

Implementation of value-based healthcare in ophthalmology: a scoping review

Zulkarnain Abubakar ,¹ Amal Chalik Sjaaf,² Tjahjono Darminto Gondhowiardjo,³ Moh Anfasa Giffari Makkaraka ⁴

To cite: Abubakar Z, Sjaaf AC, Gondhowiardjo TD, *et al.* Implementation of value-based healthcare in ophthalmology: a scoping review. *BMJ Open Ophthalmology* 2024;**9**:e001654. doi:10.1136/bmjophth-2024-001654

Received 25 January 2024
Accepted 22 February 2024

ABSTRACT

Objective This review aimed to identify and summarise how value-based healthcare (VBHC) is implemented in the field of ophthalmology.

Methods A scoping review was conducted by searching empirical and non-empirical articles from from electronic databases (PubMed, Science Direct, ProQuest and Scopus) and other methods starting January 2006 (the year Porter and Teisberg introduced VBHC) up to 31 December 2023.

Results 1.081 records were screened, and 12 articles (8 empirical studies and 4 non-empirical articles) were used for data extraction. Most articles were published in the UK. Most articles described the implementation of VBHC agenda by measuring outcomes and costs. All the included empirical studies reported implementation effect; otherwise, non-empirical articles were only described proposed implementation.

Conclusion The implementation of VