensuring they have the necessary motivation, opportunities, and capabilities. A supportive environment should be established where professionals can actively co-shape the value movement, drawing on their motivation, creativity, and expertise while addressing their needs. Given that VBHC and its implementation may necessitate new roles, tasks, and responsibilities, professionals may require support for their professionalization, including skills-building and identity development [44,76,84,85]. Clarifying and achieving agreement on their role identities and expected behaviors within VBHC may be crucial to this process.

Furthermore, it is important to examine and optimize professionals' work experiences, recognizing that the transition to VBHC may significantly affect these. Just as VBHC emphasizes asking patients, *'What matters to you?'*—focusing on their symptoms, functioning, and quality of life—similar attention could be given to healthcare professionals. As concluded in chapter 7, aligning the fit between the individual, their job, work environment, and the change process while minimizing conflicting pressures on professionals is essential for minimizing pains and maximizing gains.

5 IMPLICATIONS FOR RESEARCH

As the value movement continues to evolve, further investigation into its implementation and outcomes are essential. With an increasing number of single-case studies [86–89], future research could benefit from examining multiple case studies to build, enrich, and test theory. This approach would also ensure case anonymity, addressing challenges in evaluating ongoing programs where outcomes could affect future stakeholder support. Additionally, research could explore within-case differences, such as the varying uptake of PROMs across departments.

In the Dutch context, a critical next step is to evidence the impact of two frequently implemented elements of the value agenda—‘integrating value in patient discussions’ and ‘value-based quality improvement’. This should not only be done on patient outcomes but also on resource utilization, ultimately linking efforts to the full cycle of care. We encourage researchers to extend their aims to include other outcomes, such as those related to healthcare professionals. However, challenges to outcome evaluations persist, for example regarding the feasibility of quantifying the multifaceted concept of value [90]. Furthermore, longitudinal studies may be necessary to account for possible non-linear manifestations of outcomes. For example, the impact of VBHC on professional’s burnout may take longer to manifest [91]. Additionally, accounting for the impact of context presents another difficulty [92]. A stepped-wedge design across departments or hospitals could provide potential solutions, though this approach has its own challenges. We initially aimed to evaluate professional outcomes using such a study design, but abandoned our efforts due to the unpredictable nature of implementation progress and limitations in the actual use of PROMs by both patients and professionals. When exploring alternative pathways to study this using existing data, we encountered challenges from the lack of a robust learning health system [93], characterized by insufficient interoperable data and lack of appropriate outcome parameters.

In both VBHC-implementation and outcome research, researchers are strongly advised to comprehensively specify the VBHC initiatives under investigation. This includes identifying which aspects of VBHC were intended for implementation and those that have actually been implemented (acknowledging that VBHC is not a singular, standardized concept), evaluating how well these aspects have been implemented in practice (e.g. whether PROMs are being used as intended) and the contextual factors that influence success (e.g. the functioning of IT systems) [53,94,95]. We also encourage researchers to develop an understanding of health systems as complex adaptive systems [68] and to explore the potential of complexity-informed research [39,40]. Furthermore, since VBHC necessitates changes across multiple domains—including culture, institutions, education, technology, policy, and economics—this dissertation concludes that multidisciplinary and transdisciplinary efforts are essential to guide and examine its implementation. For example, in this work we drew from fields such as

implementation science, change management, complexity science, institutionalization, and professionalization, while acknowledging the limitations posed by the absence of perspectives like transition science [73].

Finally, given the central, yet often overlooked, role of healthcare professionals in VBHC, we advise to integrate their perspectives into future studies. We found the two-sided nature of the Job Demands-Resources (JD-R) model, focusing on both motivation and strain, to be particularly fitting for studying the perceived outcomes of VBHC. In chapter 6, we adjusted the original JD-R model to include contextual factors, aligning with the extended JD-R model published around the same time [96]. We recommend this adjusted model for future research. However, applying the JD-R theory qualitatively posed challenges, especially in distinguishing between resources and demands. The theory's developers acknowledge this difficulty [91,97]. For instance, teamwork challenges in VBHC could be perceived as either a reduced resource (since interviewees regarded effective teamwork positively) or as an increased demand (noted to cause stress). Another challenge is that the JD-R model lacks a comprehensive list of demands and resources with defined application criteria, which complicates the naming process and synthesizing the literature base. Furthermore, we observed that the current JD-R model falls short in capturing intermediate states and interactions. For example, it does not readily account for how the available data from PROMs triggers a sequence of experiences that flows from deeper conversations to an increased sense of meaningfulness and, in turn, heightened motivation, as well as how this mechanism interacts with other resources and demands. These observations could guide future research focused on advancing JD-R model and its application.

6 LIMITATIONS AND STRENGTHS

Two design choices of this dissertation limit its generalizability. First, our predominant focus on VBHC within the Dutch healthcare context, which has unique characteristics influencing the local value movement. Second, the adoption of a single case study design in chapters 2 to 5. University hospitals, such as the one studied, differ from other healthcare providers in terms of resources, financing, and patient profiles, all of which influence VBHC implementation choices. Nevertheless, a single case study is suitable for exploring unique and complex cases [98,99]. Additionally, as change co-evolves with context our study captures only a specific moment in an ongoing process. Early experiences, such as the absence of PROMs, may no longer be relevant. Nonetheless, the higher-level insights can inform change efforts across various healthcare settings.

Furthermore, we selected certain theories and frameworks ad-hoc, based on their perceived fit with the data. Future work could apply these seemingly appropriate theories and

frameworks consistently throughout the study design and data collection processes to gain more comprehensive insights. Regarding our use of the JD-R model and the challenges outlined in the implications for research, different categorization decisions could have been made in hindsight, particularly in chapter 6. We also acknowledge that our work has not been intentionally situated within specific disciplines, which has led to semantic inconsistencies in referring to VBHC as either something we 'implement' or as a 'process of change.' We believe that both perspectives are intertwined and essential. As Chambers and Emmons (2024) emphasize: *"we must reorient towards simple principles—that the research questions being asked are more important than researchers identifying themselves by specific disciplinary labels"* [100](p.6).

A notable strength of our study, albeit one that introduces limitations, is our embrace of complexity theory. We examined VBHC over time from various perspectives, using different theories and data sources, which aligns with the pluralistic epistemology of complexity [101]. However, we have been reductive by not involving or studying all key stakeholders in VBHC, excluding insurers, government agencies, and patients (except for chapter 3). Moreover, our focus has primarily been on the organizational-level shift towards VBHC, while the individual-, team- and system-level change processes have received less attention. Limitations inherent to complexity-informed research include the challenge of establishing cause-and-effect relationships [39,40]. Consequently, we cannot pinpoint the most effective strategies for implementing VBHC. It is possible that different conclusions arise from applying other theories and models of implementation and change.

Given the semantic noise around VBHC, we relied on local context to identify what constitutes (or constitutes steps toward) VBHC rather than making objective decisions. Due to frequent impartial implementation and the lack of value-based (impact) evaluations, it remains debatable whether our study cases represent true VBHC. Nonetheless, considering the value agenda, they at least reflect likely steps toward it. Furthermore, in chapters 6 and 7, it is unclear how the 'context of VBHC' affected professionals' experiences with using PROMs in routine care and quality improvements, as we did not conduct analyses comparing these experiences to literature on similar activities that do not reference VBHC.

Notwithstanding these limitations, this dissertation is among the first to conduct complexity-informed research on the implementation of VBHC and examine its implications for healthcare professionals. Key contributions include insights drawn from a decade of VBHC implementation at a pioneering university hospital and framing VBHC as an evolving goal-means hierarchy. Additionally, we propose applying insights from complexity theory to navigate the value movement, and emphasize the experiences of healthcare professionals and the importance of both (re)professionalization and (re)institutionalization.

To advance VBHC in daily practice, it is essential to optimize the dynamic between its implementation and healthcare professionals, ensuring that professionals both drive and thrive within the value paradigm. Closing the loop with J. Rohn's words from the introduction, the winds of value blow on us all. While the surrounding system can facilitate calm and inviting waters, in the end, it are healthcare professionals who set the sails to navigate the winds of VBHC, thereby realizing patient value.

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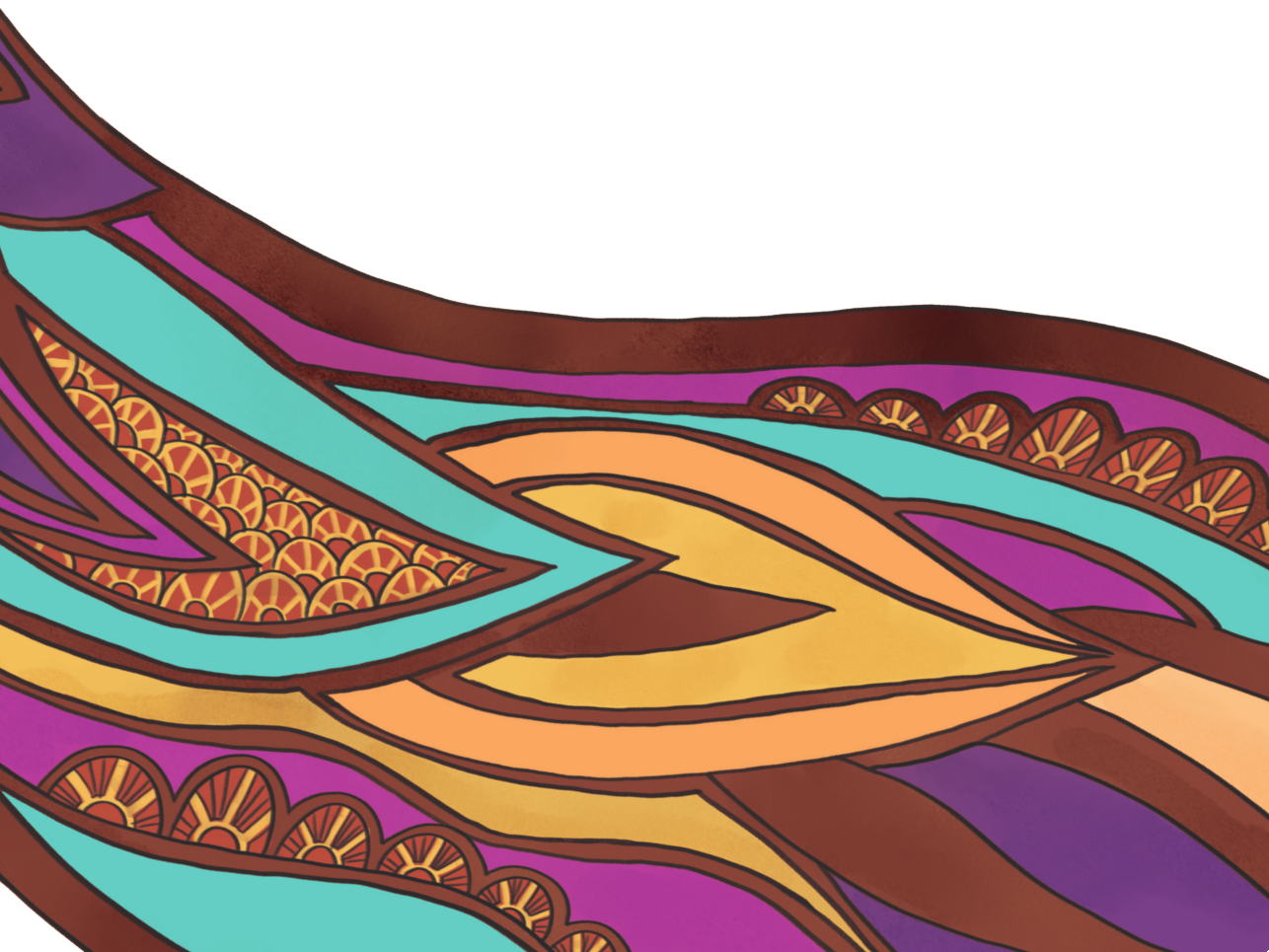
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ADDITIONAL FILES



ADDITIONAL FILE 1. INFORMATION ABOUT ERASMUS MEDICAL CENTER AND THEIR VBHC PROGRAM

Table 1. Information about Erasmus Medical Center [1]

Topic	Information
Hospital type	University hospital, including a pediatric hospital Private not-for-profit
Work organization	Specialty departments are dominant with informal interunit multidisciplinary teams
Mission	A healthy population and excellent care through research and education
Vision	Recognized as a leader in innovations for health and care
Ambitions (2019-2023)	1. Distinctive innovation, focus on technology and data 2. Attention for employee and organization 3. Positioning the patient as a partner
Total # employees	14,700
- Of which female	73%
- Of which physicians	6%
Beds	1,200
Admissions yearly	30,300
Outpatient consultations yearly	629,000
Unique patients yearly	187,000
Revenue yearly	2,2 billion
Billing	All healthcare professionals are hospital employees, i.e. pay-roll employees

Table 2. Patient Reported Outcome Measures used by Erasmus MC

Tier	Type
Generic	PROMIS v1.2 Global Health
Domain Specific	PROMIS SF v2.0 Physical function 4a PROMIS SF v1.0 Anxiety 4a PROMIS SF v1.0 Depression 4a PROMIS SF v1.0 Fatigue 4a PROMIS SF v1.1 Pain interference 4a PROMIS SF v1.0 Sleep disturbance 4a PROMIS SF v1.0 Satisfaction with participation in social roles 4a
Disease-specific	Various

PROMs dashboarding visualizations

PROM scores are calculated per tool according to the guidelines of the individual tools and visualized in a dashboard (see Figure 1). The dashboard shows patients' PROMs score per domain (over time if longitudinal data is available) and enables clinicians to view item responses.

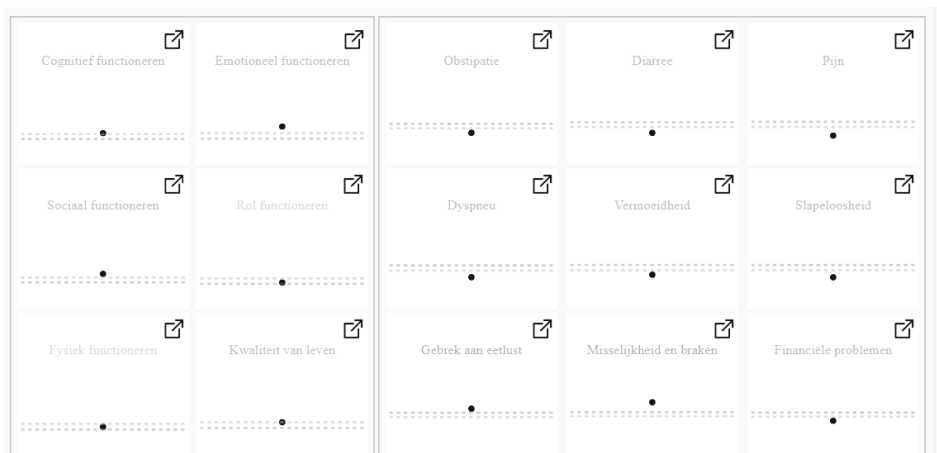


Figure 1. Example of a PROM dashboard (EORTC QLQ-C30 CAT3.0; first completion by patient) for clinician and patient to review during the consulting.

The colors green, orange and red are used to provide instant insight in whether domains do or do not warrant attention. For this visualization, one of the following three methods are used:

Method A. When Dutch reference values are available:

If a higher score indicates better patient status:

- Color red: Lowest possible score up to the mean minus 2 standard deviations of the reference population
- Color orange: Between 'mean minus 2 standard deviations' and 'mean minus 1 standard deviation' of the reference population
- Color green: From 'mean minus 1 standard deviation' of the reference population and higher

If a higher score indicates worse patient status:

- Color red: Highest possible score up to the mean plus 2 standard deviations of the reference population
- Color orange: Between 'mean plus 2 standard deviations' and 'mean plus 1 standard deviation' of the reference population
- Color green: From 'mean plus 1 standard deviation' of the reference population and lower

Method B. When no reference values are known (certain disease-specific dashboards), expert values are determined in consultation with the department, often based on the following principles:

If a higher score indicates better patient status:

- Color red: 0% – 24% of the total possible score
- Color orange: Between 25% – 75% of the total possible score
- Color green: Between 76% – 100% of the total possible score

If a higher score indicates worse patient status:

- Color green: 0% – 24% of the total possible score
- Color orange: Between 25% – 75% of the total possible score
- Color red: Between 76% – 100% of the total possible score

Method C. In disease-specific dashboards, deviations from methods A and B are sometimes made when certain symptoms are always considered alarming. In such cases, the presence of the symptom always scores red. For example, swallowing difficulties in head and neck oncology or coughing up blood in lung oncology will always be shown as red.

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ADDITIONAL FILE 2. SURVEY

In January 2023, a collective survey, named EMC23, was digitally distributed to all 194 clinicians across the 35 subdepartments that collected PROMs data from specialty outpatients in 2022. The survey included questions designed for the studies discussed in Chapters 2 and 4. Survey results are presented in Table 1. For the study presented in Chapter 4, certain survey results were analyzed by subgroup, as shown in Tables 2 and 3.

Table 1. Survey items and responses

Item	Answer categories	N responses	%
Gender	Male	47	26
	Female		75
	Other		0
Age (years)	Average	47	46
	Max		64
	Min		31
	StdDev		8,3
Function	Medical Specialist	47	64
	Doctor in training		4
	Nurse specialist		11
	Nurse		9
	Nurse consultant		6
	Psychologist		4
	Sexologist		2
Years of work experience (excluding main education)	2 - 5 years	47	4
	6 - 10 years		9
	11 - 25 years		62
	More than 25 years		26
Average number of work hours per week	17 - 32 hours	47	15
	33 - 40 hours		32
	41 hours or more		53
How often do you see most of your patients?	This varies significantly	47	34
	Multiple times over an extended period		51
	A few times in a short timeframe		11
	One time only		4

Table 1. Continued.

Item	Answer categories	N responses	%
When were PROMs first collected among patients in your department?	Between 2013 to 2019 (tools: gemstracker/zorgmonitor)	47	38
	Between 2020 and 2023		34
	I don't know		28
Which PROMs are collected from your patients?	I don't know	45	18
	Only generic PROMs and/or domain-specific PROMs		29
	Only disease-specific PROMs		16
	Both generic/domain specific and disease specific PROMs		38
Were you present during the timeframe that your department started using PROMs?	Yes	47	77
	No, I started working there later		13
	I don't know		11
How frequently do you examine patients' responses to PROMs?	I have never used PROMs	47	11
	I have stopped looking at PROMs		15
	Occasionally		36
	As often as possible		21
	Always		17
<i>If in the previous question answer 3,4 or 5 was selected:</i> To what extent do you discuss these outcomes with the patient during the consultation?	Never	35	17
	Occasionally		29
	As often as possible		26
	Always		29
<i>Among those that used PROMs at least once:</i> What is/was/are/were the primary reason(s) for you to use PROMs in the consultation room? Multiple answers are possible.	It benefits my patients	42	38
	It benefits me personally		36
	It is expected of me		45
	My patients request it		12
	Combinations with >5% occurrence		29
	The combination 'It benefits my patients' and 'It benefits me personally'		
	The combination 'It benefits my patients,' 'it benefits me personally,' and 'it is expected of me.'		7
	Only: This is expected of me		31
	Only: My patients request it		7

Table 1. Continued.

Item	Answer categories	N responses	%
<i>Among those that used PROMs at least once:</i> It is supportive that the PROM completion rate is shown at the frontpage of the Electronic Health Record.	Disagree	42	17
	Partly disagree		0
	Neutral		19
	Partly agree		19
	Agree		17
	No opinion		29
<i>Among those that used PROMs at least once:</i> The template to report PROM results in a letter to another healthcare professional or general practitioner is supportive.	Disagree	42	12
	Partly disagree		0
	Neutral		7
	Partly agree		0
	Agree		2
	No opinion		79
What are the prominent reasons that you have possibly not been able to use PROMs optimally in the consultation room? Multiple answers possible.	Dashboard functioning issues	44	55
	Not enough time		55
	Not in my routine, I forget it		50
	Misalignment with how I prefer to work		27
	Low volume of completed PROMs		39
	No added benefits for patients or myself		25
	Finding it difficult or perceiving not to possess necessary skills		18
	PROMs do not fit my patient population		16
	I have limited influence on improving PROM domains		9
	A colleague discusses PROMs		5
Al in all, what grade (1-10) do you give to the process of PROMs implementation in your consultation room?	Average	44	5,4
	Min		1
	Max		9
	StdDvt		2,4

Table 1. Continued.

Item	Answer categories	N responses	%
Al in all, what grade (1-10) do you give the outcomes of implementing PROMs in your consultation room?	Average	44	4,9
	Min		1
	Max		9
	StdDvt		2,3
I received sufficient education to use PROMs in the consultation room.	Disagree	43	30
	Partly disagree		26
	Neutral		26
	Partly agree		16
	Agree		0
	No opinion		2
I received sufficient on-the-job coaching to use PROMs in the consultation room.	Disagree	43	33
	Partly disagree		28
	Neutral		26
	Partly agree		12
	Agree		0
	No opinion		2
Stories of other healthcare professionals influenced my attitude towards working with PROMs positively.	Disagree	43	35
	Partly disagree		14
	Neutral		33
	Partly agree		16
	Agree		0
	No opinion		2
The program team... ...is helpful in the implementation of PROMs in my workplace.	Disagree	43	14
	Partly disagree		9
	Neutral		40
	Partly agree		23
	Agree		12
	No opinion		2

Table 1. Continued.

Item	Answer categories	N responses	%
The program team... ... communicates professionally and reaches me through appropriate channels.	Disagree	43	12
	Partly disagree		7
	Neutral		37
	Partly agree		30
	Agree		12
	No opinion		2
The program team... ... provides sufficient customization for my team/ department.	Disagree	43	16
	Partly disagree		12
	Neutral		49
	Partly agree		16
	Agree		5
	No opinion		2
The program team... ... asks about our experiences with working with PROMs and the implementation process.	Disagree	43	14
	Partly disagree		16
	Neutral		40
	Partly agree		23
	Agree		5
	No opinion		2
The program team... ... regularly provides feedback on the use of PROMs in my department.	Disagree	43	21
	Partly disagree		26
	Neutral		35
	Partly agree		16
	Agree		0
	No opinion		2
The program team... ... effectively encourages me to use PROMs in the consultation room.	Disagree	43	19
	Partly disagree		28
	Neutral		37
	Partly agree		12
	Agree		2
	No opinion		2

Table 1. Continued.

Item	Answer categories	N responses	%
Which of the following VBHC activities have also been part of your work? (Multiple answers possible)	Forming and working in a multidisciplinary team for a specific condition		56
	Redesigning care pathways (within the hospital)		30
	Learning, improving, and/or innovating based on PROMs data and/or benchmarks		33
	Actions related to integrated care	43	21
	Actions related to healthcare costs and financing		9
	None of the above activities, and I also do not aspire to do so		9
	None of the above activities, although I do have an interest in them		23
I support Erasmus MC's choice to implement VBHC <u>in phases, starting with PROMs</u> (instead of one of the activities mentioned above).	Disagree		17
	Partly disagree		7
	Neutral		36
	Partly agree	42	21
	Agree		19
	No opinion		0
I believe it is important for Erasmus MC to focus on <u>hospital-wide</u> implementation of PROMs	Disagree		21
	Partly disagree		7
	Neutral		24
	Partly agree	42	17
	Agree		29
	No opinion		2
I believe it is important for Erasmus MC to explicitly encourage the use of PROMs <u>in</u> the outpatient care consultation room.	Disagree		19
	Partly disagree		7
	Neutral		36
	Partly agree	42	10
	Agree		29
	No opinion		0

Table 2. Sub-group analyses. Prominent reasons for clinicians to use PROMs

Item	Answers	All respondents that used PROMs at least once (n=42)	Never attempters (n=5)	Ceased user (n=7)	Occasional users (n=17)	As often as possible users (n=10)	Always users (n=8)
Most prominent factors reasons why I use(d) PROMs.	Benefits for the patient	38%	Not applicable	0%	29%	50%	75%
	Benefits for myself	36%	Not applicable	0%	29%	40%	75%
	It is expected from me	45%	Not applicable	43%	53%	40%	38%
	Patients requests	12%	Not applicable	29%	18%	0%	0%
	Other, namely...	0%	Not applicable	0%	0%	0%	0%
Calculation	Average # of factors selected	1,3	Not applicable	0,7	1,3	1,3	1,9

Table 3. Sub-group analyses. Prominent factors that contributed to suboptimal use of PROMs

Item	Answers	All respondents (n=44*)	Never attempters (n=4*)	Ceased user (n=7)	Occasional users (n=15*)	As often as possible users (n=10)	Always users (n=8)
Most prominent factors causing sub-optimal use of PROMs, if experienced	Dashboard functioning issues	55%	50%	86%	53%	60%	25%
	Not enough time	55%	100%	100%	53%	10%	50%
	Not in my routine, I forget it	50%	75%	71%	67%	40%	0%
	Misalignment with how I prefer to work	27%	75%	43%	33%	0%	13%
	Low volume of completed PROMs	39%	25%	43%	33%	50%	38%
	No added benefits for patients or myself	25%	0%	43%	33%	20%	13%
	Finding it difficult or perceiving not to possess necessary skills	18%	50%	14%	27%	10%	0%
	PROMs do not fit my patient population	16%	25%	29%	13%	0%	25%
	I have limited influence on improving PROM domains	9%	0%	0%	20%	10%	0%
	A colleague discusses PROMs	5%	0%	0%	13%	0%	0%
Calculation	Too little reinforcement	5%	25%	14%	0%	0%	0%
	Other, namely...	55%	50%	86%	53%	60%	25%
	Average # of factors selected	3,0	4,3	4,4	3,5	2,0	1,6
	PROMs implementation process	5,4 (min 1, max 9)	3,3 (min 1, max 6)	2,4 (min 1, max 4)	5,3 (min 3, max 8)	6,5 (min 4, max 9)	7,8 (min 5, max 9)
Average grade from 1-10	PROMs implementation outcomes	4,9 (min 1, max 9)	3,3 (min 1, max 6)	2,4 (min 1, max 5)	4,9 (min 2, max 8)	5,2 (min 3, max 9)	7,5 (min 5, max 9)

ADDITIONAL FILE 3. VBHC LITERATURE WITH ERASMUS MC AUTHORSHIP

On February 28th, 2023, we systematically analyzed seven databases to retrieve international peer-reviewed articles from the Dutch university hospital Erasmus Medical Center (Erasmus MC) regarding Value-Based Health Care (VBHC). The search was conducted with support of W. Bramer, a librarian from Erasmus Medical Center, on February 28th, 2023.

3.1 Search string

The search string contained words related to 'VBH,.' as well as the hospital's developed VBHC dashboard which they initially called 'Healthcare Monitor' next to either 'Erasmus' or the location being 'Rotterdam.'

Embase

('value based care'/de OR 'value based medicine'/de OR (vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) NEAR/3 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor):ab,ti) AND (erasmus* OR rotterdam):ab,ti,ad

Medline

(Value-Based Health Care/ OR (vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) ADJ3 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor).ab,ti,kw.) AND (erasmus* OR rotterdam).ab,ti,kw,ia.

psycINFO

((vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) ADJ3 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor).ab,ti.) AND (erasmus* OR rotterdam).ab,ti.

Web of science

TS=(((vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) NEAR/2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor))) AND ALL=(erasmus* OR rotterdam)

CINAHL

((MH Value-Based Health Care+ OR TI(vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) N2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor)) OR AB((vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) N2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor))) AND (erasmus* OR rotterdam)

Business Source Premier

((MH VALUE-based healthcare OR MH VALUE-based management OR TI(vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) N2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor)) OR AB((vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) N2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor))) AND (erasmus* OR rotterdam)

EconLit

TI,AB((vbhc OR vb-hc OR value-based OR valuebased OR ((high-value OR value-driven) N2 (care OR healthcare)) OR healthcare-monitor OR health-care-monitor)) AND (erasmus* OR rotterdam)

3.2 Search outcomes and analysis

The search yielded 198 items (see Table 1), of which 15 articles were included after abstract and full-text screening, using four exclusion criteria: 1) not about VBHC; 2) Erasmus MC not the empirical field; 3) not a full article; and 4) participation in a Delphi study for PROMs outcome set development, e.g. [2–11]. The selected articles were then categorized and described based on their scope. We identified 15 peer-reviewed VBHC articles from the hospital, inductively categorized into four topics: VBHC implementation, VBHC operationalization, PROMs implementation, and the utilization of PROMs as a data source, see Table 2.

Table 1. Search outcomes per database

Database searched	Platform	Years of coverage	Records	Records after duplicates removed
Embase	Embase.com	1971 - Present	133	130
Medline ALL	Ovid	1946 - Present	4	0
Web of Science Core Collection*	Web of Knowledge	1975 - Present	154	57
CINAHL*	EBSCO	1982 - Present	3	0
PsycINFO	Ovid	1806 - Present	2	0
Business Source Premier	EBSCO	1922 - present	18	8
EconLit	ProQuest	1886 - present	7	3
Total			321	198

*Science Citation Index Expanded (1975-present) ; Social Sciences Citation Index (1975-present) ; Arts & Humanities Citation Index (1975-present) ; Conference Proceedings Citation Index- Science (1990-present) ; Conference Proceedings Citation Index- Social Science & Humanities (1990-present) ; Emerging Sources Citation Index (2005-present). No other database limits were used than those specified in the search strategies

Table 2. Identified articles categorized in four themes

Theme	Details	References
VBHC implementation	Collaboration with multiple institutions	[12]
VBHC operationalization	Consensus on value-based outpatient consultations among clinicians	[13]
PROMs implementation	Central evaluation among all participating clinicians in VBHC	[14]
	Decentral evaluation among specific disciplines, including patient experiences with PROMs and perceived service outcomes	[15,16]
	Collaboration with multiple institutions	[12,17,18]
PROMs as data source	Specific to diseases or disciplines	[4,19–25]

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ADDITIONAL FILE 4. MULTIVARIATE LOGISTIC REGRESSION ANALYSIS

Below we show additional Summary Statistics and multivariate logistic regression outcomes. These are categorized per outcome variable: *PROM completed* (Table 1), *all PROMs completed* (Tables 2 to 4), *PROMIS v1.2 Global Health completed* (Tables 5 to 7), *PROMIS SF completed* (Tables 8 to 10), and *EORTC completed* (tables 11 to 13).

4.1 PROM completed

Table 1. Summary Statistics explanatory variables specified according to PROM completed (Yes/No)

PROM completed	Category	Variable	N	Mean (%)	Min	Max
Yes	Patient characteristics (P _p)	Female	25948	51.2	0	1
		Age	25948	57.4	18	96
		SES high	25948	37.6	0	1
		SES middle	25948	35.1	0	1
		SES low	25948	27.3	0	1
	Consultation characteristics (C _c)	Consultation took place	25948	98.4	0	1
		Teleconsultation	25948	18.8	0	1
		Follow-up	25948	71.2	0	1
		Monday	25948	19.3	0	1
		Midweek	25948	63.8	0	1
		Friday	25948	17.0	0	1
		Morning	25948	56.3	0	1
		Afternoon	25948	43.7	0	1
No	Patient characteristics (P _p)	Female	20520	54.4	0	1
		Age	20520	56.4	18	97
		SES high	20520	28.4	0	1
		SES middle	20520	31.2	0	1
		SES low	20520	40.4	0	1

Table 1. Continued.

PROM completed	Category	Variable	N	Mean (%)	Min	Max
	Consultation characteristics (C _c)	Consultation took place	20520	90.6	0	1
		Teleconsultation	20520	28.1	0	1
		Follow-up	20520	77.5	0	1
		Monday	20520	17.7	0	1
		Midweek	20520	64.4	0	1
		Friday	20520	17.9	0	1
		Morning	20520	54.3	0	1
		Afternoon	20520	45.7	0	1

4.2 All PROMs completed

Table 2. Summary Statistics explanatory variables

Category	Variable	N	Mean (%)	Min	Max
Patient characteristics (P _p)	Female	46468	52.6	0	1
	Age	46468	57.0	18	97
	SES high	46468	33.5	0	1
	SES middle	46468	33.4	0	1
	SES low	46468	33.1	0	1
Consultation characteristics (C _c)	Consultation took place	46468	94.9	0	1
	Teleconsultation	46468	22.9	0	1
	Follow-up	46468	74.0	0	1
	Monday	46468	18.6	0	1
	Midweek	46468	64.0	0	1
	Friday	46468	17.4	0	1
	Morning	46468	55.4	0	1
	Afternoon	46468	44.6	0	1

Table 3. Summary Statistics explanatory variables specified according to All PROMs completed (Yes/No)

All PROMs completed	Category	Variable	N	Mean (%)	Min	Max
Yes	Patient characteristics (P _p)	Female	21164	50.7	0	1
		Age	21164	56.7	18	96
		SES high	21164	37.9	0	1
		SES middle	21164	35.2	0	1
		SES low	21164	26.9	0	1
	Consultation characteristics (C _c)	Consultation took place	21164	98.3	0	1
		Teleconsultation	21164	18.1	0	1
		Follow-up	21164	70.1	0	1
		Monday	21164	18.6	0	1
		Midweek	21164	64.5	0	1
		Friday	21164	16.9	0	1
		Morning	21164	56.2	0	1
		Afternoon	21164	43.8	0	1
No	Patient characteristics (P _p)	Female	25304	54.3	0	1
		Age	25304	57.2	18	97
		SES high	25304	29.9	0	1
		SES middle	25304	31.8	0	1
		SES low	25304	38.3	0	1
	Consultation characteristics (C _c)	Consultation took place	25304	92.1	0	1
		Teleconsultation	25304	26.9	0	1
		Follow-up	25304	77.2	0	1
		Monday	25304	18.6	0	1
		Midweek	25304	63.7	0	1
		Friday	25304	17.8	0	1
		Morning	25304	54.7	0	1
		Afternoon	25304	45.3	0	1

Table 4. Multivariate logistic regression of all PROMs completed on person and consultation characteristics. Reference values for SES, day of the week, and time of the consultation are respectively SES low, Friday, and afternoon.

Category	Variable	Odds ratio	p-value
Person characteristics (P _p)	Female	0.849	0.000
	Age	0.995	0.000
	SES high	1.833	0.000
	SES middle	1.597	0.000
Consultation characteristics (C _c)	Consultation took place	4.772	0.000
	Teleconsultation	0.633	0.000
	Follow-up	0.781	0.000
	Monday	1.074	0.027
	Midweek	1.105	0.000
	Morning	0.958	0.034
	Constant	0.231	0.000
	N = 46468		

4.3 PROMIS v1.2 Global Health completed

Table 5. Summary Statistics explanatory variables of those receiving PROMIS10

Category	Variable	N	Mean (%)	Min	Max
Patient characteristics (P _p)	Female	43452	52.8	0	1
	Age	43452	56.8	18	97
	SES high	43452	33.2	0	1
	SES middle	43452	33.4	0	1
	SES low	43452	33.4	0	1
Consultation characteristics (C _c)	Consultation took place	43452	94.8	0	1
	Teleconsultation	43452	22.7	0	1
	Follow-up	43452	73.7	0	1
	Monday	43452	18.6	0	1
	Midweek	43452	64.2	0	1
	Friday	43452	17.2	0	1
	Morning	43452	55.1	0	1
	Afternoon	43452	44.9	0	1

Table 6. Summary Statistics explanatory variables specified according to PROMIS v1.2 Global Health completed (Yes/No)

PROMIS v1.2 Global Health completed	Category	Variable	N	Mean (%)	Min	Max
Yes	Patient characteristics (P _p)	Female	24051	51.3	0	1
		Age	24051	57.2	18	96
		SES high	24051	37.4	0	1
		SES middle	24051	35.1	0	1
		SES low	24051	27.5	0	1
	Consultation characteristics (C _c)	Consultation took place	24051	98.4	0	1
		Teleconsultation	24051	18.4	0	1
		Follow-up	24051	70.9	0	1
		Monday	24051	19.4	0	1
		Midweek	24051	63.9	0	1
		Friday	24051	16.7	0	1
		Morning	24051	56.0	0	1
		Afternoon	24051	44.0	0	1
No	Patient characteristics (P _p)	Female	19401	54.6	0	1
		Age	19401	56.2	18	97
		SES high	19401	28.1	0	1
		SES middle	19401	31.3	0	1
		SES low	19401	40.6	0	1
	Consultation characteristics (C _c)	Consultation took place	19401	90.3	0	1
		Teleconsultation	19401	28.0	0	1
		Follow-up	19401	77.2	0	1
		Monday	19401	17.6	0	1
		Midweek	19401	64.6	0	1
		Friday	19401	17.8	0	1
		Morning	19401	53.9	0	1
		Afternoon	19401	46.1	0	1

Table 7. Multivariate logistic regression of PROMIS v1.2 Global Health completed on person and consultation characteristics. Reference values for SES, day of the week, and time of the consultation are respectively SES low, Friday, and afternoon.

Category	Variable	Odds ratio	p-value
Person characteristics (P _p)	Female	0.877	0.000
	Age	1.000	0.756
	SES high	1.981	0.000
	SES middle	1.669	0.000
Consultation characteristics (C _c)	Consultation took place	5.964	0.000
	Teleconsultation	0.602	0.000
	Follow-up	0.828	0.000
	Monday	1.202	0.000
	Midweek	1.105	0.000
	Morning	0.980	0.339
	Constant	0.191	0.000
	N = 43452		

4.4 PROMIS SF completed

Table 8. Summary Statistics explanatory variables of those receiving PROMIS SF

Category	Variable	N	Mean (%)	Min	Max
Patient characteristics (P _p)	Female	13715	56.7	0	1
	Age	13715	47.4	18	97
	SES high	13715	30.7	0	1
	SES middle	13715	31.1	0	1
	SES low	13715	38.1	0	1
Consultation characteristics (C _c)	Consultation took place	13715	91.9	0	1
	Teleconsultation	13715	15.7	0	1
	Follow-up	13715	59.4	0	1
	Monday	13715	13.7	0	1
	Midweek	13715	69.5	0	1
	Friday	13715	16.7	0	1
	Morning	13715	56.0	0	1
	Afternoon	13715	44.0	0	1

Table 9. Summary Statistics Explanatory variables specified according to PROMIS SF completed (Yes/No)

PROMIS SF completed	Category	Variable	N	Mean (%)	Min	Max
Yes	Patient characteristics (P _p)	Female	6831	56.6	0	1
		Age	6831	48.2	18	94
		SES high	6831	35.4	0	1
		SES middle	6831	33.4	0	1
		SES low	6831	31.2	0	1
	Consultation characteristics (C _c)	Consultation took place	6831	97.6	0	1
		Teleconsultation	6831	11.6	0	1
		Follow-up	6831	54.8	0	1
		Monday	6831	14.1	0	1
		Midweek	6831	69.7	0	1
		Friday	6831	16.1	0	1
		Morning	6831	57.3	0	1
		Afternoon	6831	42.7	0	1
No	Patient characteristics (P _p)	Female	6884	56.9	0	1
		Age	6884	46.6	18	97
		SES high	6884	26.1	0	1
		SES middle	6884	28.9	0	1
		SES low	6884	45.0	0	1
	Consultation characteristics (C _c)	Consultation took place	6884	86.2	0	1
		Teleconsultation	6884	19.7	0	1
		Follow-up	6884	64.0	0	1
		Monday	6884	13.3	0	1
		Midweek	6884	69.3	0	1
		Friday	6884	17.3	0	1
		Morning	6884	54.7	0	1
		Afternoon	6884	45.3	0	1

Table 10. Multivariate logistic regression of PROMIS SF completed on person and consultation characteristics. Reference values for SES, day of the week, and time of the consultation are respectively SES low, Friday, and afternoon.

Category	Variable	Odds ratio	p-value
Person characteristics (P _p)	Female	0.957	0.232
	Age	1.003	0.008
	SES high	1.967	0.000
	SES middle	1.657	0.000
Consultation characteristics (C _c)	Consultation took place	5.825	0.000
	Teleconsultation	0.556	0.000
	Follow-up	0.828	0.000
	Monday	1.043	0.516
	Midweek	1.130	0.012
	Morning	1.047	0.209
	Constant	0.129	0.000
	N = 13715		

4.5 EORTC completed

Table 11. Summary Statistics explanatory variables of those receiving EORTC

Category	Variable	N	Mean (%)	Min	Max
Patient characteristics (P _p)	Female	19480	50.2	0	1
	Age	19480	62.6	18	97
	SES high	19480	36.0	0	1
	SES middle	19480	34.8	0	1
	SES low	19480	29.1	0	1
Consultation characteristics (C _c)	Consultation took place	19480	97.6	0	1
	Teleconsultation	19480	25.3	0	1
	Follow-up	19480	78.7	0	1
	Monday	19480	22.5	0	1
	Midweek	19480	60.6	0	1
	Friday	19480	16.9	0	1
	Morning	19480	56.3	0	1
	Afternoon	19480	43.7	0	1

Table 12. Summary Statistics Explanatory variables specified according to EORTC completed (Yes/No)

EORTC completed	Category	Variable	N	Mean (%)	Min	Max
Yes	Patient characteristics (P _p)	Female	8791	46.4	0	1
		Age	8791	62.3	18	93
		SES high	8791	39.8	0	1
		SES middle	8791	36.5	0	1
		SES low	8791	23.6	0	1
	Consultation characteristics (C _c)	Consultation took place	8791	99.0	0	1
		Teleconsultation	8791	22.7	0	1
		Follow-up	8791	76.9	0	1
		Monday	8791	22.1	0	1
		Midweek	8791	60.9	0	1
		Friday	8791	17.0	0	1
		Morning	8791	56.8	0	1
		Afternoon	8791	43.2	0	1
No	Patient characteristics (P _p)	Female	10689	53.3	0	1
		Age	10689	62.8	18	97
		SES high	10689	32.9	0	1
		SES middle	10689	33.4	0	1
		SES low	10689	33.6	0	1
	Consultation characteristics (C _c)	Consultation took place	10689	96.5	0	1
		Teleconsultation	10689	27.5	0	1
		Follow-up	10689	80.3	0	1
		Monday	10689	22.8	0	1
		Midweek	10689	60.4	0	1
		Friday	10689	16.8	0	1
		Morning	10689	56.0	0	1
		Afternoon	10689	44.0	0	1

Table 13. Multivariate logistic regression of EORTC completed on person and consultation characteristics. Reference values for SES, day of the week, and time of the consultation are respectively SES low, Friday, and afternoon.

Category	Variable	Odds ratio	p-value
Person characteristics (P_p)	Female	0.754	0.000
	Age	0.995	0.000
	SES high	1.704	0.000
	SES middle	1.554	0.000
Consultation characteristics (C_c)	Consultation took place	3.285	0.000
	Teleconsultation	0.790	0.000
	Follow-up	0.872	0.000
	Monday	0.994	0.904
	Midweek	1.041	0.325
	Morning	0.961	0.208
	Constant	0.330	0.000
	N = 19480		

ADDITIONAL FILE 5. SEMI-STRUCTURED INTERVIEW QUESTIONS

This interview guide was used to interview individuals involved in the hospital-wide transition to Value-Based Healthcare (VBHC), particularly focusing on the implementation of Patient Reported Outcome Measures (PROMs). After re-analysis, the following questions were found to effectively prompt relevant information concerning clinicians' underuse of PROMs, hereafter issue x, and related strategies.

Questions that prompted insightful comments:

- How did the hospital approach the implementation of PROMs as part of VBHC, and what specific actions did they undertake? What were the reasons behind these actions?
- What were the primary challenges faced by the hospital during the implementation of PROMs? Probes (if necessary): can you elaborate on issue x. What caused issue x? What do you base your thoughts on? Can you think of other reasons/forces?
- How did you or the hospital address issue x (response to Question 2)? Why was this approach chosen? Probes (if necessary): Please elaborate on this. What factors led to the selection of this particular approach/strategy/solution? What facilitated its implementation, and what were the main obstacles?
- Have there been any modifications made to this approach/strategy/solution over time?
- How do you reflect upon approach/strategy/solution X in addressing issue x? What was the outcome of employing this approach/strategy/solution regarding the issue? What factors contributed to these outcomes?
- Were alternative responses considered for addressing the issue? Why were alternatives A, B, or C not pursued? What led to prioritizing approach/strategy/solution X?
- In retrospect, what insights have you gained about the issue and its management? What changes would you propose for handling this issue differently in the future? Why? Probes (if necessary): What advice would you offer to other healthcare centers facing a similar issue? What resources or conditions are essential for resolving this issue optimally?
- Is there anything that we have missed that you think is important to add? Please tell me.

General probes:

- Could you elaborate on that/tell me more about it?
- Could you provide an example?
- Is there anything else you would like to add?
- Are you suggesting that...?
- Does that imply/mean...?
- If I summarize this as..., would my understanding/interpretation be accurate?

ADDITIONAL FILE 6. SPECIFICATION OF STRATEGIES TO ENHANCE CLINICIAN’S USE OF PROMS

Below, we specify each of the hospital’s applied strategies. For ‘implementation outcome(s) affected,’ we note that the hospital did not specify these. In retrospect, we report on the most logical outcomes using CFIR’s Outcome Addendum (adoption/implementation/sustainment), except otherwise noted.

Strategy	Domain	Specification
Capability-associated strategies		
Kick-off and manual	Actor(s)	The Central Support Team (CST)
	Action(s)	A: Conducted a kick-off session B: Shared a self-developed written manual via email, later supplemented with video instructions
	Target(s) of the action	A and B: Clinicians who began to inquire Patient-Reported Outcome Measures (PROMs) among their outpatients, a decision made at the subdepartmental level A and B: Capability - Awareness and knowledge about PROMs, skills to navigate the PROMs dashboard, information on how to contact the CST for further questions
	Temporality	Often within one week following the initial inquiry (technical installation) of PROMs among outpatients
	Dose	A: Conducted once, often during a dedicated time slot in a department meeting. B: Distributed once
	Implementation outcome(s) affected	Implementation
	Justification	A: Logic – Boosts awareness and knowledge. Conducting the session during a department meeting ensures the highest likelihood of reaching as many clinicians as possible. B: Logic – Enhances skills in navigating the PROMs dashboard. Email distribution ensures that all clinicians are reached.
Pocket guide	Actor(s)	The CST with input from clinicians
	Action(s)	Developed and distributed a pocket guide on discussing PROMs with patients, available in print and digital
	Target(s) of the action	Clinicians who inquired PROMs among their outpatients Capability – practical examples of how PROMs could be discussed.
	Temporality	Developed around 2022
	Dose	Print upon request, continuously available online

Strategy	Domain	Specification
	Implementation outcome(s) affected	Implementation
	Justification	Logic - Practical examples from peers offer inspiration and guidance on how PROMs can be effectively discussed with patients.
Training sessions	Actor(s)	The CST, often in collaboration with person-centered care group.
	Action(s)	A: Developed and conducted trainings (e-modules and in-person training sessions) on PROMs use in practice. B: Highlighted external training opportunities.
	Target(s) of the action	A and B: Clinicians who inquired PROMs among their outpatients Capability - Skills to discuss PROMs
	Temporality	A and B: After technical installation/ initiation of PROMs
	Dose	A and B: Offered with varying frequency and durations
	Implementation outcome(s) affected	Implementation
	Justification	A and B: Empirical evidence - Evaluations have shown that clinicians seek training on how to discuss PROMs, particularly for Shared Decision Making and when dealing with patients who have limited literacy.
Enabling training	Actor(s)	The CST
	Action(s)	A: Made training flexible by offering e-trainings B: Sought to provide accreditation for trainings
	Target(s) of the action	Direct: educational context Indirect: clinicians who want to attend training but face limited opportunities to do so Opportunity for enhancing capability- access to trainings
	Temporality	A: Ongoing from around 2018 B: Around 2022
	Dose	-
	Implementation outcome(s) affected	Implementation
	Justification	Empirical evidence - Observations indicated that clinicians were unable to attend training due to time constraints.
Central assistance	Actor(s)	The CST
	Action(s)	Provided accessibility for questions, addressed needs, offered training upon request, and proactively reached out to (sub) departments with low PROMs usage.
	Target(s) of the action	All clinicians Capability – addressing needs

Strategy	Domain	Specification
	Temporality	Ongoing
	Dose	-
	Implementation outcome(s) affected	Adoption, implementation, maintenance
	Justification	Logic - The CST believed that adopting a personal approach and being easily accessible was crucial for effective support.
Coaching on-the-job	Actor(s)	The CST
	Action(s)	Provided on-the-job coaching
	Target(s) of the action	Clinicians seeking coaching on discussing PROMs during outpatient visits
		Capability – knowledge and experience on how to use the PROMs dashboard and the practical discussion of PROMs
	Temporality	After PROMs initiation / technical installation
	Dose	A few outpatient consultations per person; available on request.
	Implementation outcome(s) affected	Implementation
Peer-to-peer discussion	Justification	Empirical evidence - Local department experiences have shown this strategy to be effective.
	Actor(s)	The CST
	Action(s)	Organized peer-to-peer discussion events
	Target(s) of the action	All clinicians
		Capability - Knowledge about PROMs, skills to use PROMs, optimism about PROMs
	Temporality	Since around 2021
	Dose	A couple of times each year, lasting a few hours each session.
	Implementation outcome(s) affected	Adoption, implementation, sustainment
	Justification	Logic and empirical evidence - Based on the belief and observed outcomes that clinicians can most effectively support their peers in understanding and utilizing PROMs, reinforced by observations.
Opportunity-associated strategies		
Hospital-wide awareness	Actor(s)	The CST (including communication advisors, with occasional support from the communication department)
	Action(s)	A: Used hospital-wide channels and marketing to create hospital-wide awareness about PROMs and VBHC B: Aimed to extend information provision to extramural parties, such as general practitioners

Strategy	Domain	Specification
	Target(s) of the action	A: All hospital staff, especially clinicians B: General practitioners and care chain partners Opportunity - awareness about PROMs and their central role in the hospital, insight in consequences for their work
	Temporality	A: Ongoing B: Planned
	Dose	A: Varied B: Not yet implemented
	Implementation outcome(s) affected	A: Adoption, implementation, sustainment
	Justification	A: Empirical evidence - Previous experiences have shown that without social support, the adoption and utilization of PROMs can be hindered. B: Empirical evidence - Based on clinician feedback (evaluation 2020)
PROMs dashboard integrated in the Electronic Health Record (EHR)	Actor(s)	The CST
	Action(s)	A: Visualized PROMs in a dashboard B: Integrated this dashboard in the Electronic Health Record (EHR)
	Target(s) of the action	A and B: Direct: IT context A and B: indirect: Clinicians who inquire PROMs among their outpatients Opportunity - Enhancing ease of access and interpretation of PROM responses
	Temporality	From the outset of clinicians' use of PROMs.
	Dose	A and B: Ongoing
	Implementation outcome(s) affected	A and B: Adoption, implementation, maintenance
	Justification	A and B: Logic - It is believed that visualizing PROMs makes their use easier for clinicians, integrating them more seamlessly into their workflow. B: Empirical evidence – Previous experience with a standalone dashboard highlighted limitations, motivating the shift towards integration within the EHR for improved functionality and accessibility
Time saving strategies	Actor(s)	The CST
	Action(s)	A: Facilitated quick actions on PROMs outcomes B: Streamlined other care processes
	Target(s) of the action	A and B: direct: IT and care processes A and B: indirect: clinicians who inquire PROMs among their outpatients Opportunity – (perceiving) sufficient time to consider PROMs

Strategy	Domain	Specification
	Temporality	A and B: since around 2021, improvements ongoing
	Dose	ongoing
	Implementation outcome(s) affected	Adoption, implementation, sustainment
	Justification	Logic - Ensuring that the use of PROMs is straightforward and time-efficient for clinicians is essential for adoption and sustainability. Empirical evidence – identified time constraints in evaluations
PROMs completion status bar as reminder	Actor(s)	The CST
	Action(s)	Implemented a reminder to PROMs in the electronic health record (EHR) displaying patients' PROMs completion status using a status bar on the front page of their EHR.
	Target(s) of the action	A and B: direct: IT context
		A and B: indirect: clinicians who inquire PROMs among their outpatients
	Temporality	Opportunity – Enhancing memory and prompting clinicians to discuss PROMs.
		As of around 2021
	Dose	Ongoing
	Implementation outcome(s) affected	Implementation, maintenance
Patient initiative	Justification	Empirical evidence: Identified issues with remembering to discuss PROMs have highlighted the need for reminders. Logic: Visibility of PROMs is crucial for ensuring that clinicians are reminded and prompted to engage in discussions about PROMs during patient interactions.
	Actor(s)	The CST
	Action(s)	A: Facilitated patients to take the initiative to discuss PROMs by providing them with information on discussing PROMs B: Upcoming: developing a dashboard to review their own scores
	Target(s) of the action	A and B: Direct: patients that complete PROMs
		A and B Indirectly: clinicians Opportunity: Creating social influence that encourages and enables clinicians to use PROMs.
	Temporality	A: With invitation to complete PROM B: In development
	Dose	A: once for every PROMs completion cycle B: -
	Implementation outcome(s) affected	Implementation and maintenance

Strategy	Domain	Specification
	Justification	A and B: Logic: Enabling patients to view their PROMs outcomes and encouraging them to discuss these with clinicians is expected to prompt discussions and increase engagement in PROMs use.
Motivation-associated strategies		
Involve executive board for commitment	Actor(s)	The executive board
	Action(s)	A: Verbally expressed commitment to achieve VBHC B: Included VBHC as hospital aim
	Target(s) of the action	A: All hospital staff B: Policy context Knowledge and tension for change
	Temporality	A: Ongoing B: Ongoing
	Dose	A: A couple of times yearly B: -
	Implementation outcome(s) affected	Adoption, maintenance
	Justification	Logic: Leveraging perceived urgency and creating tension for change, along with the influence of social commitment, can positively contribute to adoption and long-term maintenance of VBHC initiatives within the hospital.
Involve executive board for monitoring progress and complimenting departments that excel	Actor(s)	The executive board
	Action(s)	A: Monitored departments' implementation status B: Complimented departments excelling in VBHC
	Target(s) of the action	A: All subdepartments B: Subdepartments excelling in VBHC Reinforcement; policy prerequisites and compliments
	Temporality	A and B: since around 2022
	Dose	A and B: Three times a year
	Implementation outcome(s) affected	Adoption, maintenance
	Justification	Logic – Formal pressure and social influence from the executive board can encourage departments to adhere to VBHC principles
Participation	Actor(s)	The CST and steering committee members
	Action(s)	Enabled and invited clinician representatives to participate in the steering committee.
	Target(s) of the action	Direct: Clinician representatives Indirect: all clinicians
	Temporality	Physicians involved since 2018; nurses since 2024.

Strategy	Domain	Specification
	Dose	Ongoing
	Implementation outcome(s) affected	Adoption, maintenance
	Justification	Logic – Involving clinician representatives in the steering committee fosters greater buy-in and acceptance among their peers
Communication about VBHC	Actor(s)	The CST (including communication advisor)
	Action(s)	Communicated about VBHC to achieve and sustain clinicians' interest
	Target(s) of the action	All clinicians Knowledge, motivation
	Temporality	Ongoing
	Dose	Frequent (e.g. monthly newsletter)
	Implementation outcome(s) affected	Adoption, implementation, maintenance
	Justification	Logic – By consistently communicating about VBHC, the CST aims to create and sustain interest and engagement among clinicians.
Tailored (persuasive) communication with subdepartments	Actor(s)	The CST
	Action(s)	Provided tailored education to each (sub)department on PROMs and VBHC, employing persuasive arguments, addressing concerns, and facilitating open discussions.
	Target(s) of the action	Clinicians in (sub)departments who consider using PROMs Knowledge, motivation
	Temporality	Ongoing
	Dose	Tailored to each subdepartment's needs, typically conducted once or twice as needed.
	Implementation outcome(s) affected	Adoption
	Justification	Logic – A personalized and tailored approach to communication is more effective in convincing clinicians of the benefits and importance of using PROMs and embracing VBHC principles.
Establish evidence	Actor(s)	The CST
	Action(s)	Aimed to demonstrate the impact of PROMs, including through academic partnerships

Strategy	Domain	Specification
	Target(s) of the action	Direct: research context Indirect: all clinicians Motivation – evidence of benefits and personal consequences
	Temporality	Mainly as of 2021
	Dose	Low intensity; occasional setbacks.
	Implementation outcome(s) affected	Adoption, maintenance
	Justification	Empirical evidence – Clinicians have expressed a need for evidence demonstrating the benefits and personal consequences of using PROMs.
Triability	Actor(s)	The CST
	Action(s)	Enabled (sub)departments to try PROMs with a subset of patients
	Target(s) of the action	(Sub)departments and their clinicians Motivation; To assess feasibility and benefits before making a full adoption decision.
	Temporality	Just prior to adoption decision
	Dose	-
	Implementation outcome(s) affected	Adoption Unintended consequence: implementation and maintenance
	Justification	Logic - Trialing PROMs at a small scale allows (sub) departments and clinicians to evaluate its effectiveness and feasibility in their specific context. This approach can mitigate risks and uncertainties, making it more acceptable for broader adoption by demonstrating initial benefits and addressing concerns before committing fully.
Feedback	Actor(s)	The CST
	Action(s)	Gave tailored feedback on (sub)departments/clinicians' use of PROMs
	Target(s) of the action	(sub)departments/clinicians Knowledge on their PROMs use rates, motivation, social influence
	Temporality	After PROMs initiation/installment
	Dose	Tailored based on agreement with (sub)departments; frequency ranges from monthly to a few times yearly.
	Implementation outcome(s) affected	Implementation, maintenance

Strategy	Domain	Specification
Adaptability	Justification	Logic – Providing tailored feedback serves as a reminder and motivator for (sub)departments and clinicians to continue using PROMs effectively. It also fosters social comparison, encouraging improvements and maintaining engagement over time.
	Actor(s)	The CST
	Action(s)	Enabled (sub)departments/clinicians to adapt PROMs and their uses to fit local needs and contexts.
	Target(s) of the action	(sub)departments/clinicians Motivation; encouraging ownership and autonomy in adapting PROMs to local contexts
	Temporality	Starting around 2021, focusing on increasing adaptability over time.
	Dose	-
	Implementation outcome(s) affected	Implementation, maintenance
Extending benefits	Justification	Logic - By promoting the appropriateness and local fit of PROMs innovations, and allowing stakeholders to shape their implementation, this strategy enhances perception of acceptance, ownership and autonomy
	Actor(s)	The CST
	Action(s)	Extended the use cases of PROMs
	Target(s) of the action	Direct: care processes Indirect: clinicians Motivation - Enhancing the perceived benefits of PROMs to increase cooperation among clinicians
	Temporality	Increasing over the years
	Dose	Ongoing
	Implementation outcome(s) affected	Adoption, implementation, maintenance
Clarify accountability in patient information	Justification	Logic – Clinicians have diverse motivations and perceptions regarding the usefulness of PROMs. By expanding the applications and demonstrating additional benefits of PROMs in various care processes, the CST aims to enhance their appeal and relevance to clinicians.
	Actor(s)	The CST
	Action(s)	Adapted patient information to alleviate clinicians' concerns about accountability

Strategy	Domain	Specification
	Target(s) of the action	Direct: patient communication Indirect: clinicians Motivation: Addressing concerns that could hinder adoption of PROMs, such as ensuring timely detection of critical patient information, like indications of suicidality reported in PROMs, by clinicians.
	Temporality	As of around 2022
	Dose	Ongoing
	Implementation outcome(s) affected	Adoption
	Justification	Empirical evidence –Clinicians have cited concerns about accountability as a barrier to adopting PROMs. By adapting patient information to clarify how PROMs data is managed and the responsibilities involved, the CST aims to alleviate these concerns. This approach supports the adoption of PROMs by ensuring clinicians feel confident in using and acting upon patient-reported information without undue liability concerns.
Generic		
Conduct formal and informal evaluations and adjust plans	Actor(s)	The CST
	Action(s)	Conducted formal and informal evaluations to examine clinicians' experiences with PROMs, their wishes, and their needs. They used these insights to make necessary adjustments in the implementation plan.
	Target(s) of the action	Direct: clinicians Capability, Opportunity and/or Motivation: Identifying and addressing barriers, motivations, needs, wishes among clinicians using PROMs.
	Temporality	As of 2020
	Dose	Formal evaluation annually, informal evaluations frequently
	Implementation outcome(s) affected	Adoption, implementation, sustainment
	Justification	Logic – the CST aimed to understand drivers of clinicians' behaviors and facilitate their use of PROMs.

ADDITIONAL FILE 7. DELPHI RESULTS

Table 1 lists the activities used in the first Delphi round. Table 2 presents the 63 activities that reached consensus as important for value-based outpatient care. Table 3 highlights the two activities deemed unimportant by consensus. Table 4 presents the 11 activities on which the expert panel failed to reach consensus after three Delphi rounds

Table 1. Activities used in Delphi round 1.

Activities
The patient prepares the consultation (e.g. by noting any questions).
The patient indicates how he/she is doing (on their own initiative or at the invitation of the clinician).
The patient indicates what he/she wants to discuss with the clinician (on their own initiative or at the invitation of the clinician).
The clinician actively listens to the patient, empathically and with full attention: the clinician only interrupts the patient to ask questions.
The clinician carefully develops a total understanding of the patient’s perceived health and wellbeing by discussing symptoms, functioning, and quality of life on the physical, mental, and social level (including sensitive topics).
The clinician discusses any concerns and/or fears the patient may have.
The clinician discusses how the patient’s perceived health and wellbeing changes over time.
The clinician carefully develops a broad understanding of relevant matters concerning the person behind the patient (including their daily activities, living situation, and background).
In situations in which a decision needs to be made, the clinician explains that there are different options regarding the care for the patient.
The clinician explains that the aim is to tailor care to what really matters to the patient.
The clinician explains that decision-making is a shared process in which the patient’s opinion is important.
The clinician ensures that he/she is aware of what presently really matters to the patient, in both the short and the long term.
The clinician and patient set or evaluate personal goals for the patient that are aligned to what really matters to the patient.
For each desired goal or health problem that matters to the patient, the clinician explains the relevant treatment options and their advantages and disadvantages (including, if appropriate, the option to do less or nothing).
The clinician and the patient discuss the patient’s preferences regarding the various treatment options.
During decision-making, the clinician considers the patient’s preferences regarding the treatment plan.
During decision-making, the clinician considers guidelines and/or recommendations insofar as possible.
The clinician uses tools to support the process of shared decision making such as consultation cards or decision aids.

Table 1. Continued.**Activities**

The clinician strives to make every decision in close consultation with the patient, taking into account the patient's preferences regarding participation in decision-making and their health literacy.

The clinician takes the patient's health literacy, communication skills, and digital skills into account.

The clinician checks whether everything is clear to the patient.

The clinician continually and actively strives for optimal outcomes that really matter to the patient.

The clinician asks the patient about their experience(s) with the care received.

The clinician continually and actively strives for optimal patient experiences.

The clinician indicates what the patient can expect in terms of disease course, possible treatments, and impact on their life, taking into account the patient's preferences regarding sharing this information and their health literacy.

The clinician and the patient discuss the patient's process of accepting their health condition and wellbeing.

If requested, the patient completes an online questionnaire prior to the consultation, which may consist of a Patient Reported Outcome Measure (PROM) with an open question to elicit what the patient wants to discuss with the clinician.

The clinician takes note of the responses to the patient's PROMs questionnaires prior to the consultation.

The clinician always discusses important PROM outcomes with the patient using a consultation room dashboard.

The clinician uses the results from the patient's PROMs questionnaire as an addition to anamnesis and not as a replacement.

The clinician discusses results from the patient's PROMs questionnaire that require a focused attention to reach a deeper understanding and, subsequently, initiates any necessary actions.

The clinician discusses with the patient how the patient's responses to the questionnaire* relate to previous measurements and/or benchmarks.

If appropriate, the clinician discusses insights from aggregated PROMs.

The clinician looks at the outcomes of the PREM that the patient regularly completes.

The clinician discusses the patient's PREM outcomes using a consultation room dashboard.

If appropriate, the clinician discusses insights from aggregated PREMs.

The clinician takes the time that is necessary for a good consultation.

The clinician uses consultation time as efficiently as possible.

The clinician ensures that the patient receives the right amount of care in relation to what matters to the patient. This for example could result in a reduced outpatient consultation frequency or in intensified care.

When diagnostic and/or treatment options have similar outcomes for the patient, the clinician chooses the cheapest option.

Table 1. Continued.**Activities**

The clinician organizes care at the right place in the care chain/network based on the patient's medical needs.

The clinician bases their actions on available evidence from medical literature (e.g., proven effectivity of treatment).

The clinician considers for each patient whether it is necessary to deviate from care pathways and/or guidelines.

If a patient and/or the patient's kin request health services lacking a clinical indication, the clinician will discuss this issue with the patient and/or the patient's kin to determine the extent to which the requested service is of real added value for the patient and/or the patient's kin.
If necessary, the clinician will refuse the request.

In addition to curative care, the clinician also makes health promotion and disease prevention part of the consultation.

Together with the patient, the clinician weighs up the choice of a physical follow-up consultation or a telephone/video follow-up consultation.

The clinician consults and/or refers to another (healthcare) professional if necessary and in consultation with the patient.

The clinician also discusses treatment options that fall outside mainstream healthcare if these are of potential value to the patient (e.g., homeopathy, stress management).

The clinician works together with other (healthcare) professionals in caring for patients with a specific disease. If necessary, this takes place across the boundaries of the clinician's department or organization (e.g., collaboration with psychosocial care, occupational medicine, and/or the social domain).

Within multidisciplinary teams, clinicians coordinate their consultations (e.g., who does what regarding questionnaire data*).

The clinician involves the patient's kin in the conversation if appropriate.

The clinician considers the continuity of care and follow-up in the entire intra- and extra-mural chain for the patient's complete care cycle.

The clinician clearly documents relevant VBHC matters that the patient reported during the consultation in the electronic patient file (e.g., regarding the patient's values, functioning, quality of life, and private situation).

The patient views their completed questionnaires* in the patient portal if desired prior to the consultation.

The clinician feeds patient reported data back to the referrer, GP or practitioners in the care network.

Table 2. Delphi items reaching agreement on being important for value-based outpatient care

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
1	1. The patient prepares the consultation.	P prepares the consultation	Preparing for the consultation	Empowering voices
1	2. If requested, the patient completes an online questionnaire* prior to the consultation.	P prepares the consultation using PROMs		
1	3. The patient views their completed questionnaires* in the patient portal if desired prior to the consultation.			
3	4. The clinician prepares the consultation: if necessary, he/she allows more time for this compared to a classical consultation without VBHC.	C prepares the consultation	Managing patient expectations	
1	5. The clinician takes note of the responses to the patient's questionnaires* prior to the consultation.	C prepares the consultation using PROMs		
1	6. The clinician indicates what the patient can expect in terms of disease course, possible treatments, and impact on their life, taking into account the patient's preferences regarding sharing this information and their health literacy.	C manages P's expectations regarding future disease outcomes and quality of life		
1	7. The clinician explains that the aim is to tailor care to what really matters to the patient.	C manages P's expectations regarding care decisions and objectives		
1	8. In situations in which a decision needs to be made, the clinician explains that there are different options regarding the care for the patient.			
1	9. The clinician explains that decision-making is a shared process in which the patient's opinion is important.			

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
2	10. The clinician orally informs the patient about relevant (clinical) data and explains the meaning of these data.	C informs P of clinical results and options	Providing medical insight	
1	11. For each desired goal or health problem that matters to the patient, the clinician explains the relevant treatment options and their advantages and disadvantages (including, if appropriate, the option to do less or nothing).			
1 and 2	12. The clinician actively listens to the patient, empathically and with full attention: the clinician only interrupts the patient to ask questions or to steer the patient to the core of their story and/or towards a conclusion.	C listens and provides structure	Communicating effectively	
2	13. The clinician discusses any questions the patient may have: the clinician inquires whether the patient has any questions or offers the patient space to ask questions.	C invites and is open to P's questions		
1	14. The clinician takes the patient's health literacy, communication skills, and digital skills into account.	C tailors communication to P's abilities		
1	15. The clinician checks whether everything is clear to the patient.	C checks P's understanding		
3	16. The clinician uses tools to support the process of shared decision-making (such as consultation cards or decision aids) that are easy and quick to apply and if their use is expected to be of added value for the patient.	C uses support if appropriate		

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
2	17. If necessary, the healthcare professional and the patient have a longer conversation***.	C and P have enough time for discussion		
3	18. The clinician uses a consultation room dashboard** and shows it to the patient if that is expected to add value for the patient.	C uses digital support if appropriate		
1	19. The patient indicates how he/she is doing (on their own initiative or at the invitation of the clinician).	Allowing P to express what matters	Discussing patient-reported outcomes	Discussing the biopsychosocial health outcomes as reported by the patient
1 and 2	20. The clinician carefully develops a broad understanding of the patient's perceived health and wellbeing by discussing symptoms, functioning, and quality of life on the physical, mental, and social level (including sensitive topics).	Taking a biopsychosocial perspective		
1	21. The clinician discusses any concerns and/or fears the patient may have.	Discussing P's state of mind		
1	22. The clinician and the patient discuss the patient's process of accepting their health condition and wellbeing.			
1	23. The clinician uses the results from the patient's questionnaire* as an addition to anamnesis and not as a replacement.	Using P's responses to the RPOM		
3	24. During the consultation the clinician always demonstrates their acquaintance with the most recent results from the patient's questionnaires*.			

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
1	25. The clinician discusses the results from the questionnaire* that require a focused attention to reach a deeper understanding and, subsequently, initiates any necessary actions.			
1	26. The clinician discusses how the patient's perceived health and wellbeing changes over time.	Considering P's outcomes over time	Considering outcomes over time	
2	27. The clinician discusses with the patient how the patient's responses to the questionnaire* relate to previous responses.	Considering P's PROMs outcomes over time		
1	28. The clinician carefully develops a broad understanding of relevant matters concerning the person behind the patient (including their daily activities, living situation, and background).	Seeing P as a person with a context	Considering the patient's living context	Considering the patient as a person within a context
3	29. The clinician uses available digital applications that meet the needs of the patient. Considering remote care, chronic disease management, and self-tracking based on validated instruments.	C supports P to self-manage the disease		
1	30. Together with the patient, the clinician weighs up the choice of a physical follow-up consultation or a telephone/video follow-up consultation.	Considering interaction preferences		
2	31. The clinician includes what really matters to the patient in the conversation.	C speaks about topics that matter to P	Speaking to the heart of the patient	Building and maintaining a therapeutic relationship

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
3	32. If appropriate, the clinician discusses the opinion, needs, and/or wishes of the patient's kin regarding the treatment plan.	C considers the viewpoint of P's kin	Involving the patient's kin in decisions regarding the treatment plan.	Involving the patient's kin
3	33. If appropriate, the clinician discusses the wellbeing of the patient's kin.	C considers the wellbeing of P's kin	Inquiring about the wellbeing of the patient's kin	
1	34. The patient indicates what he/she wants to discuss with the clinician (on their own initiative or at the invitation of the clinician).	P informs the consultation agenda	Setting a shared agenda	Sharing power and responsibility
1	35. The clinician and patient set or evaluate personal goals for the patient that are aligned to what really matters to the patient.	C and P inform the care agenda		
2	36. The clinician discusses all matters that he/she considers important (in addition to matters that the patient considers important).	C informs the consultation agenda		
1	37. The clinician and the patient discuss the appropriateness of the various treatment options for the patient in order to derive the patient's preferences.	C and P discuss the fit of care options	Sharing in the decision-making process	
1	38. The clinician strives to make every decision in close consultation with the patient, taking into account the patient's preferences regarding participation in decision-making and their health literacy.	C adapts to P's preferences for SDM		
3	39. During decision-making, the clinician considers the patient's preferences regarding the treatment plan insofar as possible.	C weighs information during decision-making		

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
1 and 2	40. The clinician asks the patient about their experience(s) with the care received across the entire care path.	C asks about P's experiences	Learning from the patient's experiences and values	Optimizing care for the individual patient
2	41. The clinician asks the patient about their experience(s) with the care the clinician him/herself provided or the care provided by immediate colleagues on the ward.			
1	42. The clinician ensures that he/she is aware of what presently really matters to the patient, in both the short and the long term.	C informs him/herself about what matters to P		
1	43. The clinician continually and actively strives for optimal outcomes that really matter to the patient.	C strives to optimize outcomes for P	Optimizing care	
2	44. While pursuing outcomes that really matter to the patient, the clinician strives to minimize and/or to prevent (potential) damage to or negative consequences for the patient.	C strives to minimize downsides for P		
1	45. The clinician continually and actively strives for optimal patient experiences.	C strives to optimize experience for P		
3	46. When decision-making, the clinician considers the short- and long-term advantages and disadvantages of treatment options for the patient as far as possible.	Looking longitudinally		
1	47. In addition to curative care, the clinician also makes health promotion and disease prevention part of the consultation.	C integrates prevention		

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
2	48. The clinician also discusses treatment options that fall outside mainstream healthcare if these are of potential value to the patient.	C considers possible benefits from care by others		
1	49. During decision-making, the clinician considers guidelines and/or recommendations insofar as possible.	C follows advice	Following guidelines and diverting from them when appropriate	
2	50. The clinician bases their actions on available scientific knowledge and best practices, insights from own clinical experience or that of others, and patient experiences. This may mean that, if appropriate for a specific patient, the clinician can offer care that lacks scientific substantiation on its effectiveness.	C makes informed choices		
1	51. The clinician considers for each patient whether it is necessary to deviate from care pathways and/or guidelines.			
1	52. The clinician consults and/or refers to another (healthcare) professional if necessary and in consultation with the patient.	C works across disciplines in the full care chain	Collaborating in the full care chain and considering continuity of care	Coordinating care
1	53. The clinician works together with other (healthcare) professionals in caring for patients with a specific disease. If necessary, this takes place across the boundaries of the clinician's department or organization (e.g., collaboration with psychosocial care, occupational medicine, and/or the social domain).			

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
1	54. The clinician organizes care at the right place in the care chain/network based on the patient's medical needs.	C organizes care at the right place		
1	55. The clinician considers the continuity of care and follow-up in the entire intra- and extra-mural chain for the patient's complete care cycle.	C considers care continuity throughout the full care chain		
1	56. Within multidisciplinary teams, clinicians coordinate their consultations (e.g., who does what regarding questionnaire data*).			
1	57. The clinician clearly documents relevant VBHC matters that the patient reported during the consultation in the electronic patient file (e.g., regarding the patient's values, functioning, quality of life, and private situation).	C documents what the patient reported	Documenting data transparently	
2	58. The clinician cooperates in adequate data exchange between co-practitioners, with consent of the patient.	C supports data exchange		
1	59. The clinician ensures that the patient receives the right amount of care in relation to what matters to the patient. This for example could result in a reduced outpatient consultation frequency or in intensified care.	C ensures that the right amount of care is provided	Efficiently allocating resources resulting in similar or improved patient outcomes	Dealing wisely with available resources
2	60. The clinician prevents unnecessary medical investigation and treatment (e.g. duplication, repetition or surplus medications).			
1	61. The clinician uses consultation time as efficiently as possible.	C efficiently uses consultation time		

Table 2. Continued.

# Delphi round consensus	Activity item	Code	Sub-theme	Theme
3	62. Whenever possible, the clinician opts for cheaper care alternatives with similar or greater benefits for the patient (such as generic instead of patented medication).	C considers available cheaper alternatives	Weighing financial costs	
1	63. If a patient and/or the patient's kin request health services lacking a clinical indication, the clinician will discuss this issue with the patient and/or the patient's kin to determine the extent to which the requested service is of real added-value for the patient and/or the patient's kin. If necessary, the clinician will refuse the request.	C discusses value with P to make an informed judgement	Refusing low-value care	

Legend: C= clinician, P= patient. Items with an asterisk (*): please see sub-questions below.

Sub-questions

*Questionnaire

Item: if the patient is to complete a questionnaire, this questionnaire should contain...:	Consensus outcome
... <i>domain-specific</i> Patient Reported Outcome Measures (PROMs) (e.g., the PROMIS domains of 'pain barriers' or 'anxiety and depression').	Important
... <i>disease-specific</i> PROMs and/or single disease-specific questions.	Important
... an open question to elicit what the patient wants to discuss with the clinician.	Important
... <i>generic</i> PROMs (e.g., the general quality-of-life questionnaire, PROMIS-10).	No consensus
... a Patient Reported Experience Measure (PREM) (assessed after the consultation)	No consensus

**Dashboard

Item: in addition to the patient's clinical data, the consultation room dashboard would ideally include...:	Consensus outcome
... the PROMs outcomes of the individual patient (including any explanations/comments/questions from the patient).	Important
... the PROMs outcomes of a group of patients (perhaps the clinician's own patients, department level, and/or national level).	No consensus
... the PREMs outcomes of the individual patient.	No consensus
... VBHC data of the individual patient obtained by intramural and extramural co-practitioners.	No consensus
... process information regarding diagnostics/treatment options (such as waiting times, number of hospital visits).	No consensus
... (financial) cost indicators of diagnostics/treatment options.	No consensus
... the total costs incurred and expected future costs for the individual patient.	No consensus
... latest evidence regarding outcomes of options.	No consensus
... recommendations and/or guidelines.	No consensus
... the PREMs (experience) outcomes of a group of patients (perhaps the clinician's own patients, department level, and/or national level)	Not important
... information on the climate impact of diagnostics/treatment options (such as CO2 emissions).	Consensus: not important

*** Extending the conversation

Items on extending the conversation	Consensus outcome
The clinician spends all the available consultation time to the extent necessary, and schedules an additional consultation if required.	Important
More time is allocated in advance for a consultation if this is expected to be necessary.	Important
If necessary, the consultation will be extended provided this is not at the expense of caring for other patients.	Important

Table 3. Delphi items reaching agreement on being unimportant for value-based outpatient care

# round	Activity item	Code	Sub-theme	Theme
consensus				
3	1. During decision-making, the clinician considers the costs to society (loss of productivity, etc.) as far as is possible.	C considers costs to society	Considering societal costs	Dealing wisely with available resources
3	2. During decision-making, the clinician considers the climate footprint of care (CO2 emissions, polluting substances, waste, etc.) as far as possible.	C considers climate footprint	Considering the climate footprint	

Legend: C=clinician, P=patient

Table 4. 11 activities on which the expert panel failed to reach consensus after three Delphi rounds

Activity item	Results third Delphi round: Code		Sub-theme	Theme
	Important	Unimportant		
1. The clinician takes note of the patient's PREM outcomes prior to the consultation.	41%	59%	P prepares the consultation using PREMs	Empowering voices
2. The clinician assesses the patient's interest in insights from PROM outcomes of a group of comparable patients ('patients-like-me'), such as symptoms and quality of life that may be expected after a certain treatment. If desired, the healthcare professional shares this knowledge.	47%	53%	C asks if P wants insight into outcomes of peers/others Managing patient expectations	
3. The clinician assesses the patient's interest in insights from PREM outcomes of a group of comparable patients ('patients-like-me'), such as expected symptoms and quality of life after a certain treatment. If desired, the clinician shares these insights.	25%	75%	C asks if P wants insight into experiences of peers/others	
4. The clinician assesses the patient's interest regarding how their PROM outcomes relate to those of a group of comparable patients ('patients-like-me') and/or normal ranges. If desired, the clinician shares these insights.	53%	47%	C asks if P wants a medical comparison with peers/others Providing medical insight	
5. The clinician has the option to determine whether their patients are required to complete a PROM questionnaire. If 'yes', the clinician can choose the type of PROM, the frequency of inquiry, and specify the patient group(s).	71%	29%	C chooses if, and when, to use PROMs Professional autonomy	
6. The clinician discusses with the patient any personal PREM outcomes that require attention.	53%	47%	C discusses PREM with P Learning from the patient's experiences and values	Optimizing care for the individual patient

Table 4. 11Continued.

Activity item	Results third Delphi round: Code		Sub-theme	Theme
	Important	Unimportant		
7. During decision-making, the clinician considers the short- and long-term advantages and disadvantages of treatment options for the patient's kin insofar as possible.	76%	24%	C considers impact on P's kin in decision-making Seeing behind the patient 'a person with a context'	Involving the patient's kin
8. During decision-making, the clinician considers the costs of diagnostics and treatment (e.g. medication, equipment, admission, deployment of staff, etc.) insofar as possible.	41%	59%	C considers costs of material and personnel Considering costs	Dealing wisely with available resources
9. During decision-making, the clinician considers the total costs of the patient's entire care path as far as possible. This also includes future costs. (For example: an expensive operation may reduce or prevent future costs such as medication and homecare).	41%	59%	C considers total costs	
10. During decision-making, the clinician considers the costs-effectiveness insofar as this is possible.	53%	47%	C considers cost effectiveness	
11. After the consultation, it takes longer for the clinician to complete everything (documentation, etc.) than with a consultation without VBHC.	71%	29%	C allocates more time for the tasks required after the consultation Documenting data transparently	Coordinating care

Legend: C= clinician, P= patient

ADDITIONAL FILE 8. SEARCH STRING SYSTEMATIC LITERATURE REVIEW

8.1 Search strings

Additional information on search string

- The two groups of the International Standard Classification of Occupations ISCO-08 [26] that were included are 1) 'health professionals' (medical doctors and nursing professionals) and 2) the group 'other care professionals' (e.g. such as dentists, pharmacists and dieticians). These groups cover most care-related occupations.
- Human values with a double meaning, e.g. power, have been excluded as inclusion would increase the number of retrieved studies substantially.

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 OR Polite* OR Obedien* OR Self-disciplin* OR Honoring* OR Loyal* OR Responsib* OR Adheren* OR
 nonAdheren* OR complian* OR noncomplian* OR Fitting-in* OR Self-aware* OR Ethical-behav* OR
 Humble* OR Accepan* OR Devout* OR Honour* OR Integrity* OR Honest* OR Morality* OR Duty* OR
 Duties* OR Temperan* OR Harmony* OR Stability* OR Social-order* OR Belonging* OR Relatedness* OR
 Confidentiality* OR Emotional-stability* OR Prudence* OR Vigilance* OR Self-protection* OR Trust* OR
 Well-paid* OR Financial-stability* OR Comfort* OR Convenien* OR Control* OR Dominan* OR Social-
 power* OR Recognition* OR Leader* OR lead OR Hierarch* OR Paternalism* OR Capab* OR Competen*
 OR Ambitious* OR Influential* OR Intelligence* OR Approval* OR Enjoy* OR Self-indulgen* OR Excite*

OR Novelt* OR Challenge* OR Daring* OR Variation* OR Independen* OR Autonom* OR Creativit* OR Freedom* OR Curious* OR Goal-setting* OR Problem-solving* OR Imagination* OR Objectivity* OR Self-regulation* OR Status* OR Prestige* OR Humble* OR Self-effac* OR Safety OR FaceOR Moderate* OR Wealth OR Success* OR Image OR moral OR capacit* OR courage* OR self-report* OR participat* OR cooperat* OR workload*OR work-load* OR proactiv*OR pro-activ* OR Influence* OR Impact* OR Affect* OR Effect* OR Outcome* OR Implication* OR Consequence* OR Change* OR Contribute* OR Benefit* OR Advantage* OR Disadvantage* OR Drawback* OR Driver* OR Tension* OR Conflict* OR learning OR atmosphere* OR culture* OR cohesion* OR development* OR think OR cope OR coping)) OR Professionalism*))

Business Source Premier EBSCOhost

((TI(vbhc OR vb-hcOR ((high-value OR value-driven) N2 (care OR healthcare))) OR AB(vbhc OR vb-hcOR ((high-value OR value-driven) N2 (care OR healthcare))) OR ((TI(value-based OR valuebased) OR AB(value-based OR valuebased)) NOT (TI((value-based OR valuebased) N2 (insuran* OR purchas* OR pric* OR reimburse* OR contract* OR payment* OR partnership*)) OR AB((value-based OR valuebased) N2 (insuran* OR purchas* OR pric* OR reimburse* OR contract* OR payment* OR partnership*)))))) AND (MH HOSPITAL personnel attitudes+ OR ((MH MEDICAL personnel+ OR MH Work Environment) AND (MH EMPLOYEE morale OR MH Leadership OR MH EMPLOYEE motivation OR MH Job Satisfaction)) OR TI(((healthcare-personnel* OR health-care-personnel* OR Physician* OR Specialist* OR Medical-Specialist* OR Medical-assistant* OR Nurse* OR Doctor* OR Anesthesiologist* OR Anaesthesiologist* OR Cardiologist* OR Dermatologist* OR Endocrinologist* OR Geriatrician* OR Gynecologist* OR Gynaecologist* OR Hematologist* OR Haematologist* OR Neurologist* OR Obstetrician* OR Oncologist* OR Otolaryngologist* OR Optometrist* OR Pediatrician* OR Paediatrician* OR Pathologist* OR Pulmonologist* OR Radiologist* OR Rheumatologist* OR Surgeon* OR Traumatologist* OR Urologist* OR General-Practitioner* OR GP* OR Family-doctor* OR Therapist* OR Dentist* OR Physiotherapist* OR Physical-therapist* OR Dietician* OR Pharmacist* OR Psychologist* OR Psychiatrist* OR healthcare-professional* OR health-care-professional* OR healthcare-provider* OR health-care-provider*)) N5 (attitude* OR involvement* OR Fulfillment* OR Engagement* OR Involvement* OR Commitment* OR Motivat* OR Intention* OR Behav* OR Belief* OR View* OR Perspective* OR Perception* OR Opinion* OR Feeling* OR Experience* OR Emotion* OR Satisf* OR Self-efficac* OR Qualities* OR Mindset* OR Mind-set* OR Virtue* OR Stress* OR Burn-out*OR Burnout* OR Teamwork* OR Team-work* OR Wellbeing* OR Values* OR Performance* OR Collaboration* OR Climate* OR Universalism* OR Equalit* OR Benevolence* OR Altruism* OR Conformit* OR Tradition* OR Moralit* OR Securit* OR Power* OR Authorit* OR Achievement* OR Capabilit* OR Hedonism* OR Pleasure* OR Self-direction* OR Critical-thinking* OR Stimulation* OR Humilit* OR Broadminded* OR Wisdom* OR Justice* OR Tolerance* OR Understand* OR Appreciation* OR Acceptance* OR Respect OR Advocacy* OR Equity* OR Dignity* OR Socialism* OR Solidarity* OR Humanism* OR Helping* OR Honest* OR Forgiving* OR Loyal* OR Responsible* OR Friendship* OR Love* OR Belonging* OR Meaning* OR Caring* OR Empathy* OR Compassion* OR Polite* OR Obedien* OR Self-disciplin* OR Honoring* OR Loyal* OR Responsib* OR Adheren* OR nonAdheren* OR complian* OR noncomplian* OR Fitting-in* OR Self-aware* OR Ethical-behav* OR Humble* OR Acceptan* OR Devout* OR Honour* OR Integrity* OR Honest* OR Morality* OR Duty* OR Duties* OR Temperan* OR Harmony* OR Stability* OR Social-order* OR Belonging* OR Relatedness* OR Confidentiality* OR Emotional-stability* OR Prudence* OR Vigilance* OR Self-protection* OR Trust* OR Well-paid* OR Financial-stability* OR Comfort* OR Convenien* OR Control* OR Dominan* OR Social-power* OR Recognition* OR Leader* OR lead OR Hierarch* OR Paternalism* OR Capab* OR Competen* OR Ambitious* OR Influential* OR Intelligence* OR Approval* OR Enjoy* OR Self-indulgen* OR Excite* OR Novelt* OR Challenge* OR Daring* OR Variation* OR Independen* OR Autonom* OR Creativit* OR Freedom* OR Curious* OR Goal-setting* OR Problem-solving* OR Imagination* OR Objectivity* OR Self-regulation* OR Status* OR Prestige* OR Humble* OR Self-effac* OR Safety OR FaceOR Moderate* OR Wealth OR Success* OR Image OR moral OR capacit* OR courage* OR self-report* OR participat* OR cooperat* OR workload*OR work-load* OR proactiv*OR pro-activ* OR Influence* OR Impact* OR Affect* OR Effect* OR Outcome* OR Implication* OR Consequence* OR Change* OR Contribute* OR Benefit* OR Advantage* OR Disadvantage* OR Drawback* OR Driver* OR

Tension* OR Conflict* OR learning OR atmosphere* OR culture* OR cohesion* OR development* OR think OR cope OR coping)) OR Professionalism*)OR AB(((healthcare-personnel* OR health-care-personnel* OR Physician* OR Specialist* OR Medical-Specialist* OR Medical-assistant* OR Nurse* OR Doctor* OR Anesthesiologist* OR Anaesthesiologist* OR Cardiologist* OR Dermatologist* OR Endocrinologist* OR Geriatrician* OR Gynecologist* OR Gynaecologist* OR Hematologist* OR Haematologist* OR Neurologist* OR Obstetrician* OR Oncologist* OR Otolaryngologist* OR Optometrist* OR Pediatrician* OR Paediatrician* OR Pathologist* OR Pulmonologist* OR Radiologist* OR Rheumatologist* OR Surgeon* OR Traumatologist* OR Urologist* OR General-Practitioner* OR GP* OR Family-doctor* OR Therapist* OR Dentist* OR Physiotherapist* OR Physical-therapist* OR Dietician* OR Pharmacist* OR Psychologist* OR Psychiatrist* OR healthcare-professional* OR health-care-professional* OR healthcare-provider* OR health-care-provider*) N5 (attitude* OR involvement* OR Fulfillment* OR Engagement* OR Involvement* OR Commitment* OR Motivat* OR Intention* OR Behav* OR Belief* OR View* OR Perspective* OR Perception* OR Opinion* OR Feeling* OR Experience* OR Emotion* OR Satisf* OR Self-efficac* OR Qualities* OR Mindset* OR Mind-set* OR Virtue* OR Stress* OR Burn-out* OR Burnout* OR Teamwork* OR Team-work* OR Wellbeing* OR Values* OR Performance* OR Collaboration* OR Climate* OR Universalism* OR Equalit* OR Benevolence* OR Altruism* OR Conformit* OR Tradition* OR Moralit* OR Securit* OR Power* OR Authorit* OR Achievement* OR Capabilit* OR Hedonism* OR Pleasure* OR Self-direction* OR Critical-thinking* OR Stimulation* OR Humilit* OR Broadminded* OR Wisdom* OR Justice* OR Tolerance* OR Understand* OR Appreciation* OR Acceptance* OR Respect OR Advocacy* OR Equity* OR Dignity* OR Socialism* OR Solidarity* OR Humanism* OR Helping* OR Honest* OR Forgiving* OR Loyal* OR Responsible* OR Friendship* OR Love* OR Belonging* OR Meaning* OR Caring* OR Empathy* OR Compassion* OR Polite* OR Obedien* OR Self-disciplin* OR Honoring* OR Loyal* OR Responsib* OR Adheren* OR nonAdheren* OR complian* OR noncomplian* OR Fitting-in* OR Self-aware* OR Ethical-behav* OR Humble* OR Acceptan* OR Devout* OR Honour* OR Integrity* OR Honest* OR Morality* OR Duty* OR Duties* OR Temperan* OR Harmony* OR Stability* OR Social-order* OR Belonging* OR Relatedness* OR Confidentiality* OR Emotional-stability* OR Prudence* OR Vigilance* OR Self-protection* OR Trust* OR Well-paid* OR Financial-stability* OR Comfort* OR Convenien* OR Control* OR Dominan* OR Social-power* OR Recognition* OR Leader* OR lead OR Hierarch* OR Paternalism* OR Capab* OR Competen* OR Ambitious* OR Influential* OR Intelligence* OR Approval* OR Enjoy* OR Self-indulgen* OR Excite* OR Novelt* OR Challenge* OR Daring* OR Variation* OR Independen* OR Autonom* OR Creativit* OR Freedom* OR Curious* OR Goal-setting* OR Problem-solving* OR Imagination* OR Objectivity* OR Self-regulation* OR Status* OR Prestige* OR Humble* OR Self-effac* OR Safety OR FaceOR Moderate* OR Wealth OR Success* OR Image OR moral OR capacit* OR courage* OR self-report* OR participat* OR cooperat* OR workload*OR work-load* OR proactiv*OR pro-activ* OR Influence* OR Impact* OR Affect* OR Effect* OR Outcome* OR Implication* OR Consequence* OR Change* OR Contribute* OR Benefit* OR Advantage* OR Disadvantage* OR Drawback* OR Driver* OR Tension* OR Conflict* OR learning OR atmosphere* OR culture* OR cohesion* OR development* OR think OR cope OR coping)) OR Professionalism*))

EconLit ProQuest

TI,AB((vbhc OR vb-hc OR ((value-based OR valuebased) NOT ((value-based OR valuebased) N/2 (insuran* OR purchas* OR pric* OR reimburse* OR contract* OR payment* OR partnership*))) OR ((high-value OR value-driven) N/2 (care OR healthcare)))) AND TI,AB(((healthcare-personnel* OR health-care-personnel* OR Physician* OR Nurse* OR Doctor* OR healthcare-professional* OR health-care-professional* OR healthcare-provider* OR health-care-provider*)))

8.2 Results per database

Database	Number of studies	Number of studies after removal of duplicates
Embase.com	1020	1000
Medline ALL Ovid	974	120
PsycINFO ALL Ovid	303	203
Web of Science (SCI-EXPANDED & SSCI)	524	201
CINAHL EBSCOhost	806	286
Business Source Premier EBSCOhost	150	88
EconLit ProQuest	5	5
Total	3782	1903

References

26. Uter, W. (2020). Classification of Occupations. In: John, S., Johansen, J., Rustemeyer, T., Elsner, P., Maibach, H. (eds) *Kanerva's Occupational Dermatology*. Springer, Cham. https://doi.org/10.1007/978-3-319-68617-2_7

ADDITIONAL FILE 9. QUALITY APPRAISAL USING THE MIXED METHOD APPRAISAL TOOL (MMAT)

9.1 How MMAT has been used to appraise quality

- All included studies have been subjected to the two generic screening items (see below).
- Qualitative and quantitative studies have been subjected to their unique category of screening items (see below).
- Mixed methods studies have been subjected to all three screening categories (qualitative, quantitative and mixed method) (see below).
- Response options were: Yes, No and Can't tell.

9.2 Response to score conversion

As suggested in the MMAT 2018 guideline [27], 'Yes' responses have been scored '1' and 'No' and 'Can't tell' responses have been scored '0'. Each category can receive a maximum score of 5. The score '5' means that 100% of the quality criteria are met. Respectively, a score of 0 means that none of the quality criteria were met. For mixed method studies the category with the lowest scoring assessment was used, because studies cannot exceed the quality of its weakest component.

MMAT does not provide cut off values to characterize 'low', 'medium' and 'high' quality studies. Authors are free in this choice as long as the chosen cutoff values are transparent. In this review three categories (low, medium, and high quality) were used, representing studies with scores 0-2, 3 and 4-5 respectively.

9.3 Screening items

Screening (all studies)

S1. Are there clear research questions?

S2. Do the collected data allow to address the research questions?

Qualitative

1.1. Is the qualitative approach appropriate to answer the research question?

1.2. Are the qualitative data collection methods adequate to address the research question?

1.3. Are the findings adequately derived from the data?

1.4. Is the interpretation of results sufficiently substantiated by data?

1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?

Quantitative descriptive

- 4.1. Is the sampling strategy relevant to address the research question?
- 4.2. Is the sample representative of the target population?
- 4.3. Are the measurements appropriate?
- 4.4. Is the risk of nonresponse bias low?
- 4.5. Is the statistical analysis appropriate to answer the research question?

Mixed methods

- 5.1. Is there an adequate rationale for using a mixed methods design to address the research question?
- 5.2. Are the different components of the study effectively integrated to answer the research question?
- 5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?
- 5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?
- 5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?

9.4 Results

All included studies rated 'Yes' to the two screening questions, indicating that MMAT can be used as a tool for further assessment. These screening questions were left out in the table on the following page.

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)															Score Quality
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	
Stammen, L. A., Driessen, E. W., Notermans, C. C. V. I., Scheele, F., Stassen, L. P. S., & Stalmeijer, R. E. (2020). How Do Attending Physicians Prepare Residents to Deliver High-Value, Cost-Conscious Care? <i>Academic Medicine</i> , 95, 764–770. https://doi.org/10.1097/acm.00000000000003051	1	1	1	1	1											5 High
Tartaglia, K. M., Kman, N., & Leford, C. (2015). Medical Student Perceptions of Cost-Conscious Care in an Internal Medicine Clerkship: A Thematic Analysis. <i>Journal of General Internal Medicine</i> . https://doi.org/10.1007/s11606-015-3324-4	0	0	1	1	1											3 Medium
Nilsson, K., Bååthe, F., Erichsen Andersson, A., & Sandoff, M. (2017). Value-based healthcare as a trigger for improvement initiatives. <i>Leadership in Health Services</i> , 30(4), 364–377. https://doi.org/10.1108/LHS-09-2016-0045	1	1	1	1	1											5 High
Blayney, D. W., Simon, M. K., Podttschaske, B., Ramsey, S., Shyu, M., Lindquist, C., & Milstein, A. (2018). Critical lessons from high-value oncology practices. <i>JAMA Oncology</i> , 4(2), 164–171. https://doi.org/10.1001/jamaoncol.2017.3803	1	1	1	1	1											5 High
Meyer, M. (2017). Qualifications and Competencies for Population Health Management Positions: A Content Analysis of Job Postings. <i>Population Health Management Health Manage</i> , 0(0), 475–485. https://doi.org/10.1089/pop.2016.0197	1	1	1	1	1											5 High
Varley, A. L., Kripalani, S., Spain, T., Mixon, A. S., Acord, E., Rothman, R., & Limper, H. M. (2020). Understanding Factors Influencing Quality Improvement Capacity Among Ambulatory Care Practices Across the MidSouth Region: An Exploratory Qualitative Study. <i>Quality Management in Health Care</i> , 29(3), 136–141. https://doi.org/10.1097/qmh.0000000000000255	1	1	1	1	1											5 High
Robinson, C., Lee, J. W., Davis, K. N., & O'Connor, M. (2019). Findings From FMAHealth's Bright Spots in Practice Transformation Project. <i>Family Medicine</i> , 51(2), 137–142. https://doi.org/10.22454/FamMed.2019.163860	1	1	1	1	0											4 High

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)															Score Quality	
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5		
Erichsen Andersson, A., Bååthe, F., Wikström, E., & Nilsson, K. (2015). Understanding value-based healthcare – an interview study with project team members at a Swedish university hospital. <i>Journal of Hospital Administration</i> , 4(4), 64–72. https://doi.org/10.5430/jha.v4n4p64	1	1	1	1	1	1										5	High
Nilsson, K., & Sandoff, M. (2017). Leading implementation of the management innovation value-based healthcare at a Swedish University Hospital. <i>Journal of Hospital Administration</i> , 6(1), 51–59. https://doi.org/10.5430/jha.v6n1p51	1	1	1	1	1	1										5	High
McAlearney, A. S., Walker, D. M., & Hefner, J. L. (2018). Moving Organizational Culture from Volume to Value: A Qualitative Analysis of Private Sector Accountable Care Organization Development. <i>Health Services Research</i> , 53(6), 4767–4788. https://doi.org/10.1111/1475-6773.13012	1	1	1	1	1	1										5	High
Collén, C., & Hellström, A. (2018). Value-based healthcare translated: A complementary view of implementation. <i>BMC Health Services Research</i> , 18(681), 1–12. https://doi.org/10.1186/s12913-018-3488-9	1	1	1	1	1	1										5	High
Quantitative designs																	
Makdisse, M., Ramos, P., Malheiro, D., Felix, M., Cypriano, A., Soares, J., Carneiro, A., Cendoroglo Neto, M., & Klajner, S. (2020). What Do Doctors Think About Value-Based Healthcare? A Survey of Practicing Physicians in a Private Healthcare Provider in Brazil. <i>Value in Health Regional Issues</i> , 23(C), 25–29. https://doi.org/10.1016/j.vhri.2019.10.003						1	1	0	0	1						3	Medium
Beck, J. B., McDaniel, C. E., Bradford, M. C., Brock, D., Sy, C. D., Chen, T., Foti, J., & White, A. A. (2018). PROMspective observational study on high-value care topics discussed on multidisciplinary rounds. <i>Hospital Pediatrics</i> , 8(3), 119–126. https://doi.org/10.1542/hpeds.2017-0183						0	0	1	0	1						2	Low

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)															Score	Quality
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5		
Larsen, K. N., Kristensen, S. R., & Søgaard, R. (2018). Autonomy to health care professionals as a vehicle for value-based health care? Results of a quasi-experiment in hospital governance. <i>Social Science and Medicine</i> , 196, 37–46. https://doi.org/10.1016/j.socscimed.2017.11.009						1	0	0	1	1						3	Medium
Gupta, R., Steers, N., Moriates, C., & Ong, M. (2018). Association between hospitalist productivity payments and high-value care culture. <i>Journal of Hospital Medicine</i> , 13, 16–21. https://doi.org/10.12788/jhm.3084						1	0	1	0	1						3	Medium
Leep Hunderfund, A. N., Starr, S. R., Dyrbye, L. N., Baxley, E. G., Gonzalo, J. D., Miller, B. M., George, P., Morgan, H. K., Allen, B. L., Hoffman, A., Fancher, T. L., Mandrekar, J., & Reed, D. A. (2019). Imprinting on Clinical Rotations: Multisite Survey of High- and Low-Value Medical Student Behaviors and Relationship with Healthcare Intensity. <i>Journal of General Internal Medicine</i> , 34(7), 1131–1138. https://doi.org/10.1007/s11606-019-04828-8						1	0	1	1	1						4	High
Pereira, V., Gabriel, M. H., & Unruh, L. (2019). Multiyear Performance Trends Analysis of Primary Care Practices Demonstrating Patient-Centered Medical Home Transformation: An Observation of Quality Improvement Indicators among Outpatient Clinics. <i>American Journal of Medical Quality</i> , 34(2), 109–118. https://doi.org/10.1177/1062860618792301						1	0	1	1	1						4	High
Hanak, M. A., McDevitt, C., & Dunham, D. P. (2017). Perceptions of Ambulatory Workflow Changes in an Academic Primary Care Setting. <i>The Health Care Manager</i> , 36(3), 261–266. https://doi.org/10.1097/hcm.0000000000000174						1	0	0	0	1						2	Low
Gupta, R., Steers, N., Moriates, C., Wali, S., Braddock, C. H., & Ong, M. (2019). High-Value Care Culture Among the Future Physician Workforce in Internal Medicine. <i>Academic Medicine</i> , 94(9), 1347–1354. https://doi.org/10.1097/acm.00000000000002619						1	0	1	0	1						3	Medium

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)															Score	Quality
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5		
Grosso, M. J., Courtney, P. M., Kerr, J. M., Della Valle, C. J., & Huddleston, J. I. (2020). Surgeons' Preoperative Work Burden Has Increased Before Total Joint Arthroplasty: A Survey of AAHKS Members. <i>The Journal of Arthroplasty</i> , 1–5. https://doi.org/10.1016/j.arth.2020.01.079						1	1	0	0	1						3	Medium
Mordang, S. B. R., Leep Hunderfund, A. N., Smeenk, F. W. J. M., Stassen, L. P. S., & Könings, K. D. (2020). High-Value, Cost-Conscious Care Attitudes in the Graduate Medical Education Learning Environment: Various Stakeholder Attitudes That Residents Misjudge. <i>Journal of General Internal Medicine</i> . https://doi.org/10.1007/s11606-020-06261-8						0	1	1	0	1						3	Medium
Brandt Vegas, D., Levinson, W., Norman, G., Monteiro, S., & You, J. J. (2015). Readiness of hospital-based internists to embrace and discuss high-value care with patients and family members: a single-centre cross-sectional survey study. <i>CMAJ Open</i> , 3(4), E382–E386. https://doi.org/10.9778/cmajo.20150024						1	0	1	0	1						3	Medium
Nilsson, J., Mischo-Kelling, M., Thiekoetter, A., Deufert, D., Mendes, A. C., Fernandes, A., Kirchhoff, J. W., & Lepp, M. (2019). Nurse professional competence (NPC) assessed among newly graduated nurses in higher educational institutions in Europe. <i>Nordic Journal of Nursing Research</i> , 39(3), 159–167. https://doi.org/10.1177/2057158519845321						0	0	1	0	1						2	Low
Gardulf, A., Florin, J., Carlsson, M., Leksell, J., Lepp, M., Lindholm, C., Nordström, G., Theander, K., Wilde-Larsson, B., & Nilsson, J. (2019). The Nurse Professional Competence (NPC) Scale: A tool that can be used in national and international assessments of nursing education programmes. <i>Nordic Journal of Nursing Research</i> , 0(0), 1–6. https://doi.org/10.1177/2057158518824530						1	0	1	0	1						3	Medium
Ryskina, K. L., Smith, C. D., Weissman, A., Post, J., Dine, C. J., Bollmann, K. L., & Korenstein, D. (2015). U.S. Internal Medicine Residents' Knowledge and Practice of High-Value Care: A National Survey. <i>Academic Medicine</i> , 90(10), 1373–1379. https://doi.org/10.1097/ACM.0000000000000791						1	1	0	0	1						3	Medium

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)														Score Quality		
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5		
Mixed Method designs																	
Artenstein, A. W., Higgins, T. L., Sellar, A., Meyer, D., Knee, A. B., Boynton, G., Picchioni, M., Geld, B., & Whitcomb, W. F. (2015). Promoting high value inpatient care via a coaching model of structured, interdisciplinary team rounds. <i>British Journal of Hospital Medicine</i> , 76(1), 41–45. https://doi.org/10.12968/hmed.2015.76.1.41	1	0	0	1	0	0	0	1	0	1	0	1	0	1	0	2	Low
Ryskina, K. L., Holmboe, E. S., Shea, J. A., Kim, E., & Long, J. A. (2018). Physician Experiences with High Value Care in Internal Medicine Residency: Mixed Methods Study of 2003–2013 Residency Graduates. <i>Teach Learn Medicine</i> , 30(1), 57–66. https://doi.org/10.1080/10401334.2017.1335207	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	4	High
Briggs, A. M., Houlding, E., Hinman, R. S., Desmond, L. A., Bennell, K. L., Darlow, B., Pizzari, T., Leech, M., MacKay, C., Larmer, P. J., Bendrups, A., Greig, A. M., Francis-Cracknell, A., Jordan, J. E., & Slater, H. (2019). Health professionals and students encounter multi-level barriers to implementing high-value osteoarthritis care: a multi-national study. <i>Osteoarthritis Cartilage</i> , 27, 788–804. https://doi.org/10.1016/j.joca.2018.12.024	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	4	High
van Veghel, D., Daeter, E. J., Bax, M., Amoroso, G., Blaauw, Y., Camaro, C., Cummins, P., Halfwerk, F. R., Wijdh-Den Hamer, I. J., de Jong, J. S. G., Stooker, W., van der Wees, P. J., & van der Nat, P. B. (2019). Organization of outcome-based quality improvement in Dutch heart centres. <i>European Heart Journal - Quality of Care and Clinical Outcomes</i> , 0, 1–6. https://doi.org/10.1093/ehjqcco/qcz021	1	0	1	0	1	0	1	0	1	0	1	1	1	1	0	2	Low
Sondheim, S. E., Patel, D. M., Chin, N., Barwis, K., Werner, J., Barclay, A., & Mattie, A. (2017). Governance Practices in an Era of Healthcare Transformation: Achieving a Successful Turnaround. <i>Journal of Healthcare Management</i> , 62(5), 316–326. https://doi.org/10.1097/jhm-d-15-00036	1	0	0	0	0	1	0	0	1	1	0	1	1	1	0	1	Low

Study	Criteria from the Mixed Method Appraisal Tool (MMAT 2018)															Score Quality		
	1.1	1.2	1.3	1.4	1.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5			
Laureij, L. T., Been, J. V., Lugtenberg, M., Ernst-Smelt, H. E., Franx, A., Hazelzet, J. A., de Groot, P. K., Frauenfelder, O., Henriquez, D., Lamain-de Ruiter, M., Neppelenbroek, E., Nij Bijvank, S. W. A., Schaap, T., Schagen, M., Veenhof, M., & Vermolen, J. H. (2020). Exploring the applicability of the pregnancy and childbirth outcome set: A mixed methods study. <i>Patient Education and Counseling</i> , 103, 642–651. https://doi.org/10.1016/j.pec.2019.09.022	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1		3	Medium
Wiencek, C. A., Kleinpell, R., Moss, M., & Sessler, C. N. (2019). Choosing Wisely in Critical Care: A National Survey of Critical Care Nurses. <i>28(6)</i> , 434–440. https://doi.org/10.4037/ajcc2019241	1	0	0	1	0	1	1	0	0	1	0	1	0	1	0		2	Low
Boynes, S., Nelson, J., Diep, V., Kanan, C., Pedersen, D. N., Brown, C., Mathews, R., Tranby, E., Apostolon, D., Bayham, M., & Minter-Jordan, M. (2020). Understanding value in oral health: the oral health value-based care symposium. <i>Journal of Public Health Dentistry</i> , 80, S27–S34. https://doi.org/10.1111/jphd.12402	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0		0	Low

9.5 Results summary

Study Design	Number of studies (total)	Number of studies per MMAT quality appraisal score category
Qualitative	23	18 high, 2 medium, 3 low
Quantitative	14	2 high, 9 medium, 3 low
Mixed Method	8	2 high, 1 medium, 5 low

References

27. Hong Q, Pluye P, Fàbregues S, et al. (2018). Mixed Methods Appraisal Tool (MMAT), Version 2018. User guide. *McGill*. Published online:1-11. http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/attach/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf

ADDITIONAL FILE 10. SUMMARY TABLE SYSTEMATIC LITERATURE REVIEW

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/ specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Promoting high value inpatient care via a coaching model of structured, interdisciplinary team rounds	Artenstein et al.	2015	USA	Hospital	Care professional	General medicine/ surgical ward	To assess, in descriptive fashion, the feasibility and the impact of incorporating an experienced physician into structured, interdisciplinary, ward rounds to coach the elements of high-value care.	Mixed Method	High-value care	Team-based care, Organize care around disease within setting	Active involvement in (see left)
Physician Experiences with High Value Care in Internal Medicine Residency: Mixed Methods Study of 2003–2013 Residency Graduates	Ryskina et al.	2018	USA	Hospital	Care professional	Internal medicine	To assess trends in US physician experiences with high value care during residency over the past decade.	Mixed Method	High-value care	Resource stewardship, SDM, Generic HVC or not specified,	Uncertain or not all professionals are actively involved in (see left)
What Do Doctors Think About Value-Based Healthcare? A Survey of Practicing Physicians in a Private Healthcare Provider in Brazil	Makdisse et al.	2020	Brazil	Hospital	Care professional	Not specified (all disciplines)	To capture awareness of value-based healthcare (VBHC).	Quantitative	Value-based care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)
Health professionals and students encounter multi-level barriers to implementing high-value osteoarthritis care: a multi-national study	Briggs et al.	2019	Australia, New Zealand and Canada	Physiotherapy Primary care	Care professional + student	Physiotherapy Primary care	To explore barriers to high-value OA care delivery among clinicians and students.	Mixed Method	High-value care	Generic HVC or not specified	Uncertain or not all professionals are actively involved in (see left)
Experiences from implementing value-based healthcare at a Swedish University Hospital - a longitudinal interview	Nilsson, K et al.	2017	Sweden	Hospital	Care professional	Four different diagnostic groups	To explore how the representatives of four pilot project teams experienced implementing VBHC over a period of 2 years in four different groups of patients at a large Swedish University Hospital.	Qualitative	Value-based care	Organize care around disease within setting Team-based care Outcome measures Quality improvement Involve patient representatives	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
The Role of the Pathologist in Population Health	Gross et al.	2018	USA	Medical laboratory	Care professional	Pathology Medical laboratory	To better understand the role pathologists can have in population health.	Qualitative	Value-based care	Population Health	Active involvement in (see left)
The Struggle Is Real: How Residents Learn to Provide High-Value, Cost-Conscious Care	Stammen et al.	2019	The Netherlands	Hospital, Primary care, Elderly care	Student	Dermatology Elderly care Family medicine Internal medicine Orthopaedics Surgery	To offer insight into how residents learn to provide high-value, cost-conscious care in the workplace and how the postgraduate training environment influences this learning.	Qualitative	High-value, cost-conscious care	Generic HVCCC	Uncertain or not all professionals are actively involved in (see left)
PROMspective Observational Study on High-Value Care Topics Discussed on Multidisciplinary Rounds	Beck et al.	2018	USA	Hospital	Care professional	General medicine Endocrinology Neurology Rheumatology Gastroenterology Nephrology Craniofacial	To explore the types of HVC discussions that take place at the bedside and who participates in those discussions.	Quantitative	High-value care	Discussing value in clinical encounter	Uncertain or not all professionals are actively involved in (see left)
Organization of outcome-based quality improvement in Dutch heart centres	Van Veghel et al.	2019	The Netherlands	Hospital	Care professional	Heart care	To evaluate the current state of outcome-based quality improvement within six of these Dutch heart centres	Mixed Method	Value-based care	Outcomes measures Quality improvement	Active involvement in (see left)
Autonomy to health care professionals as a vehicle for value-based health care? Results of a quasi-experiment in hospital governance	Larsen et al.	2018	Denmark	Hospital	Care professional	General Medicine Ophthalmology Oral and Maxillofacial Surgery Orthopaedics Acute Medicine Ear, Nose and Throat Neurology Neurosurgery	To investigate the performance of eight hospital departments in the second largest region of Denmark that were delegated the authority to choose their own performance focus during a three-year test period from 2013-6.	Quantitative	Value-based care	Quality improvement (via delegated autonomy)	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/ specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
The need to succeed - learning experiences resulting from the implementation of value-based healthcare	Nilsson, K et al.	2018	Sweden	Hospital	Care professional	Four different diagnostic groups	To explore learning experiences from the two first years of the implementation of VBHC at a large Swedish University Hospital.	Qualitative	Value-based care	Organize care around disease within setting Team-based care Outcome measures Quality improvement Involve patient representatives	Active involvement in (see left)
The strategic role of competency based medical education in health care reform: a case report from a small scale, resource limited, Caribbean setting	Busari & Duits	2015	Curacao	Diverse actors in care landscape	Diverse actors	Not specified	To investigate for the requirements needed to build a health care environment that is conducive for change and capable of facilitating the smooth migration of existent services into an effective and sustainable VBHC system.	Qualitative	Value-based care	Generic VBHC/not specified	Participant has not been exposed to VBHC (yet)
Governance Practices in an Era of Healthcare Transformation: Achieving a Successful Turnaround	Sondheim et al.	2017	USA	Hospital	Care professional	Emergency care	To examine a small community hospital's successful transition from one emergency care center (ECC) physician group to another and the methods by which significant improvements in outcomes were achieved.	Mixed Method	Value-based care	Team-based care Outcome measures Quality improvement Accountability	Active involvement in (see left)
A realist evaluation of value-based care delivery in home care: The influence of actors, autonomy and accountability	Dainty et al.	2018	Canada	Home care	Care professional	Home care Community wound care services	To evaluate value-based implementation.	Qualitative	Value-based care	Organize care around disease (across organizations) Team-based care Outcome measures Bundled payment	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
How Do Attending Physicians Prepare Residents to Deliver High-Value, Cost-Conscious Care?	Stammen et al.	2019	The Netherlands	Hospital, Homecare, Elderly care	Care professional	Not specified	To understand how attending physicians, who have a central role in the workplace, prepare residents to provide HV3C.	Qualitative	High-value, cost-conscious care	Generic HVCCC or not specified	Uncertain or not all professionals are actively involved in (see left)
Association between Hospitalist Productivity Payments and High-Value Care Culture	Gupta et al.	2018	USA	Hospital	Care professional	Internal medicine	To evaluate if hospitalist reimbursement models are associated with high-value culture in university, community, and safety-net hospitals.	Quantitative	High-value care	Generic HVC, Resource stewardship	Uncertain or not all professionals are actively involved in (see left)
Medical Student Perceptions of Cost-Conscious Care in an Internal Medicine Clerkship: A Thematic Analysis	Tartagila et al.	2015	USA	Hospital	Student	Internal medicine	To examine medical students' perceptions of healthcare delivery as it relates to cost consciousness.	Qualitative	High-value care Cost-Conscious Care	Generic HVCCC, Resource stewardship	Uncertain or not all professionals are actively involved in (see left)
Value-based healthcare as a trigger for improvement initiatives	Nilsson, K. et al.	2017	Sweden	Hospital	Care professional	Four different diagnostic groups	To explores four pilot teams' experiences of improvements resulting from the implementation of value-based healthcare (VBHC) at a Swedish University Hospital. The aim of this study is to gain a deeper understanding of VBHC when used as a management strategy to improve patients' health outcomes.	Qualitative	Value-based care	Organize care around disease within setting Team-based care Outcome measures Quality improvement Evidence & tailor Benchmark	Active involvement in (see left)
Exploring the applicability of the pregnancy and childbirth outcome set: A mixed methods study	Laureij et al.	2020	The Netherlands	Hospital, Primary care, Maternity care, Midwifery practice	Care professional	Perinatal care	To assess views on the PCB set.	Mixed Method	Value-based care	Outcome measures Collaborate in chain, involve patient representatives	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Imprinting on Clinical Rotations: Multisite Survey of High and Low-Value Medical Student Behaviors and Relationship with Healthcare Intensity	Hunderfund et al.	2019	USA	Hospital	Student	Not specified	To explore potential imprinting on clinical rotations by (a) describing high- and low-value behaviors among medical students and (b) examining relationships with regional healthcare intensity (HCI).	Quantitative	High-value care Low-value care	Resource stewardship	Uncertain or not all professionals are actively involved in (see left)
Critical Lessons From High-Value Oncology Practices	Blayney et al.	2017	USA	Ambulatory care	Care professional	Oncology	To assess oncology practice attributes distinguishing "high value" that may be tested and adopted by others to produce similar results.	Qualitative	High-value care	Generic VBHC or not specified	Active involvement in (see left)
Qualifications and Competencies for Population Health Management Positions: A Content Analysis of Job Postings	Meyer	2017	USA	Not applicable	Not applicable (about all care professionals)	Not applicable	To analyze the types of population health management positions for which health care organizations are hiring, including qualifications and competencies required for these positions.	Qualitative	Value-based care	Population health	Not applicable
Multiyear Performance Trends Analysis of Primary Care Practices Demonstrating Patient-Centered Medical Home Transformation: An Observation of Quality Improvement Indicators among Outpatient Clinics	Pereira et al.	2019	USA	Primary care	Not applicable (about all care professionals)	Primary care	To describe national trends in National Committee for Quality Assurance PCMH recognition for more than 23 000 primary care practices across the United States from 2008 to 2017.	Quantitative	Value-based care	Patient-Centered Medical Home (PCMH)	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Understanding Factors Influencing Quality Improvement Capacity Among Ambulatory Care Practices Across the MidSouth Region: An Exploratory Qualitative Study	Varley et al.	2020	USA	Ambulatory care	Care professional	Ambulatory care	To explore factors influencing QI capacity among ambulatory care practices in the MidSouth Practice Transformation Network.	Qualitative	Value-based care	Quality improvement	Uncertain or not all professionals are actively involved in (see left)
Findings from FMA-Health's Bright Spots in Practice Transformation Project	Robinson et al.	2019	USA	Primary care	Care professional	Family physician	To identify drivers of transformation to value-based care and ways of working with drivers to mitigate potential barriers, and to determine relationships between practice transformation and joy of practice.	Qualitative	Value-based care	Practise transformation to value-based model, seemingly including: Organize care around disease within setting Team-based care Outcome measures Engaged leadership	Active involvement in (see left)
A value-based taxonomy of improvement approaches in healthcare	Collden et al.	2017	Sweden	Hospital, outpatient care	Care professional	Psychiatry	To construct a taxonomy that supports management of parallel IAs in healthcare.	Qualitative	Value-based care	Overall VBHC / not specified	Active involvement in (see left)
Perceptions of Ambulatory Workflow Changes in an Academic Primary Care Setting	Hanak et al.	2017	USA	Ambulatory care, Primary care	Care professional	Ambulatory care, Primary care	To evaluate various components of a CMA (certified medical assistants (CMAs)) workflow in adult primary care practices within an academic medical center.	Quantitative	Value-based care High-value care	Workflow redesign	Active involvement in (see left)
High-Value Care Culture Among the Future Physician Workforce in Internal Medicine	Gupta et al.	2019	USA	Hospital	Student	Internal medicine	To evaluate whether trainees' exposure to a high-value care culture differed based on type of health system in which they trained.	Quantitative	High-value care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Redefining value: a discourse analysis on value-based health care	Steinmann et al.	2020	The Netherlands	Diverse actors in care landscape	Diverse actors	Not applicable	To map the ambiguity surrounding VBHC.	Qualitative	Value-based care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)
Surgeons' Preoperative Work Burden Has Increased Before Total Joint Arthroplasty: A Survey of AAHKS Members	Grosso et al.	2020	USA	Hospital	Care professional	Orthopaedics	To quantify the work burden associated with preoperative TJA care.	Quantitative	Value-based care	Organize care around disease within setting Care Pathway	Active involvement in (see left)
High-Value, Cost-Conscious Care Attitudes in the Graduate Medical Education Learning Environment: Various Stakeholder Attitudes That Residents Misjudge	Mordang et al.	2020	The Netherlands	Hospital	Care professional, student	Not specified	To measure stakeholders' HVCCC attitudes in residents' learning environment, compare these with resident perceptions of their attitudes, and identify factors associated with attitudinal differences among each stakeholder group.	Quantitative	High-value, cost-conscious care	Generic HVCCC or not specified	Uncertain or not all professionals are actively involved in (see left)
Choosing Wisely in Critical Care: A National Survey of Critical Care Nurses	Wiencek et al.	2019	USA	Hospital	Care professional	Acute and ICU clinical practice	To assess nurses' reports of the use of Choosing Wisely recommendations in critical care settings.	Mixed Method	High-value care	Resource stewardship Guidelines	Uncertain or not all professionals are actively involved in (see left)
Qualitative Study to Understand Pediatric Hospitalists and Emergency Medicine Physicians' Perspectives of Clinical Pathways	O'hara et al.	2020	USA	Hospital	Care professional	Pediatric (emergency) medicine	To examine pediatric hospital medicine (PHM) and pediatric emergency medicine (PEM) physician perspectives of clinical pathways.	Qualitative	High-value care	Pathway (re)design	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Readiness of hospital-based internists to embrace and discuss high-value care with patients and family members: a single-centre cross-sectional survey study	Brandt Vegas et al.	2015	Canada	Hospital	Care professional	Internal medicine	To determine how ready practicing internists were to embrace and openly address high-value care during conversations with patients or their families.	Quantitative	High-value care	Discussing value in the clinical encounter Resource stewardship	Uncertain or not all professionals are actively involved in (see left)
High-value care for older adults with complex care needs: Leveraging nurses as innovators	Demiris et al.	2020	USA	Diverse actors in care landscape	Care professional	Gerontology	To introduce a series of recommendations for leveraging nurses to generate innovative tools and solutions for the delivery of value-based care for older adults living with complex health and social needs and their families.	Qualitative	Value-based care High-value care	Leadership in generic VBHC/ not specified	Uncertain or not all professionals are actively involved in (see left)
The use of PROMs and shared decision-making in medical encounters with patients: An opportunity to deliver value-based health care to patients	Damman et al.	2019	The Netherlands	Hospital	Care professional	Neurology Oncology Mental health care	To describe approaches and lessons learned in the fields of SDM and VBHC implementation that converge in using PROMs in medical encounters.	Qualitative	Value-based care	Outcome measures SDM	Active involvement in (see left)
Leadership skills essential in the value-based care era	Cornell	2020	USA	ACO	Care professional (Executive leader)	Not specified	What primary executive leadership skills are essential in the VBHC era.	Qualitative	Value-based care	Leadership in generic VBHC/ not specified	Active involvement in (see left)
Nurse professional competence (NPC) assessed among newly graduated nurses in higher educational institutions in Europe	Nilsson, J. et al.	2019	Europe (11 institutions)	Not specified	Student	Not specified	To assess and compare nursing education and self-reported professional competence among nursing students graduating with a bachelor's degree from higher education institutions in Europe.	Quantitative	Value-based care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
The Nurse Professional Competence (NPC) Scale: A tool that can be used in national and international assessments of nursing education programmes	Gardulf et al.	2019	Sweden	Not specified	Student	Not specified	To investigate whether the Nurse Professional Competence (NPC) Scale could serve as a tool to measure and detect possible differences between universities/university colleges regarding nursing students' self-reported competence.	Quantitative	Value-based care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)
Understanding value-based healthcare – an interview study with project team members at a Swedish university hospital	Erichsen Andersson et al.	2015	Sweden	Hospital	Care professional	Psychiatry Oncology Orthopaedics Heart care	To explore how representatives from four project teams understand the concept of value-based Healthcare.	Qualitative	Value-based care	Organize care around disease within setting Team-based care Outcome measures Quality improvement, involve patient representatives Benchmark	Active involvement in (see left)
Leading implementation of the management innovation value-based healthcare at a Swedish University Hospital	Nilsson & Sandoff	2017	Sweden	Hospital	Care professional	Psychiatry Oncology Orthopaedics Heart care	To explore medical and care staff's experiences of leading the implementation of the management innovation, named value-based healthcare (VBHC).	Qualitative	Value-based care	Outcome measures Quality improvement ment	Active involvement in (see left)
Moving Organizational Culture from Volume to Value: A Qualitative Analysis of Private Sector Accountable Care Organization Development	McAlearny et al.	2018	USA	ACO	Care professional	Not specified	To explore the cultural change necessary for shifting from volume to value in ACO's.	Qualitative	Value-based care	Accountable care Population health	Active involvement in (see left)

Study	Authors	Year of publication	Country of studied population	Setting	Profession	Discipline/specialty	Aim	Study design	VBHC taxonomy	Main VBHC interventions applied and/or studied	Involvement of the population in VBHC intervention
Value-based healthcare translated: a complementary view of implementation	Colldén & Hellström	2018	Sweden	Hospital	Care professional	Psychiatry	To investigate how a translation theory perspective can inform the Consolidated Framework of Implementation Research (CFIR) to increase understanding of the complex process of putting MIs into practice.	Qualitative	Value-based care	Outcome measures Value discussions (Benchmark). Organize care around disease within setting	Active involvement in (see left)
Understanding value in oral health: the oral health value-based care symposium	Boynes et al.	2020	USA	Oral health	Diverse actors	Oral health	To develop a gap analysis and capture insights into professional readiness for value-based care design.	Mixed Method	Value-based care	Generic VBHC or not specified	Uncertain or not all professionals are actively involved in (see left)
U.S. Internal Medicine Residents' Knowledge and Practice of High-Value Care: A National Survey	Ryskina et al.	2015	USA	Hospital	Student	Internal medicine	To determine U.S. internal medicine (IM) residents' knowledge of, attitudes toward, and self-reported practice of high-value care (HVC), or care that balances the benefits, harms, and costs of tests and treatments.	Quantitative	High-value care	Generic HVC or not specified	Uncertain or not all professionals are actively involved in (see left)

ADDITIONAL FILE 11. ADDITIONAL FINDINGS SYSTEMATIC LITERATURE REVIEW

This complementary file elaborates on the findings stated in the main text regarding the 'VBHC specific' elements. These elements comprised the 'professional', the 'job' of pursuing value in care and the 'environment.'

11.1 The professional

The element 'professional' covers the 'personal & professional characteristics', 'conceptual awareness & understanding' and 'attitudes towards VBHC' of healthcare professionals. Table 1 provides an overview.

Personal & professional characteristics

Studies reported on an association between age and gender, as personal characteristics, and VBHC awareness [28], HVCCC scores [29], and attitudes towards VBHC [30]. Other personal characteristics in VBHC mentioned were pro-activeness [31], criticalness [32] and attributing importance to new technologies and public disclosure of patient satisfaction surveys [28]. Outcomes were studied in relation to, and compared between, employee characteristics such as job position [28–30,33].

Conceptual awareness & understanding

Professionals' awareness was studied in relation to VBHC [28], choosing wisely recommendations [34], Shared Decision Making (SDM) [35] and VBHC implementation [36]. Studies investigated how professionals perceived value and VBHC, also in relation to other management innovation tools [37], and showed that understanding and interpretation was not uniform and sometimes involved prioritization of patient outcomes or costs [28,32,33,36–43]. Rapid pace of VBHC implementation was suggested to negatively impact the development of understanding [36,43].

Attitudes towards VBHC

Mixed attitudes towards VBHC were reported. On the positive side, VBHC was received with excitement and enthusiasm, conviction and with suggested readiness [28–30,32,38–40,44–51]. VBHC was perceived positively, as commendable and to trigger hope. Although VBHC was assumed to connect to professionals' intrinsic motivation [38], none of the included studies investigated motivation. Participants expressed relevance of outcome measures [28,44], which made them accept the necessary registration [52]. Some professionals reported on their motives for integrating costs in care delivery [32,46]. Participants also felt urgency to improve care in case of low outcome scores [45], and expressed interest to participate in improvements [29] and to receive feedback on their value-based behaviors [46].

However, negative attitudes were also reported [30,32,34–39,42,43,46,49–51,53,54], for example in the form of critique [38], drawbacks [30], ignorance [36] and resistance [32,34,42,43]. Possible explanations for these negative attitudes were prior experiences with time-consuming coding and meaningless outcomes [41], tiredness of the cost-focus that had been existing for long [43], residents' short-term involvement [32] and other root-cause problems [43]. Professionals seemed reluctant to consider costs [32,37,46,53] and to discuss costs openly [46,51], although positive attitudes towards cost incorporation were mentioned as well [46]. Furthermore, professionals reported on possible misconceptions in relation to: the need of SDM and the necessary time for SDM [35], the possibility to benchmark [52] their power in VBHC [54].

Table 1. Overview and illustrative quotes about the professional in VBHC

Professional codes and subcodes		Studies	Exemplary quote
Personal & professional characteristics		[28–34]	"Among residents, male gender and [...] were associated with more favorable attitudes toward high-value care ($\beta = 0.09$, 95% CI = 0.03, 0.16, $p = 0.006$; $p = 0.006$). However, male residents also endorsed more potential drawbacks ($\beta = 0.13$, 95% CI = 0.04, 0.21, $p = 0.004$), as did younger residents ($\beta = 0.02$, 95% CI = 0.03, 0.00, $p = 0.01$)" [30]
Awareness & understanding	Awareness	[28,34–36]	"Twenty-seven percent of physicians rated their awareness of VBHC as high or very high" [28]
	Conceptual understanding and factors impacting development of understanding	[28,32,33, 36–43]	"Four discourses on VBHC:] Firstly, there is what we have labeled a Patient Empowerment discourse (PEMP), in which VBHC is chiefly portrayed as a framework for strengthening the position of patients regarding their medical decisions. Secondly, we have identified a Governance discourse (GOV) in which VBHC is primarily construed as a mechanism to steer and regulate care providers toward value for patients. Third, there is a Professionalism discourse (PROF), in which VBHC is predominantly construed as a methodology for the organization and improvement of health care delivery. Fourthly, we have identified a Critique discourse (CRI), which is characterized by a specific form of critique of VBHC, particularly its emphasis on measurement and standardization" [55]
Attitude towards VBHC	Positive	[28–30,32, 38–40,44–51]	"In sum, individuals with different points of view could all attach hope to the new fuzzy concept VBHC" [41]
	Negative	[30,32,34–39,42,43,46, 49–51,53,54]	"They found it [HV3C] hard, sometimes even undesirable, to translate into practice. [...] One of the residents who participated in the focus groups felt very strongly that it was incumbent upon residents to do everything in their power to help the patient, however costly" [32]

11.2 The job: pursuing value in care

Studies described behaviors of professionals in VBHC and their performance. Studies suggested that VBHC is a bottom-up initiative that expanded roles, established new roles and called for leadership. Although none of the included studies provided overview of all the behaviors in VBHC, thematic analysis revealed ten behaviors. These behaviors, which build upon professionals acting upon their professional standards [56], are interconnected and mutually reinforcing. More information about professionals' roles and the VBHC behaviors are detailed below. An overview is provided in Figure 2 and Table 2.

Bottom-up role

Studies reported on VBHC as bottom-up initiatives [34,38,40,45,47,49,57,58]. Top-down approaches were considered not appropriate. One study investigated the delegation of authority to professionals and found a neutral effect on quality improvements [59].

Role expansion & new roles

VBHC was associated with role expansion and new roles [31,44,45,47,58,60–65]. For example, roles were expanded to include discussion of patient reported outcomes [44,61], coaching of peers [60], championship [31] and research-skilled professionals were assumed to guarantee critical thinking [43]. Medical assistants [64,65] and nurses [62,63,66] saw or suggested expansion of their tasks and function, such as the establishment of contact nurse function. Professionals from less obvious disciplines to participate in VBHC, such as pathologists and professionals in dental care, felt the urge to express their relevance [31,67]. Studies suggested that roles in VBHC still need to be formalized [44,45], while one of these studies also indicated that professionals prefer no mandates [45].

Leadership characteristics

Engaged leadership was described necessary to involve and engage staff [36,40,49,64,68], while this also depended on the attitude and autonomy of the staff [49]. Important leadership characteristics and competences included approachability, having vision, perseverance and positivity. Nurses [63] and pathologists [31], were two professions described to potentially take up leadership roles in the future.

VBHC behaviors

Thematic analysis revealed ten specific behaviors that professionals pursued in VBHC, next to acting upon their professional standards. These interconnected and mutually reinforcing behaviors are to 1) focus on what matters to patients & adopt other VBHC mindsets 2) measure outcomes, 3) learn & improve care, 4) organize care around the full cycle of disease, 5) participate in population health & prevention, 6) discuss value in the clinical encounter, 7) involve patient representatives, 8) take accountability for patients & resources, 9) practice bottom-up engagement and above all: 10) work in teams.

Behavior 1. Focus on what matters to patients & adopt other VBHC mindsets

Ten studies reported on professionals starting to think differently and adopt new mindsets [31,34,35,37,38,43,57,60,69,70]. A challenge professionals faced was to truly focus on what matters to patients and take unexpected answers as basis since risks existed that professionals were (unintentionally) driven by their own values [35,37,38,43,57,60,69,70]. Especially for benchmarking an open mindset was considered important. Professionals were suggested to view benchmarking as an opportunity for learning rather than a moment to explain away their lower scores [52]. This open mindset was also considered critical to address each other on outcomes [44] and start collaboration with less obvious partners [31]. Furthermore, professionals adjusted their expectation of quick results and now viewed VBHC as 'never-ending' [43]. Other changes in mindset were to take research as basis for changes [43] and to view conservative testing as the new norm [34].

Behavior 2. Measure outcomes

Various actions in relation to outcome measures were described [36,44,47,49,50,56,57,70–72]. These included establishment and use of performance metrics, professional-reported outcomes and patient-reported outcome measures (PROMs). Amongst others, professionals mapped current processes and measurements and investigated what needed to be measured and how this could be achieved [36,41,43,49,52]. Routines and technology to facilitate data capture were revised or developed [41,43,66] and finally data was captured [36,43,44,71,72].

Behavior 3. Learn & improve care

Amongst others by discussing outcome data, professionals identified and made improvements [31,34,38,43,49,56,57,64,69–71,73,74]. This process was facilitated by use of Quality Improvement (QI) methods such as LEAN [64] and Choosing Wisely recommendations [34]. Professional started by identifying the root cause [52,58]. Improvements were combined [43] and if needed current practices were discarded [31,41,52,73]. Professionals were also suggested to aim for demonstrating best practices [56], next to their engagement in benchmarking [41,66,71]. QI was used as a criterion for 'medical home' assessment, which showed repetitive underperformance in various cases [74].

Behavior 4. Organize care around the full cycle of disease

Professionals organized care around the full cycle of disease [40,43,59,60,62,64,65,67,70,72,74–76]. This was done based on measurements [66] and pathways [76]. Care was planned in collaboration with patients at admission and with staff working on the whole care process [66]. Moreover, professionals proactively addressed and streamlined care processes and transitions [60,64,67] by internal cooperation with other departments [43] and by cooperation between in- and outpatient care [40,43]. For example, professionals explicitly discussed the most efficient testing route to patient goals [62] and provided proactive support [62] and preoperative services [75]. Although improved care planning was mentioned [59,72,74], care

professionals had different perceptions about professionals' adherence to new workflows [65]. Improvement potential was identified for referral tracking, for follow-up and patient-centered care collaboration between clinical and nonclinical team members and between primary care provider and specialty care providers [74].

Behavior 5. Participate in population health & prevention

Care coordination was also considered essential when professionals engaged in population health and prevention [31,43,64,67,74], namely to counteract possible adverse effects related to use of care services and hence safeguard sustainability [64]. Although prevention was considered important in VBHC [67], studies did not report on specific preventative behaviors.

Behavior 6. Discuss value in the clinical encounter

In VBHC professionals with direct patient contact discussed value in the clinical encounter [32,34,35,44,51,57,61,62,77,78]. Patients viewed it was the role of healthcare professionals to discuss PROMs, especially the more sensitive topics [44]. At the same time many professionals preferred to discuss value implicitly [51]. One observation-based study reported that in 30 per cent of patient encounters a value-related topic was discussed [60]. Most occurring VBHC topics discussed were avoidance of a low-value tests and the tailoring of care plans. Other studies reported that professionals asked for treatment experience [52] and discussed treatment planning [34,62] and medication [32]. There was variety in the extent costs were discussed [77,78] and SDM was applied [35].

Behavior 7. Involve patient representatives

Professionals took efforts to involve patient representatives [35,43,52,66,69]. Involving patient representatives was considered important for PROM development [35]. Moreover, involvement of patient representatives strengthened the focus on value for patients [36,43] and raised awareness of improvement potential [66]. Involvement of patient representatives was considered to 'add something' [52] while professionals were also aware of the necessary delicacy and preparation that involvement of patient representatives demanded [36].

Behavior 8. Take accountability for patients and resources

VBHC asked professionals to take accountability [40,56,72], especially for the care of patients and use of resources [29,32,34,40,44,46,53,56,57,62,65,69,72,73,77,78]. Professionals took accountability for resources by attempting to measure costs [39,48], studying cost theory [46], prescribing generic medication and reviewing medicine [53,65] discussing costs of care [56,77], weighing costs in decision-making [29,73,78] and discussing conservative testing [62]. However, improvement potential was identified [34]. Due to limited sense of resource-stewardship in junior residents [77], one study described junior residents as potential delivers of wasteful care and hence in need of guidance or limits in their autonomy [46].

Behavior 9. Practice bottom-up engagement

Staff involvement was considered essential [34,43,45,49,50,57,66,69]. Efforts were taken to inform and engage staff pedagogically using informal dialogues with repeated information [36,49] and by fostering their confidence [49]. Also, amongst others, professionals shared examples of good practices [43], provided feedback [49], used prompts [34] and made VBHC appear locally invented [41]. Resistance was overcome by discarding existing measures when possible [41,52]. However, reflection learned that staff engagement was not yet optimal and may need other approaches [66,71].

Behavior 10. Work together & collaborate

Studies reported on deployment of team-based models in VBHC and increased collaboration [31,35,49,56,57,60,64,67,79]. Professionals collaborated during VBHC implementation, improvement work, when preparing patient consultations and during patient care itself. Various actors were mentioned as a member of the multidisciplinary team, such as experienced physicians, sub-specialists, medical assistants, care coordinators, nurse managers, social workers, pharmacists, respiratory therapists, and bedside nurses.

Table 2. Overview and illustrative quotes on the job of pursuing value in care

VBHC-job codes and sub-codes		Studies	Exemplary quote
Role	Bottom-up	[34,38,40,45, 47,49,57,58]	"Outcome performance and improvement is partially discussed within specialties (the doctor's unit 'cardiothoracic surgery'), partially appropriated by initiatives from individual physicians and partially in project teams. [...],physicians taking initiative either individually or within project teams generally do not enjoy a formal mandate within the organization" [45]
	Role expansion & new roles	[31,44,45,47, 58,60–65]	"As the implementation work preceded, the contact nurse's function became more established. After two years, continuous measurements showed that 90 per cent of the patients were appointed a contact nurse (IP17) " [66]
	Leadership	[36,40,49,64, 68]	[Study on leadership skills essential in the value-based care era] [68]
Behavior and performance	Act upon professional standards	[56]	"They should act in accordance with the responsibilities as defined by their respective professional standards, The medical specialist is expected to provide good health care services that meet acceptable standards i.e. are safe, effective, patient centered, delivered timely and commensurate with the patient's real needs. The medical specialist abides by the professional guidelines/ protocols that apply to him, and may deviate from these, if and when necessary, [continued]" [56]

Table 2. Continued.

VBHC-job codes and sub-codes	Studies	Exemplary quote
Focus on what matters to patients & adopt other VBHC mindsets	[31,34,35,37, 38,43,57,60, 69,70]	"Over time, participants questioned their own thinking and said they had had to learn a new way of thinking, integrating the patients' perspective in their more traditional profession-based thinking" [36]
Measure outcomes	[36,44,47,49, 50,56,57,70–72]	"To solve these problems, they established a new coding system and a new working routine " [66]
Learn & improve care	[31,34,38,43, 49,56,57,64, 69–71,73,74]	"The participants found that measuring different variables contributed to the possibility of identifying not only what they needed to do better, but also what they did wrong. Detecting divergences in the scorecards led to improvements in care processes as well as the development of new procedures" [43]
Organize care around the full cycle of disease	[40,43,59,60, 62,64,65,67, 70,72,74–76]	"Proactive support for patients during predictably stressful" [62]
Participate in population health & prevention	[31,43,64,67, 74]	"Key characteristics associated with the best practices for the current state OHVBC [oral health value based care] were discussed among the expert participants, including prevention innovation, expanded workforce, and health outcome measures for prevention" [67]
Discuss value in the clinical encounter	[32,34,35,44, 51,57,61,62, 77,78]	"Overall, 29% of all patient encounters (191 of 660; 95% CI: 26%–33%) included at least 1 observed HVC discussion from the 10 potential topics " [61]
Involve patient representatives	[35,43,52,66, 69]	"Importance of listening to patient representatives. [...] involves putting questions to patients" [57]
Take accountability for patients & resources	[29,32,34,40, 44,46,53,56, 57,62,65,69, 72,73,77,78]	"45% reported weighing costs in clinical decision making" [73]
Practice bottom-up engagement	[34,43,45,49, 50,57,66,69]	"Therefore, in order to forestall organizational resistance and gain acceptance among professionals, the project group first focused on reducing measurements that professionals perceived as meaning- less and time consuming" [41]
Work in teams & collaborate	[31,35,49,56, 57,60,64,67, 79]	"All practices interviewed had moved to team-based care and indicated it was a primary driver of practice transformation" [64]

11.3 The Environment

Analysis identified several characteristics of the environment that were measured or discussed from the perspective of the healthcare professional. These characteristics, as shown in Table

3, related to culture, HR & capacity, organizational facilities and approaches, other meso- and macro-level obstacles and the time era.

Employer characteristics

Employer characteristics such as type of hospital [29,73], region [30,74,80], health-care intensity [77] and number of clinicians [74] were related to, amongst others, self-reported knowledge, perceived barriers, behaviors and performance in VBHC [29,30,32,61,62,73,74, 77,78,80].

Culture

Participants mentioned the need for cultural change [34,43,44,57], and more specifically cultures that are transparent, blame-free, self-critical and focus on improvement as well as cultures where professionals address each other on outcomes [29,38,44,57,64,67,71,73].

HR & capacity

Professionals reported on staffing constraints, both for professionals and supportive personnel [33,36,54,60]. Although staff stability was considered important [43,54,64], concern was expressed about nurses trained in VBHC leaving for promotions at other practices [64]. Besides numerous studies reporting on deployment of third-party services, consultants, data analysis and econometrists, e.g. [47,50,62–65,67,69,71,75,79], studies also reported on specific staffing needs [31,49,67,69,81] such as current open positions in population health functions [81].

Organizational facilities & approaches

Thematic analysis revealed various latent needs and desires of professionals. These related to provision of dedicated time for VBHC [54,64,71] as lack of time was considered a possible barrier [54], the adoption of a step-by-step approach [44,49,50,67,79] and supportive IT and organizational commitment and investment in VBHC [31,38,40,44,46,47,54,57,63,64,67,76], with special attention to engaged leadership [40,50,64,69,71].

Other meso-, and macro-level obstacles

Professionals also identified organizational-level and system-level challenges that formed obstacles to VBHC but were not explicitly labeled as a demand. These obstacles included patients' limited access to care [33] and lack of understanding of VBHC [40], organizational obstacles [41,43] such as conflicting interests [33], and lack of commitment and messaging from ministry [79].

Time era

One study addressed the time era by stating that Covid19 was considered to have a progressive impact on VBHC [67].

Table 3. Overview and illustrative quotes on reported environment-related aspects in VBHC

Environment codes and subcodes		Studies	Exemplary quote
Employer characteristics	-	[29,30,32,61, 62,73,74,77, 78,80]	"Hospital region was significantly associated with faculty's attitudes toward high-value care ($p = 0.002$) and cost incorporation ($p = 0.004$), but not with their beliefs about potential drawbacks" [30]
Culture	Culture change	[34,43,44,57]	"a culture change is needed in order to create an environment in which it is normal to address each other on outcomes" [44]
	Assessment and need of specific culture	[29,38,44,57, 64,67,71,73]	"A culture exists to openly discuss outcomes within each specialty, but less openness exists to discuss outcomes in a multidisciplinary setting" [45]
HR & capacity	Staffing constraints	[33,54,60,69]	"Limitations with the service environment, including inadequate human resources" [33]
	Staff composition	e.g. [47,50, 62–65,67, 69,71,75,79]	"Care Team Functions at the Highest Level of Competence and License. The use of experienced oncology nurses and other nononcologist care providers was another often-mentioned attribute [of high-value practices]" [79]
	Staff stability	[43,54,64]	"Once trained at the highest scope of their licenses, they found medical assistants and registered nurses may leave for promotions as office managers and care managers, respectively, at other local practices" [64]
	Need for certain staff	[31,49,67,69, 81]	"Qualifications and competencies for population health management positions" [81]
Organizational facilities and approaches	Provide dedicated time	[54,64,71]	"Others stated that dedicated time and [...] were key activities to sustaining improvements" [64]
	Adopt a focused, step-by-step approach	[44,49,50,67, 79]	"The anchoring process was facilitated by implementing changes in small steps" [44]
	Overall supportive environment (policy, IT etcetera)	[31,38,40,44, 46,47,54,57, 63,64,67,76]	"Additionally, they mentioned their need for supportive data on their own behavior and the opportunity to compare their data with the data of colleagues" [46]
	Engaged leadership	[40,50,64, 69,71]	"Transformation did not happen by chance; it was initiated by a leader who recognized the importance of value-based care and was sustained through engaged leadership" [64]
Other meso- and macro-level obstacles	-	[33,40,43,50, 79]	"Perceived conflicts between industry sector interests and what might be best for the patient were also highlighted by some [as barrier]" [33]
Time era	-	[67]	"80 percent of respondents believed that the COVID-19 pandemic would have a progressive impact on OHVBC [oral health value-based care]" [67]

ADDITIONAL FILE 12. EXEMPLARY QUOTES OF INTERVIEWS

This file contains exemplar quotes for all codes using in the study presented in Chapter 7, organized into two tables.

Table 1. Exemplar quotes for motivation/strain affecting codes

Affected JD-R outcome Theme		Mechanisms	Codes	Exemplar quote
Motivation: the extent to which professionals are willing and eager to engage in their work	Perception of making a positive impact	Increasing motivation	Genuinely supporting individual patients	"[by discussing the patient's responses to PROMs], the conversation took a surprising turn, which brought the patient a sense of relief. It gave me great satisfaction to have facilitated that for the patient" (interviewee 7)
		Improving care for many patients collectively		"I feel that this approach enables me to have more organizational influence and ultimately make a greater impact, reaching more people than I would with seeing individual patients in the consultation room" (interviewee 23)
		Advancing VBHC		"I feel motivated and enthusiastic when you see progress being made, such as having a PROMs dashboard that we can now use in practice" (interviewee 6)
		Decreasing motivation	Constraints to making a positive impact	"Then you dig into it, and it turns out to be due to some kind of duplicate entry or just a slight difference in how we record things. So it's not like you're discovering anything where you'd say, 'Wow, this is a real eye-opener. Now we can truly improve the value of care.' I don't come across that very often, which makes me question whether we should continue investing so much time in this" (interviewee 24)
		Doubting positive contribution of VBHC-efforts		"But in practice, I notice that you have to remind the patient about 20 times to fill out the questionnaire again. [...] I don't get the sense that patients really feel the need for it, let me put it that way. [...] You're doing something without being sure it's really necessary, and that affects my motivation." (interviewee 15)
		Slow progress in achieving VBHC and optimizing value *		<u>Motivation-related quote:</u> "We are, of course, very focused on delivering quick results and solutions, but this process just moves much more slowly. That can challenge my motivation at times and makes you feel a bit uneasy because it takes so long." (interviewee 8) <u>Strain-related quote:</u> "You have to wait for other steps in the process, and you have no influence over that. That's actually the most frustrating part. It drains your energy and focus, constantly inquiring about the status, but there's nothing I can do about it" (interviewee 12)
		Increased richness and depth in consultations		"Talking about more than just their disease gives me more satisfaction" (interviewee 11)

Table 1. Continued.

Affected JD-R outcome Theme	Mechanisms	Codes	Exemplar quote
Personal development	Increased motivation	Increased task diversity	"I wouldn't enjoy being confined to the consultation room alone. [...] [Seeking value-based quality] improvements has significantly contributed to my joy at work." (interviewee 23)
		Alignment of tasks with expertise and preferred challenge level	"A little stress is okay; otherwise, it gets boring" (interviewee 9)
		No changes in one's task attributes	"My work has remained relatively stable, as it largely depends on my fundamental attitude toward my job—at least, that's how I view it. I always strive to maintain a patient-centered perspective, so VBHC has not changed that." (interviewee 7)
		Work remains equally enjoyable	"I already had a high level of job satisfaction, and with VBHC, I still feel the same. I'm not sure if there's anything that could increase it further. I'm happy." (interviewee 10)
		Reduced time for valued tasks	"I'm often busy managing questionnaires and other tasks, which leaves me with much less time for the patients themselves. [...] It really grabs me by the throat [...] in that sense I do less of what I like to do" (interviewee 13).
	Personal growth	Discontent with VBHC-related task attributes	"It constantly revolves around money, productivity, and FTEs, and there's not even a mention of quality, PROMs, or PREMs—zero focus on that. This makes me think, 'This isn't why I chose this profession.' If we could shift that focus, it would make my work two to three times more enjoyable: not having to deal with the constant tug-of-war between departments. Above all, we all want to implement VBHC and deliver the best care for our patients" (interviewee 4)
		Opportunities for personal development	"[Regarding receiving feedback on personal care delivery]. That energy it provides, everyone wants to be the top performer and avoid being the lowest scorer" (interviewee 14).
		Personal growth	"I have developed myself immensely. I joined as a very young medical specialist, and when they said, 'This really seems like something for you,' I naively replied, 'I'm going to do it' [...] Project management and leadership—skills I hardly possessed at the beginning. This [growth] feels rewarding." (interviewee 19)

Table 1. Continued.

Affected JD-R outcome Theme	Mechanisms Codes	Exemplar quote
Sense of community and support	Decreasing motivation	"What I find challenging is when you can't fully trace where the data comes from; why the outcomes aren't as expected. That holds me back from engaging with the issue to improve it" (interviewee 8)
	Increasing motivation	"What positive things has it brought me? A lot of wonderful people to collaborate with and the successes we've been able to celebrate together" (interviewee 23)
	Collaboration (external)	"I think it motivates different parties to ask, 'Oh, how is someone else doing it? Can we learn from that? Are we doing things well ourselves?' I enjoy that, because ultimately, it can lead to new insights or ideas" (interviewee 21)
	Organizational support	"Because you have a shared goal and means to row in the same direction, it gives you the strength of ten as an organization" (interviewee 10)
	Unengaged colleagues *	Motivation-related quote: "Sometimes I felt like I was in a bubble, with none of my colleagues understanding what VBHC is" (interviewee 8) Strain-related quote: "I believe that getting the team on board is important, even the most important aspect, and it also requires the most energy to convince people that this is the right way to work" (interviewee 5)
Decreasing motivation	Limitations in organizational support *	Motivation-related quote: "I am disappointed in the support, but others are truly frustrated. They are no longer willing to engage in the change" (interviewee 18) Strain-related quote: "And because there isn't a data analyst available, I spend my scarce free time analyzing data in Excel. That's not how things should be. A few times, all right, but not structural." (interviewee 16)

Table 1. Continued.

Affected JD-R outcome Theme	Mechanisms	Codes	Exemplar quote
Strain: the physical, mental, and emotional exhaustion that limits professionals' ability to engage in their work		Systemic limitations within national healthcare system *	<u>Motivation-related quote</u> "The electronic health records do not support what is needed for VBHC, and the developers are by no means facilitating this. This has made me start the process with a heavy heart." (interviewee 1)
			<u>Strain-related quote</u> "And what drains all my energy is the lack of strong national leadership regarding the digital support of healthcare. [...]. Every hospital, and sometimes every department, is developing its own IT systems independently. [...]. So much energy wasted. [...]. It feels like we are left in the cold; it doesn't feel like we are doing it together as a nation" (interviewee 12)
	Workload	Additional, uncompensated time investment	"When you start, you don't realize how much work it entails, how much energy it takes, and what obstacles you'll encounter along the way" (interviewee 11)
		Neutral	"I haven't noticed much relief in my workload from that yet" (interviewee 9)
	Decreasing strain	Efficient, streamlined processes	"One can very specifically discuss what the patient wants to talk about instead of the standard routine" (interviewee 8)

Table 1. Continued.

Affected JD-R outcome Theme	Mechanisms	Codes	Exemplar quote
Cognitive demands	Increasing strain	Data overwhelm and scatteredness	"You can get a bit overwhelmed [...] you have so many information sources to consider, and yes, it can be quite labour-intensive to gather all that information" (interviewee 14)
	Decreasing strain	Improved oversight (processual)	"PROMs have really provided me with a sort of guideline for conducting my consultations, ensuring I cover all relevant from the patient's perspective" (interviewee 8)
Confidence		Ease from increased information availability	"I can now show the patient that X percent achieve these outcomes after the procedure, and this is what patients experience if they choose not to undergo it. This information makes it much easier for me to help patients with decision-making" (interviewee 4)
	Increasing strain	Deviating from established standards	"[younger colleagues are] raised with the philosophy to maximize standardization and to go to great lengths to minimize every small risk, then that [customization] can be really daunting" (interviewee 22)
		Perceived limitations in competence	"I'm not quite sure how to use PROMs or how others are utilizing them, which sometimes makes me feel uncertain, and those thoughts weigh on me" (interviewee 2)
	Neutral	Feedback on performance	"I haven't really experienced stress from it. [Our hospital] has created a safe environment for us to do this. It shouldn't be simply used as a tool for accountability" (interviewee 12)
	Decreasing strain	Confidence from increased information availability	"I can now see whether patients have collected their medication. This gives me confidence and ammunition for [patient] discussions" (interviewee 7)
			<u>Motivation-related quote:</u> "We secretly find it really exciting to be considered a best practice, which is quite flattering. Hearing that we're doing so well motivates us to maintain that status. We don't want to be known as 'oh yes, they were once very good, but now others have taken their place.' No, this reassures us that we are doing the right thing and fuels our motivation to keep it up" (interviewee 9)
			<u>Strain-related quote:</u> "I feel much more relaxed now that I know my work is appreciated. That is reflected in the data when you're doing the right things." (interviewee 16)

* These elements were associated with both decreased motivation and increased strain.

** These elements were associated with both increased motivation and decreased strain.

Table 2. Exemplar quotes for other codes

Theme	Code	Exemplar quote
Regulation	Personal regulation: individuals' self-management strategies to support their motivation and well-being	"I try to keep my expectations and emotions in check regarding how things will go; otherwise, I end up disappointed every time." (Interviewee 21)
	Organizational regulation: policies and practices implemented at the organizational level to support employee motivation and well-being	"At a certain point, I got access to a data analyst, and that made my work in VBHC so much easier and more enjoyable" (interviewee 23)
	Team regulation: policies and practices implemented at the team level to support employee motivation and well-being	"We divide the tasks to ensure everyone is involved and the workload is evenly distributed." (interviewee 20)
Performance	Value-based consultations	"Sometimes I don't discuss the PROMs, and I end up regretting it afterward." (interviewee 4)
	Value-based quality improvement	"Yeah, then I think, next time I'll just participate very low-profile." (interviewee 8)
	VBHC implementation	"I've already indicated that if we are going to implement PROMs for the next condition, someone else will have to take the lead on that." (interviewee 15)
	Balance gains/pains	"I perceive the balance as positive and feel confident in maintaining it [VBHC-efforts]." (interviewee 14)
Interaction with	Personal resources/ characteristics	"I am a do-er doctor, just like many others. We want to solve problems and see the results of our actions, which can conflict with the progression of VBHC" (interviewee 26)
	Organizational resources/ characteristics	"Our PROMs dashboard is not yet integrated into the electronic health record (EHR), so we have to open a separate dashboard, which makes everything much more cumbersome." (interviewee 24)
	Ordinary job	"This all adds to our already very demanding jobs." (interviewee 1)
Other	Other activity	"I am now also involved with home monitoring." (interviewee 5)
	Other outcome	"I am curious whether VBHC encourages more people to pursue careers in healthcare." (interviewee 19)
	Other (generic)	"There are still so many questions surrounding VBHC. Is what we are doing now truly VBHC? If not, then what is? What does the future look like? What does this mean for our work?" (interviewee 17)

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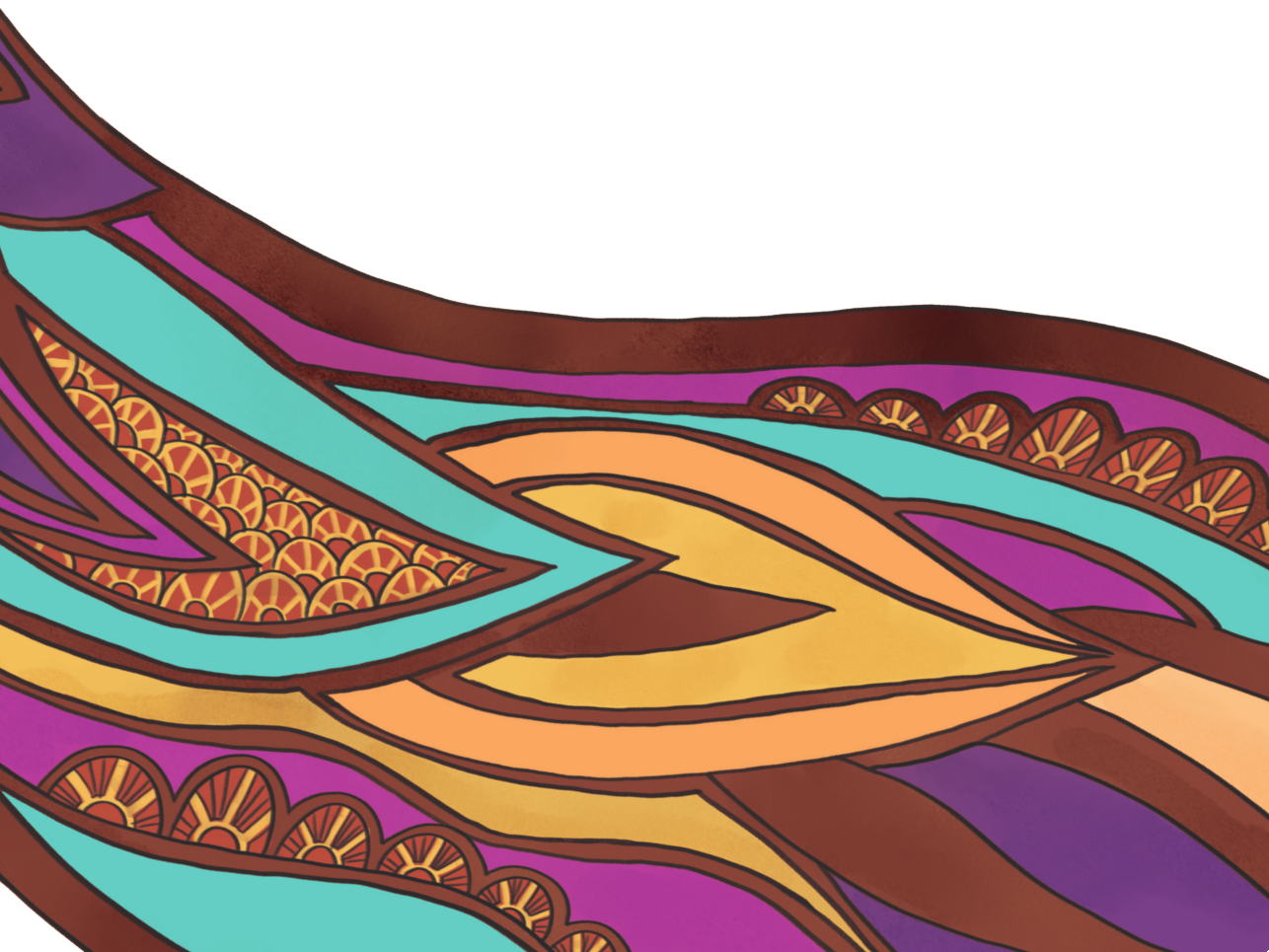
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SUMMARY SAMENVATTING



SUMMARY

Introduction

To avert a crisis in the United States healthcare, Porter and Teisberg introduced a novel approach in 2006, known as Value-Based Healthcare (VBHC). This approach focuses on fundamentally improving the healthcare system by adjusting the way care is delivered, organized, measured, and reimbursed. In essence, VBHC aims to prioritize and optimize value for the patient.

While there are multiple definitions of the concept of 'value', they generally converge on the idea that it refers to outcomes that matter to patients relative to the resources invested, measured across the entire cycle of patient care. VBHC distinguishes itself in several ways from current practice. For instance, healthcare organizations often focus exclusively on improving either care outcomes or controlling healthcare resources, with minimal attention to the relationship between the two and how they manifest throughout the entire care cycle. Additionally, there is often a focus on the volume of healthcare services delivered, as this is reimbursed, rather than on incentives based on value. VBHC also prioritizes care outcomes that are truly important to patients. In other words, VBHC aims to understand and address the comprehensive care needs of the patient with a specific condition in an effective and efficient manner, ensuring that every resource is optimally utilized for the benefit of the patient.

The concept of VBHC has been carried on the wind from the United States to various other countries, including the Netherlands. Here, it is also expected to help address urgent challenges in healthcare, aiming to ensure that services remain accessible, high-quality, and affordable for everyone. Examples include increasing demand for care amid limited resources and variations in care quality, where the patient is not always central. It is also anticipated that VBHC will reconnect healthcare professionals with their original motivations for working in healthcare, a particularly relevant goal given current concerns about their well-being and motivation.

To support healthcare organizations and systems in implementing VBHC, Porter and Lee (2013) outlined six distinct yet interconnected elements for adoption in the so-called 'value agenda'. In 2021, Van der Nat expanded this agenda with four elements. One element of the value agenda is measuring outcomes that matter to patients, typically using structured questionnaires known as Patient-Reported Outcome Measures (PROMs). These questionnaires allow patients to report relevant outcomes, such as symptoms, functioning, and quality of life. This outcome information serves several purposes, including guiding outpatient consultations and optimizing care processes when data from multiple patients are aggregated. Both applications are part of the extended value agenda.

Hospitals and healthcare professionals play a crucial role in implementing VBHC. However, three knowledge gaps hinder this process. First, hospitals lack guidance on how they can shape and facilitate the implementation of VBHC. Second, there is a lack of clarity and consensus on what VBHC entails in daily practice. Third, there has been limited attention to healthcare professionals within VBHC, resulting in a lack of understanding of how VBHC impacts them, for example concerning job strain and motivation

This dissertation seeks to bridge these gaps through three aims, explored across six empirical studies.

Aim 1: Unravelling the implementation of VBHC in a leading Dutch university hospital

Chapters 2, 3, and 4 focus on the implementation of VBHC at Erasmus Medical Center (Erasmus MC), which began adopting this approach in 2012 and is considered a front-runner. This research applied theories on implementation, change, and complexity. Data sources included internal documents from Erasmus MC's central VBHC program team (n = 10,536), indicators from their implementation monitoring system (n = 4), a survey of healthcare professionals (n = 47), interviews with individuals contributing to VBHC at the hospital level (n = 20), and PROM data from patients combined with electronic health record data (n = 46,468 outpatient visits).

A decade of VBHC implementation

In **chapter 2**, we examine VBHC implementation at Erasmus MC over a decade (2012–2023). We identified three successive change strategies, which we termed based on their characteristics as 'depth-first,' 'breadth-first,' and 'hybrid' strategy. 'Depth' refers to the extent of transformative change, while 'breadth' denotes its scope within the organization.

In the initial implementation phase (2012–2019), various multidisciplinary, disease-specific teams of healthcare professionals pursued deep change by locally implementing several elements of the value agenda. They were supported by a central VBHC support team. Despite their efforts, these local initiatives remained limited to 'pilots'. They encountered various obstacles and lacked professionalization, which hindered their ability to achieve the intended depth and realize their full potential. This resulted in frustration among professionals and was perceived to negatively impact the change movement. Moreover, this strategy required significant investments for a relatively small audience, and the customized solutions developed were often not scalable, leading to a multitude of different PROMs and IT applications. In short, these efforts yielded valuable insights into VBHC and its implementation, and initial successes strengthened confidence in VBHC's potential. However, the strategy, in its existing form and level of support, was deemed inadequate to advance VBHC to the desired next level of sustainable, organization-wide change.

Around 2020, following the above conclusions and a shift in leadership, the hospital adopted a ‘breadth-first’ strategy. VBHC became a hospital-wide program with more supportive resources, aiming for gradual, sustainable change in the entire hospital over five years. As an initial step, alongside knowledge dissemination, generic PROMs were to be implemented in each department, allowing healthcare professionals to enhance their consultations immediately. Once all interested departments were supported, the hospital would progressively deepen the initiative by incorporating domain- and disease-specific PROMs. Subsequent steps would include utilizing PROM data to improve care pathways, integrating cost data as management indicators, organizing around care paths and adapting reimbursement practices.

Although this strategy laid a stronger foundation for VBHC with structural and technical improvements, the initial changes—such as the introduction of generic PROMs—were too general to engage healthcare professionals. Furthermore, concerns arose about maintaining change momentum over several years. In other words, the centrally driven implementation decisions did not sufficiently align with the diverse motivations and needs of healthcare professionals.

For these reasons, the approach shifted to a ‘hybrid strategy’ around 2021, which combined local and hospital-wide changes. The hospital supported teams to further advance VBHC, such as by immediately incorporating domain- and disease-specific PROMs and helping teams progress toward value-based quality improvements. They also responded to bottom-up requests, such as integrating PROMs data into triage. Meanwhile, the hospital maintained a focus on gradual, organization-wide changes and ensuring VBHC’s sustainable integration. They gradually formalized VBHC through its integration into mandatory departmental reporting cycles. This approach continues into 2024.

Chapter 2 concludes that Erasmus MC has made progress over the past decade in measuring patient outcomes and, to a limited extent, using them in consultations. However, there has been little focus on other value-determining elements, such as invested resources and the entire care cycle, which extends beyond hospital care alone. The implementation process was non-linear and progressed more slowly than anticipated.

Healthcare professionals, teams, healthcare organizations, healthcare networks, and the healthcare system must change to realize VBHC. Our study indicates that one-sided approaches to implementing VBHC in hospitals seem not viable. Both strategies—tailored, in-depth local pilots and a generic, hospital-wide rollout of VBHC—did not yield the desired results. We recommend adopting a combination of both local and larger scale actions. Local, deep, well-supported, and harmonized changes integrated into processes and systems can culminate in a large-scale, sustainable transformation to VBHC. Integrating insights

from multiple perspectives, including complexity theory, (re)institutionalization, and (re)professionalization, seems beneficial.

Enhancing use of PROMs in outpatient practice

Chapter 2 shows that Erasmus MC has invested substantially in measuring PROMs. However, both the completion rates among patients and the engagement of healthcare professionals with PROMs data in outpatient care require improvement, prompting additional efforts to enhance their use.

Consequently, **chapters 3 and 4** explore the use of PROMs by outpatients and healthcare professionals at Erasmus MC, detailing the hospital's strategies to improve their use and examining future opportunities for optimization.

In 2023, outpatients completed PROMs in over half (56%) of the 46,468 consultations for which a PROM was distributed. Healthcare professionals opened, on average, only 3 out of 20 completed PROMs on the day of consultation, which serves as a proxy for the discussion of PROMs in practice. In response, the hospital introduced various strategies to support the capability, opportunity, and motivation of both patients and healthcare professionals.

To inform future strategies, **chapter 3** analyses patient response patterns to PROMs using a multivariate logistic regression model. Findings show that patients with medium or high socioeconomic status and those physically present for consultations (versus phone or video consultations) had significantly higher completion rates. Conversely, women, patients attending follow-up consultations, and those with appointments on Fridays were slightly but significantly less likely to complete PROMs. Qualitative insights suggest that improvement is possible through effective feedback mechanisms, such as patient dashboards or feedback through healthcare professionals, and by accommodating non-Dutch-speaking patients.

Chapter 4 examines the use of PROMs among healthcare professionals. In 2023, 194 healthcare professionals had access to PROM data for their outpatients, of whom 47 agreed to participate in our study. Based on their self-reported use of PROMs, we identified four groups: professionals who made no attempt to use PROMs (an adoption issue; 11%), those who used PROMs inconsistently (an implementation issue; 58%), and those who had discontinued use (a maintenance issue; 15%). Only 17% of healthcare professionals always reviewed completed PROMs.

Over half of the professionals cited lack of time and slow loading of the PROM dashboard as substantial barriers. Additionally, more than a quarter of professionals—especially those who had stopped using PROMs—felt that PROMs did not align with how they preferred to work. Qualitative data indicated a limited perceived urgency to use PROMs, experiences of

insufficient training in PROM-related skills, and the influence of institutional barriers, such as non-billability of PROMs discussions conducted by nurses.

The findings suggest that it is worthwhile to better understand and address the factors influencing PROM use among both patients and professionals. This could involve designing targeted strategies for specific segments of patients and professionals based on shared characteristics (e.g., gender), consultation types (in-person, via phone or video), and factors related to motivation, perceived opportunity, and capability.

Aim 2: Reaching consensus on what constitutes a value-based outpatient consultation

Chapter 5 describes a Delphi study involving a panel of 19 healthcare professionals from Erasmus MC, recognized as pioneers and influencers of VBHC within the hospital. The study aimed to identify which activities the panel deemed essential for an ideal, value-based outpatient consultation, which activities could be considered irrelevant, and for which no consensus could be reached. Insights from this research can help facilitate, educate, and evaluate value-based outpatient care.

After three Delphi rounds, the panel reached consensus on the importance of 63 activities. These included discussing the bio-psychosocial health outcomes of patients and optimizing care for the individual patient. They also identified several strategies for managing limited resources in healthcare as essential, such as preventing redundant tests. The panel deemed two activities irrelevant to a value-based outpatient consultation: considering societal costs, like productivity loss, and evaluating the climate footprint of healthcare.

The panel was unable to reach consensus on 11 activities, including the use of a patient's responses to a survey about their experiences with the care received, the consideration of the financial costs of diagnostics and treatment, and their cost-effectiveness. In their comments, panel members emphasized the importance of contextual decision-making and described varying perspectives on the feasibility and desirability of resource-conscious behaviours. For instance, some panel members prioritized fulfilling patient wishes over efficient resource use, while others noted a lack of insight into the actual costs of interventions.

The results indicate that an ideal VBHC consultation is rooted in person-centred care and adapts to the specific characteristics of both the consultation and the patient. Furthermore, according to the panel, a value-based consultation involves optimizing care for the individual patient and implementing specific measures to judiciously manage limited healthcare resources. These primarily include actions that align with patient needs or have a neutral impact on them.

Aim 3: Examining the perceived impact of VBHC on healthcare professionals

Chapters 6 and 7 examine the experiences of healthcare professionals with VBHC in various (inter)national hospitals. These chapters utilize the Job Demands-Resources model, which examines both motivation and workload, along with the factors that precede them and their outcomes.

Chapter 6 presents a systematic literature review of 45 included studies focused on summarizing existing knowledge about the relationship between VBHC and healthcare professionals. The review concludes that relatively few studies have prioritized this perspective as a primary research objective. To expand our understanding, **chapter 7** reports on semi-structured interviews with 26 healthcare professionals from six Dutch hospitals. These interviews clarify the perceived impact of three specific VBHC activities on healthcare professionals: value-based outpatient consultations (with a focus on using PROMs), value-based quality improvement, and implementation activities associated with both. Additionally, the study examines how healthcare professionals and their employers strive to enhance positive work experiences with VBHC.

Both chapters reveal that healthcare professionals perceive that VBHC influences their motivation and strain both positively and negatively— in other words: they experience gains and pains. A key gain noted was that VBHC provided professionals with a sense of meaningful contribution to patient care, thereby enhancing their motivation. They also observed that VBHC led to greater depth and variety in their tasks, making their work more enjoyable. Furthermore, they appreciated the increased opportunities for personal development that VBHC offered.

However, a recurring pain was the heightened workload associated with VBHC. Several professionals reported limitations in supportive facilities, such as insufficient consultation times and a lack of designated time for VBHC improvement initiatives and implementation. They also pointed out more abstract tensions arising from institutional complexity, including delayed payment reforms and the stress of deviating from protocols to prioritize patient values. Some indicated that certain aspects of VBHC work conflicted with their personal values. For instance, the rise of digital and data-driven work within VBHC resulted in less time for direct patient contact. While committed pioneers in VBHC expressed frustration with the slow pace of change (as noted in chapter 7), those less prepared felt rushed by the movement (chapter 6).

We identified various ways in which healthcare professionals and their employers are attempting to make VBHC a positive experience. Professionals focused on strategies to maximize perceived gains, developed workarounds for pains, and employed emotional and cognitive coping mechanisms, such as lowering their expectations. At the organizational level, there was appreciation for efforts to improve facilities and resources, including effective

and integrated IT systems, support from data analysts for improvement initiatives, training, additional time for VBHC activities, and fostering a safe environment for feedback on their care delivery.

Although healthcare professionals generally reported a positive balance, some viewed their participation in VBHC as suboptimal or consciously chose a more passive role. This led some to reduce or even eliminate the use of PROMs during consultations, as well as to decrease their efforts in implementing VBHC and value-based quality improvement initiatives. These decisions were primarily driven by time constraints, dissatisfaction with the increasing digitalization of their work, and the perception of slow progress, combined with the belief that they could exert greater and more direct influence through other activities to improve healthcare.

In conclusion, we can assert that healthcare professionals have experienced VBHC initiatives as a double-edged sword. The outcomes appear to depend on the alignment between their personal characteristics, specific VBHC activities, the local work environment, and the implementation process of VBHC. While healthcare professionals generally assessed the balance between gains and pains positively, the experienced pains have led some to participate sub optimally in VBHC. Therefore, there is both an opportunity and a necessity to prioritize the motivation and well-being of healthcare professionals by improving the alignment between the individual, their tasks, the work environment, and the change process.

Discussion

Chapter 8 concludes this dissertation with a summary of the key findings and reflections on the concept of VBHC and its implementation. Important contributions include framing VBHC as a goal-means hierarchy, applying insights from complexity theory to navigate the value movement, and emphasizing the experiences of healthcare professionals and the importance of (re)professionalization. As depicted on the cover of this dissertation, VBHC calls on professionals to engage with complexity, requiring them to open new doors and transcend a world often characterized by linear thinking and siloed, protocol-driven, and treatment-focused approaches.

To advance VBHC in daily practice, optimizing the dynamic between its implementation and healthcare professionals is essential. This optimization enables professionals to both drive and thrive within the value paradigm. In the end, healthcare professionals are the ones who set their sails to navigate the winds of VBHC, thereby realizing patient value.

SAMENVATTING

Inleiding

Om een crisis in de Amerikaanse gezondheidszorg af te wenden, introduceerden Porter en Teisberg in 2006 een vernieuwende benadering, namelijk waardegedreven zorg (WGZ). Deze is gericht op fundamentele verbetering van het gezondheidszorgsysteem, met aanpassingen in de manier waarop zorg wordt geleverd, georganiseerd, gemeten en bekostigd. Kort gezegd streeft WGZ naar het centraal stellen en optimaliseren van waarde voor de patiënt.

Hoewel de definitie van 'waarde' varieert, komt het er in de kern op neer dat het verwijst naar uitkomsten die er voor patiënt 'toe doen' in verhouding tot de ingezette middelen, gemeten over de gehele cyclus van patiëntenzorg. WGZ onderscheidt zich op diverse manieren van de huidige praktijk. Zo richten zorgorganisaties zich vaak uitsluitend op het verbeteren van óf zorguitkomsten óf het beheersen van middelen, met minimale aandacht voor de relatie tussen beide en hoe deze zich door de gehele zorgcyclus manifesteren. Daarnaast wordt veelal gewerkt aan de hand van een volume prikkel, die wordt bekostigd, in plaats van een prikkel op waarde. Ook helpt WGZ om zorguitkomsten te prioriteren die de patiënt echt belangrijk vindt. Ofwel: WGZ richt zich op het begrijpen van en tegemoetkomen aan de totale zorgbehoeften van de patiënt met een bepaalde aanpak op een effectieve en efficiënte wijze. Hierdoor wordt elk middel optimaal ingezet ten behoeve van de patiënt.

Het WGZ-gedachtegoed is vanuit de VS naar diverse andere landen overgewaaid, waaronder Nederland. De verwachting is dat WGZ ook hier een oplossing kan bieden voor verschillende dringende uitdagingen in de gezondheidszorg, met als doel om de zorg voor eenieder toegankelijk, kwalitatief goed en betaalbaar te houden. Voorbeelden hiervan zijn de toenemende zorgvraag in combinatie met beperkte middelen en variërende prestaties van de zorgverlening, waarbij de patiënt nog niet altijd centraal staat. Een andere verwachting is dat WGZ zorgprofessionals helpt weer in contact komen met hun oorspronkelijke drijfveren voor het werken in de gezondheidszorg. Dit is met name relevant vanwege de huidige zorgen over het welzijn en de motivatie van zorgprofessionals.

Om zorgorganisaties en -systemen te ondersteunen bij de implementatie van WGZ, beschrijven Porter en Lee (2013) zes aparte, elkaar versterkende onderdelen in de zogenaamde 'waarde agenda'. In 2021 breidde Van der Nat deze agenda uit met vier onderdelen. Eén van de onderdelen van de waarde agenda is het meten van uitkomsten die er 'voor de patiënt toe doen'. Hiervoor worden doorgaans gestructureerde vragenlijsten gebruikt, bekend als patiënt-gerapporteerde uitkomst maten (vanuit het Engels afgekort tot PROMs). Patiënten rapporteren hiermee zelf relevante uitkomsten, zoals symptomen, hun functioneren en ervaren kwaliteit van leven. Deze uitkomstinformatie dient verschillende doelen, zoals input voor een poliklinische afspraak en voor het optimaliseren van zorgprocessen wanneer de gegevens

van meerdere patiënten worden samengevoegd. Beide toepassingen zijn ook onderdeel van de uitgebreide waarde agenda.

Ziekenhuizen en zorgprofessionals spelen een cruciale rol in het implementeren van WGZ. Er zijn echter drie kennislacunes, die deze implementatie belemmeren. Ten eerste ontbreekt het ziekenhuizen aan handvatten voor het vormgeven en faciliteren van de algehele implementatie van WGZ. Ten tweede is er een gebrek aan duidelijkheid en consensus over wat WGZ in de dagelijkse praktijk inhoudt. Ten derde is er tot nu toe beperkt aandacht besteed aan de zorgprofessionals, waardoor onduidelijk blijft welke implicaties WGZ voor hen heeft, bijvoorbeeld voor wat betreft hun werkbelasting en motivatie.

Dit proefschrift draagt bij aan het overbruggen van deze lacunes door het stellen van de volgende drie doelen, die worden onderzocht aan de hand van zes empirische studies.

Doel 1: Het ontrafelen van de implementatie van WGZ in een academisch ziekenhuis in Nederland

De **hoofdstukken 2, 3 en 4** zijn gericht op de implementatie van WGZ in het Erasmus Medisch Centrum (Erasmus MC), dat in 2012 als een van de eerste ziekenhuizen in Nederland met deze aanpak begon en als koploper kan worden beschouwd. Voor dit onderzoek zijn theorieën over implementatie, verandering en complexiteit toegepast. De databronnen omvatten interne documenten van het centrale WGZ-programmateam van het ziekenhuis ($n = 10,536$), indicatoren van hun implementatiecontrolesysteem ($n=4$), een enquête onder zorgprofessionals ($n = 47$), interviews met betrokkenen bij WGZ op ziekenhuisniveau ($n = 20$) en gegevens over het invullen van PROMs door patiënten, gecombineerd met data uit het elektronisch patiëntendossier ($n= 46,468$ poliklinische consulten).

Een decennium van WGZ-implementatie

In **hoofdstuk 2** onderzoeken we de implementatie van WGZ in het Erasmus MC over een periode van tien jaar (2012-2023). We identificeerden drie opeenvolgende veranderstrategieën, die we op basis van hun kenmerken typeren als 'diepte-eerst', 'breedte-eerst' en 'hybride'. 'Diepte' verwijst naar de mate van transformatieve verandering, terwijl 'breedte' op de reikwijdte van de verandering binnen de organisatie duidt.

In de eerste implementatieperiode (2012-2019) streefden diverse multidisciplinaire, ziekte-specifieke teams van zorgprofessionals naar diepgaande verandering door meerdere onderdelen van de waarde agenda te implementeren. Zij werden ondersteund door een centraal WGZ-ondersteuningsteam. Ondanks hun inspanningen bleven deze lokale initiatieven beperkt tot 'pilots'. Ze ondervonden diverse hindernissen en professionalisering bleef uit. Hierdoor werd het behalen van de beoogde diepgang belemmerd en kon het volledige potentieel van deze initiatieven niet worden gerealiseerd. Dit leidde tot frustraties bij zorgprofessionals

en had mogelijk een negatieve invloed op de veranderbeweging. Bovendien vereiste deze strategie aanzienlijke investeringen voor een relatief kleine doelgroep. De ontwikkelde maatwerkoplossingen waren vaak niet schaalbaar en resulteerden in een wildgroei van PROMs en IT-toepassingen. Kortom, de inspanningen leverden waardevolle inzichten op in WGZ en de implementatie ervan. Ook versterkten de eerste behaalde successen het geloof in de potentie van WGZ. Echter, de strategie in die huidige vorm en de mate van ondersteuning werden als onvoldoende geschikt beschouwd om WGZ naar het volgende niveau te tillen, richting een duurzame, organisatiebrede verandering.

Rond 2020 koos het ziekenhuis, ingegeven door bovenstaande conclusie en na een wisseling van bestuurlijk leiderschap, voor een 'breedte-eerst' strategie. WGZ werd een ziekenhuisbreed programma met meer ondersteunende middelen, gericht op stapsgewijze, duurzame veranderingen in het hele ziekenhuis gedurende vijf jaar. Als eerste stap zouden, naast kennisverspreiding, generieke PROMs op elke afdeling worden geïmplementeerd, wat zorgprofessionals direct in staat zou stellen hun consultvoering te verbeteren. Zodra alle geïnteresseerde afdelingen waren gefaciliteerd, zou er stapsgewijs diepgang worden gezocht met domein- en ziekte-specifieke PROMs. Latere stappen omvatten het gebruik van PROMs-gegevens voor het verbeteren van zorgpaden, het integreren van kostendata als stuurindicatoren, het organiseren rond zorgpaden en het anders bekostigen van zorg.

Hoewel deze strategie voor een steviger fundament voor WGZ zorgde, met verbeteringen in structuur en techniek, bleken de eerste veranderingen – zoals de generieke PROMs – te algemeen om door zorgprofessionals te worden omarmd. Daarnaast bestond er twijfel over het vasthouden van veranderingsenergie gedurende meerdere jaren. Met andere woorden, de centraal gestuurde implementatiekeuzes sloten onvoldoende aan bij de uiteenlopende motivaties en behoeften van zorgprofessionals.

Om die redenen verschoof de aanpak rond 2021 naar een 'hybride strategie', die lokale veranderingen combineert met ziekenhuisbrede acties. Het ziekenhuis ondersteunde teams bij het verder ontwikkelen van WGZ, bijvoorbeeld door domein- en ziektespecifieke PROMs direct te implementeren en teams te begeleiden naar de volgende stap: waarde gedreven kwaliteitsverbeteringen. Ook werd er voldaan aan verzoeken vanuit de praktijk, zoals het integreren van PROM-gegevens in de triage van patiënten. Ondertussen bleef het ziekenhuis gericht op geleidelijke, organisatiebrede veranderingen en de duurzame inbedding van WGZ. Daarnaast werd WGZ geformaliseerd door het te integreren in de verplichte rapportagecycli van afdelingen. Deze aanpak werd in 2024 voortgezet.

Hoofdstuk 2 concludeert dat het Erasmus MC in de afgelopen tien jaar voortgang heeft geboekt in het meten van patiëntuitkomsten en, in gelimiteerde mate, het toepassen daarvan in de spreekkamer. Er is echter beperkt aandacht geweest voor andere elementen die waarde

bepalen, zoals de benodigde middelen en de volledige zorgcyclus, die immers vaak verder reikt dan alleen ziekenhuiszorg. Het implementatieproces verliep niet-lineair en de voortgang was trager dan verwacht.

Zorgprofessionals, teams, zorgorganisatie, zorgnetwerken en het zorgsysteem zullen moeten veranderen om WGZ door te voeren. Uit onze studie bleken eenzijdige aanpakken om WGZ in het ziekenhuis te implementeren niet levensvatbaar. De twee benaderingen –via maatwerk, diepgaande lokale pilots en via een generieke, ziekenhuisbrede uitrol van WGZ– lieten niet de gewenste resultaten zien. Een combinatie van een lokale en bredere benadering is aan te bevelen. Lokale, diepgaande, goed gefaciliteerde en geharmoniseerde veranderingen, geïntegreerd in processen en systemen, kunnen leiden tot grootschalige en duurzame transformatie naar WGZ. Het combineren van inzichten vanuit verschillende perspectieven, zoals de complexiteitstheorie, (her)institutionalisering en (her)professionalisering, kan behulpzaam zijn.

Het vergroten van het gebruik van PROMs in de poliklinische praktijk

Uit hoofdstuk 2 blijkt dat het Erasmus MC sterk heeft geïnvesteerd in het meten van PROMs. Echter, het invullen hiervan door patiënten en het bespreken van de uitkomsten door zorgprofessionals liet te wensen over, wat leidde tot onvoorziene extra inspanningen om dit te verbeteren.

In **hoofdstukken 3 en 4** bestuderen we daarom het gebruik van PROMs door poliklinische patiënten en zorgprofessionals van het Erasmus MC. We beschrijven de strategieën die het ziekenhuis heeft geïntroduceerd om het gebruik van PROMs te verbeteren en verkennen toekomstige mogelijkheden voor optimalisatie.

In 2023 vulden poliklinische patiënten bij meer dan de helft (56%) van de 46,468 consulten waarvoor een PROM was uitgestuurd, deze ook in. Zorgprofessionals openden gemiddeld slechts 3 van de 20 ingevulde PROMs op de dag van het consult, wat als proxy voor bespreking dient. Hierop introduceerde het ziekenhuis verschillende strategieën om de bekwaamheid, mogelijkheden en motivatie van zowel patiënten als zorgprofessionals te verbeteren.

Om input te genereren voor toekomstige strategieën hebben we in **hoofdstuk 3** de respons van patiënten op PROMs onderzocht met een multivariaat logistisch regressiemodel. De resultaten toonden aan dat patiënten met een hogere of middelhoge sociaaleconomische status en patiënten die fysiek aanwezig waren bij het consult (in tegenstelling tot telefonisch contact of beeldbellen), significant hogere responsepercentages vertoonden. Daarentegen was er bij vrouwen, patiënten met een follow-up consult, en patiënten met consulten op een vrijdag een kleine, maar significant lagere kans dat PROMs waren ingevuld. Kwalitatieve bevindingen benadrukten dat algemene verbetering mogelijk is door het opzetten van

effectieve feedbackmechanismen, bijvoorbeeld via zorgprofessionals of een patiënten-dashboard, en het tegemoetkomen aan niet-Nederlands sprekende patiënten.

Hoofdstuk 4 onderzoekt het gebruik van PROMs onder zorgprofessionals. In 2023 hadden 194 zorgprofessionals toegang tot PROMs-gegevens van hun poliklinische patiënten, van wie 47 bereid waren deel te nemen aan ons onderzoek. Op basis van hun zelf gerapporteerde gebruik van PROMs konden we vier groepen onderscheiden: zorgprofessionals die geen poging hadden ondernomen om PROMs te gebruiken (een adoptiekwestie; 11%), zorgprofessionals die PROMs inconsistent gebruikten (een implementatiekwestie; 58%) en zorgprofessionals die het gebruik hadden gestaakt (een onderhoudskwestie; 15%). Slechts 17% van de zorgprofessionals bekeek ingevulde PROMs altijd.

Meer dan de helft van de zorgprofessionals noemde tijdgebrek en lange laadtijd van het dashboard met de PROM-uitslagen van patiënten als belemmeringen. Daarnaast vond meer dan een kwart van de zorgprofessionals, vooral degenen die gestopt waren, dat PROMs niet aansloten bij hun gewenste werkwijze. Kwalitatieve gegevens toonden aan dat er beperkte urgentie werd ervaren om PROMs te gebruiken, dat tekortkomingen in vaardigheidstraining werden ervaren, en dat institutionele belemmeringen een rol speelden, zoals het ontbreken van declaratiemogelijkheden voor verpleegkundigen om PROMs-uitkomsten met patiënten te bespreken.

De bevindingen duiden erop dat het de moeite waard is om de factoren, die het gebruik van PROMs door patiënten en zorgprofessionals beïnvloeden, beter te doorgronden en te benutten voor maatwerkinterventies. Dit kan inhouden dat het raadzaam is strategieën te ontwikkelen gericht op specifieke segmenten van patiënten en zorgprofessionals met gemeenschappelijke kenmerken (zoals geslacht), consultkenmerken (zoals fysiek, via beeldbellen of telefonisch), en factoren die gerelateerd zijn aan motivatie, waargenomen mogelijkheden en bekwaamheid.

Doel 2: Het bereiken van consensus over de inhoud van een waardegedreven poliklinisch consult

Hoofdstuk 5 beschrijft een Delphi-studie met een panel van 19 zorgprofessionals uit het Erasmus MC, die als pioniers en vormgevers van WGZ binnen het ziekenhuis worden beschouwd. Onderzocht is welke activiteiten volgens hen tot een ideaal, waardegedreven poliklinisch consult behoren, welke activiteiten niet relevant zijn, en over welke activiteiten geen consensus kan worden bereikt. Inzichten hieruit kunnen bijdragen aan het faciliteren, onderwijzen en evalueren van waardegedreven poliklinische zorg.

Na drie ronden bereikten de panelleden consensus over het belang van 63 activiteiten. Deze omvatten onder andere het bespreken van de bio-psychosociale gezondheidssuitkomsten van de patiënt en het optimaliseren van de zorg voor de individuele patiënt. Ook beschouwden zij ver-

schillende strategieën om met beperkte middelen in de zorg om te gaan als essentieel, zoals het voorkomen van dubbel onderzoek. Het panel beschouwde twee activiteiten als irrelevant voor een waardegedreven poliklinisch consult: het rekening houden met maatschappelijke kosten, zoals productiviteitsverlies, en het overwegen van de ecologische voetafdruk van de zorg.

De panelleden slaagden er niet in consensus te bereiken over 11 activiteiten, waaronder het gebruik van vragenlijstantwoorden van individuele patiënten over hun ervaringen met de ontvangen zorg, het in overweging nemen van de financiële kosten van diagnostiek en behandeling, en de kosteneffectiviteit daarvan. In hun commentaren benadrukten de panelleden het belang van contextuele besluitvorming en beschreven zij verschillende perspectieven op de mogelijkheid en wenselijkheid van middelenbewust gedrag. Bijvoorbeeld, enkele panelleden gaven aan dat zij het vervullen van de wensen van een patiënt een hogere prioriteit gaven dan het efficiënt omgaan met middelen, terwijl anderen aangaven onvoldoende inzicht te hebben in de daadwerkelijke kosten van interventies.

De resultaten tonen aan dat een ideaal WGZ-consult geworteld is in persoonsgerichte zorg en adaptief inspeelt op de specifieke kenmerken van zowel het consult als de patiënt. Bovendien omvat een waardegedreven consult, volgens de panelleden, het optimaliseren van zorg voor de individuele patiënt en het nemen van enkele specifieke maatregelen om verstandig met beperkte zorgmiddelen om te gaan. Dit betreft met name acties die aansluiten bij de behoeften van de patiënt of die een neutrale impact op hen hebben.

Doel 3: Het achterhalen van de waargenomen invloed van WGZ op zorgprofessionals

In de **hoofdstukken 6 en 7** worden de ervaringen van zorgprofessionals met WGZ in verschillende (inter)nationale ziekenhuizen onderzocht. Deze hoofdstukken maken gebruik van het Job Demands-Resources model, dat zowel motivatie als werkbelasting verkent, inclusief de factoren die hieraan voorafgaan en de uitkomsten daarvan.

Hoofdstuk 6 presenteert een systematisch literatuuronderzoek van 45 geïncludeerde studies, gericht op het samenvatten van bestaande kennis over de relatie tussen WGZ en zorgprofessionals. Het onderzoek concludeert dat slechts weinig studies deze impact op de zorgprofessional als primair onderzoeksdoel hadden. Om onze kennis hierover uit te breiden, doet **hoofdstuk 7** verslag van semigestructureerde interviews met 26 zorgprofessionals uit zes Nederlandse ziekenhuizen. Deze interviews verhelderen de waargenomen impact van drie specifieke WGZ-activiteiten op zorgprofessionals: het uitvoeren van waardegedreven poliklinische consulten (waarbij het gebruik van PROMs centraal staat), waardegedreven kwaliteitsverbetering en de implementatie van deze WGZ-werkzaamheden. Daarnaast is onderzocht hoe zorgprofessionals en hun werkgevers proberen positieve werkervaringen met WGZ te bevorderen.

Beide hoofdstukken laten zien dat zorgprofessionals vinden dat WGZ hun motivatie en werkbelasting zowel positief als negatief beïnvloedt—oftewel: ze ervaren ‘gains’ en ‘pains’. Een belangrijk voordeel was dat WGZ zorgprofessionals het gevoel gaf betekenisvol bij te dragen aan de patiëntenzorg, wat hun motivatie vergrootte. Ook merkten ze op dat WGZ tot meer diepgang en variatie in hun taken leidt, wat het werk leuker maakte. Daarnaast waardeerden ze de toegenomen mogelijkheden voor persoonlijke ontwikkeling die WGZ hen bood.

Een terugkerend pijnpunt was de verhoogde werkbelasting die WGZ met zich meebracht. Meerdere zorgprofessionals meldden beperkingen in ondersteunende faciliteiten, zoals te korte consulttijden en het ontbreken van gereserveerde tijd voor WGZ-verbeterinitiatieven en implementatie. Daarnaast wezen zij op meer abstracte spanningen die voortkwamen uit institutionele complexiteit, waaronder vertraagde hervormingen in bekostiging en de spanning bij het afwijken van protocollen om patiëntwaarden centraal te stellen. Ook gaven sommigen aan dat bepaalde kenmerken van WGZ-werkzaamheden botsten met hun persoonlijke waarden. Een voorbeeld hiervan was dat de toename van digitaal en data-gestuurd werk binnen WGZ leidde tot minder tijd voor direct patiëntencontact. Terwijl pioniers binnen WGZ hun frustratie uitten over het trage tempo van verandering (zoals opgemerkt in hoofdstuk 7), voelden anderen, die niet tot de voorhoede behoren, zich juist opgejaagd (hoofdstuk 6).

We identificeerden diverse voorbeelden van hoe zorgprofessionals en hun werkgevers zich inzetten om WGZ tot een positieve ervaring te maken. Zorgprofessionals richtten zich op strategieën om de ervaren voordelen te maximaliseren, ontwikkelden ‘workarounds’ voor pijnpunten en pasten emotionele en cognitieve copingmechanismen toe, zoals het verlagen van hun verwachtingen. Op organisatieniveau was er waardering voor inspanningen om faciliteiten en middelen te verbeteren, waaronder goed functionerende en geïntegreerde IT-systemen, ondersteuning van data-analisten bij verbeterinitiatieven, training, extra tijd voor WGZ-activiteiten, en het bevorderen van een veilig klimaat voor feedback op de eigen zorgverlening.

Hoewel zorgprofessionals over het algemeen een positieve balans rapporteerden, beschouwden sommigen hun deelname aan WGZ als suboptimaal of kozen ze bewust voor een meer passieve rol. Dit leidde bij enkelen tot een verminderd gebruik of zelfs het volledig weglaten van PROMs tijdens consulten, evenals een afname van hun inspanningen bij de implementatie van WGZ en waardegedreven kwaliteitsverbeteringsinitiatieven. Deze keuzes waren voornamelijk ingegeven door tijdsdruk, ontevredenheid over de toenemende digitalisering van hun werk en de perceptie van trage vooruitgang, samen met de overtuiging dat de zorgprofessional een grotere en directere invloed kon uitoefenen via andere activiteiten om de gezondheidszorg te verbeteren.

Concluderend kunnen we stellen dat zorgprofessionals WGZ-initiatieven tot nu toe als een tweesnijdend zwaard ervaren. De uitkomsten lijken afhankelijk van de afstemming tussen hun persoonlijke kenmerken, specifieke WGZ-activiteiten, de lokale werkomgeving en het implementatieproces van WGZ. Hoewel zorgprofessionals over het algemeen de balans tussen 'gains' en 'pains' positief beoordeelden, hebben de ervaren pijnpunten ertoe geleid dat sommigen suboptimaal deelnamen aan WGZ. Daarom is er zowel een kans als een noodzaak om prioriteit te geven aan de motivatie en het welzijn van de zorgprofessionals, door de afstemming tussen de persoon, de werkzaamheden, de werkomgeving en het veranderproces te verbeteren.

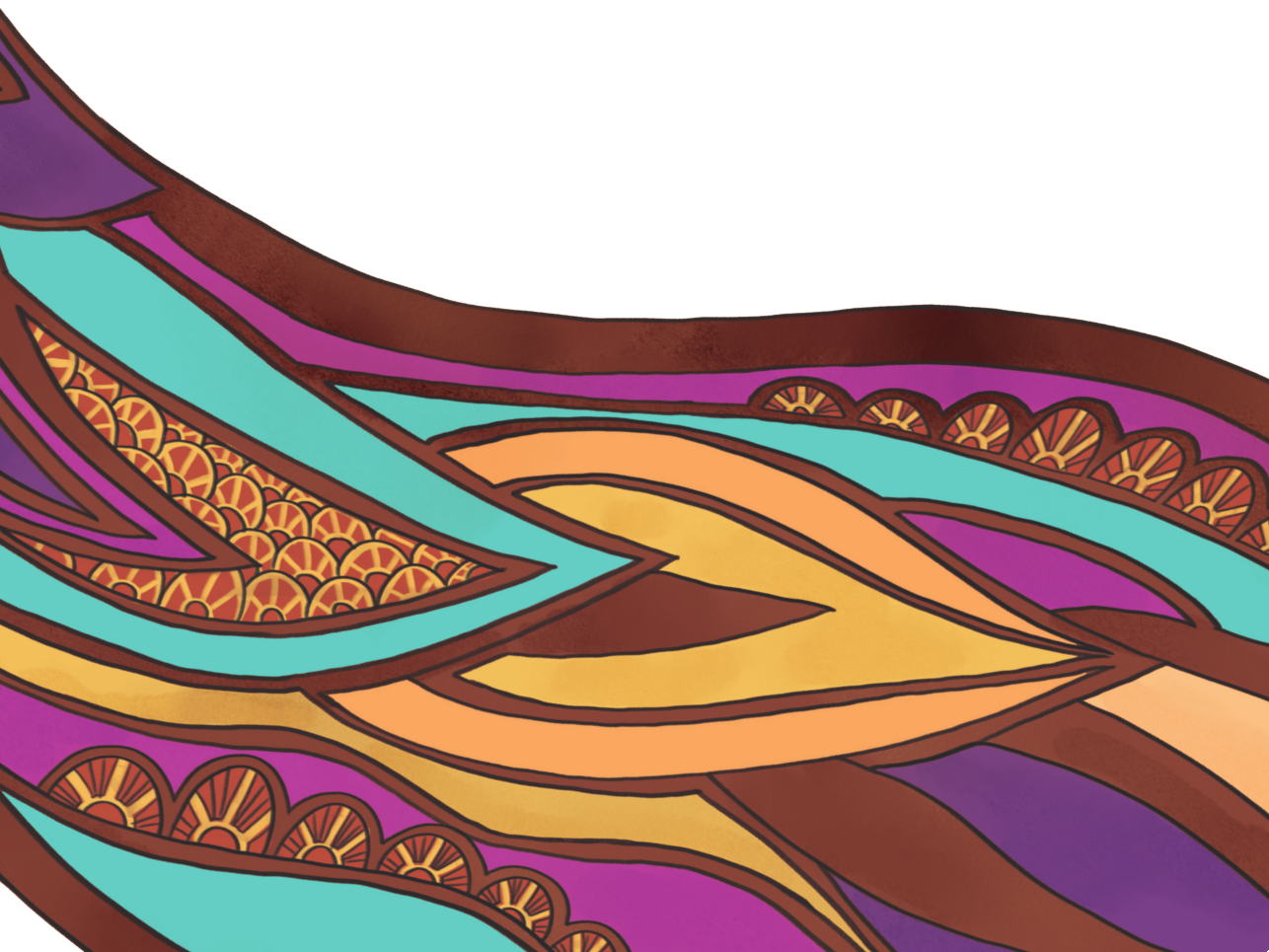
Discussie

Hoofdstuk 8 sluit dit proefschrift af met een samenvatting van de belangrijkste bevindingen en reflecties op het concept WGZ en de implementatie daarvan. Belangrijke bijdragen omvatten het kaderen van WGZ als een doel-middelenhiërarchie, het toepassen van inzichten uit complexiteitstheorie in de veranderbeweging naar WGZ, en het benadrukken van de ervaringen van zorgprofessionals en het belang van (her)professionalisering. Zoals afgebeeld op de omslag van dit proefschrift, vraagt VBHC professionals om zich te begeven in een wereld van complexiteit. Ze worden gevraagd nieuwe deuren te openen en een wereld te overstijgen die vaak wordt gekenmerkt door lineair denken, silo's en een protocolgestuurde, behandelgerichte aanpak.

Om WGZ verder te ontwikkelen in de dagelijkse praktijk, is het essentieel om de dynamiek tussen de implementatie van WGZ en zorgprofessionals te optimaliseren. Dit stelt hen in staat deze beweging verder te bevorderen én om er zelf goed in te gedijen. Uiteindelijk zijn het de zorgprofessionals die de zeilen richten om voor de wind van WGZ te gaan en zo waarde voor de patiënt realiseren.



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PORTFOLIO

Name Veerle van Engen
Period November 2020- October 2024

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van Engen, V., Buljac-Samardzic, M., Baatenburg de Jong, R., Braithwaite, J., Ahaus, K., Den Hollander-Ardon, M., Peters, I., & Bonfrer, I. (2024). A decade of change towards Value-Based Health Care at a Dutch University Hospital: a complexity-informed process study. *Health Research Policy and Systems*. 22(24), 1-19. <https://doi.org/10.1186/s12961-024-01181-z>

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Kaplan, R., van Engen, V., Ahaus, K., Korf, C., Blijlevens, N., Dinmohamed, A., Lingsma, H. The establishment of hemato-oncological networks in the Netherlands: a historical perspective on changing care structures.

Courses	Institute
University Teaching Qualification (UTQ)	Risbo, Erasmus University Rotterdam
Coaching skills	Boertien Vergouwen Overduin
Impact maken door kracht	Leading academic
Brush up your research design	
How to finish your PhD in time	
Q-Methodology	
Qualitative coding with Atlas.Ti	
Visual exploration of scientific literature with VOSviewer	
Brush up your SPSS skills	Graduate School, Erasmus University Rotterdam
Data carpentry for social sciences and humanities	
Digital research methods for textual data	
English academic writing	
Maximise your visibility as a researcher	
Qualitative Comparative Analysis	

Conferences	Contribution	Year	Location
The European Health Management Conference (EHMA)	Oral presentation	2022	Brussels, Belgium
International Conference on Healthcare Systems Ergonomics and Patient Safety (HEPS)	Oral presentation	2022	Delft, The Netherlands
European Implementation Event (EIE)	Oral presentation	2023	Basel, Switzerland
The International Society for Quality in Health Care International Conference (ISQua)	Workshop and poster presentation (Figure 1)	2023	Seoul, South-Korea

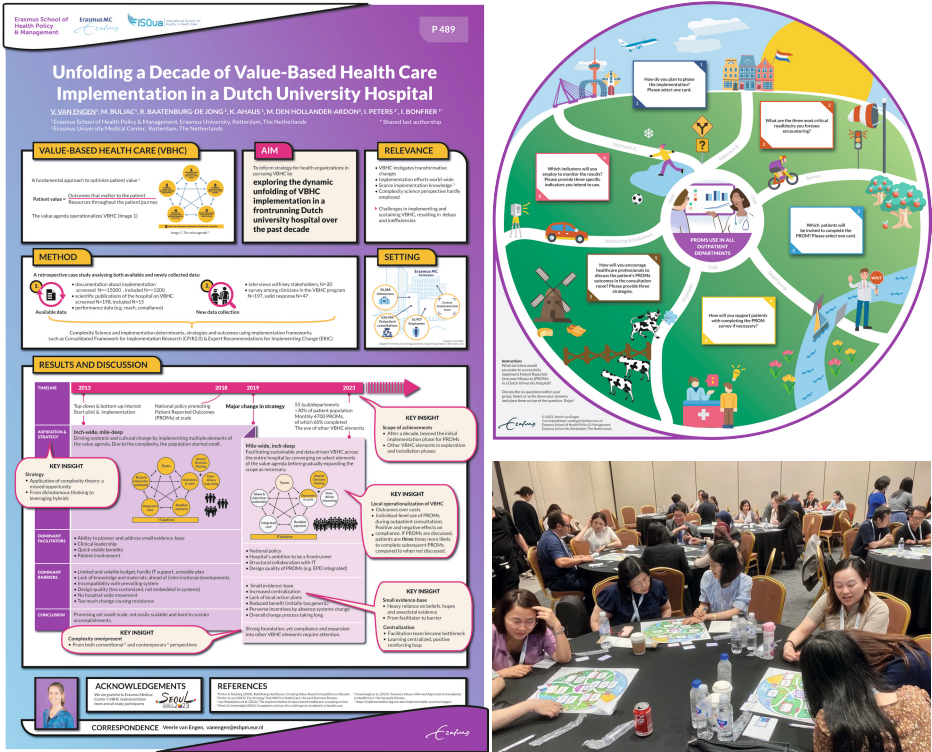


Figure 1. Poster (left) and workshop tool developed for and delivered at The International Society for Quality in Health Care International Conference (ISQua), Seoul, South Korea (right). The workshop has subsequently been used in the ESHPM Master’s elective on Value-Based Services.

Teaching	Role	Year
Blok 5 Technologie & Innovatie	Coach	2022, 2023
	Tutor	2022, 2023
	Lecturer	2023
Design for data-driven prevention	Marking work	2021, 2022
	Course development	2022
	Tutor	2022
Bachelor thesis	Supervisor	2021, 2022
Health Services Innovation	Marking work	2021

Additional activities	Description	Year
Academic visit	Visiting researcher at the Australian Institute of Health Innovation, Macquarie University, Sydney, Australia	January – April 2024
Guest lecturer	Open Day Bachelor, Erasmus University Rotterdam	2022
	Capita Selecta, Industrial Design Engineering, Delft Technical University	2021
Review activities	Health Services Management Research	2023
	Patient Education and Counseling	2023
Member of the advisory board	Stichting Je Leefstijl als Medicijn (foundation Your Lifestyle as Medicine)	2020-2024
Board member	Co-founding the Early Career network for Health Outcomes Research & Management (ECHORM)	2021-2024
Sounding board member	MySelfPortrait, OpenMindCall, Delft Technical University	2021
Invited discussion	Ministry of Health, Welfare and Sport	2023
Received grants	Travel grant Erasmus Trustfonds (€2,500)	2024
	Travel grant Fund dr. Catharina van Tussenbroek (€3,000)	2024

ABOUT THE AUTHOR

Veerle van Engen (born 1997, The Netherlands) completed her Bachelor's degree in Industrial Design at Eindhoven University of Technology (2015-2018). She then pursued a Master's degree in Strategic Product Design at Delft University of Technology (2018-2020), graduating cum laude with a specialization in designing for health and well-being.



During her PhD at Erasmus School of Health Policy & Management (ESHPM) at Erasmus University Rotterdam (2020-2024), Veerle studied the implementation of Value-Based Health Care (VBHC) at a Dutch university hospital. On a broader scale, she examined the perceived implications of VBHC for healthcare professionals, with a particular focus on their motivation and strain. Veerle has published articles in international peer-reviewed journals and presented her research widely, including leading a self-designed workshop at ISQua23 in Seoul, South Korea, and engaging in an invited discussion with the Dutch Ministry of Health, Welfare, and Sport.

As part of her PhD, Veerle initiated, organized and secured funding for a four-month academic visit to Macquarie University's Center for Healthcare Resilience and Implementation Science in Sydney, Australia. Certified with a University Teaching Qualification (2021), Veerle co-designed a master's course on Design Thinking and enjoyed teaching and supervising students in the Health Policy & Management program. Additionally, she co-founded a network for young researchers in outcomes research (ECHORM) (2022-2024) and served as an advisor to 'Stichting Leefstijl als Medicijn,' a foundation focused on lifestyle as medicine (2019-2024).

In November 2024, Veerle assumed the position of policy advisor at the Albert Schweitzer Hospital, a renowned top-clinical teaching hospital in Dordrecht. In this role, she supports the hospital in navigating emerging health care challenges and leveraging new opportunities while continuing her interest in research.

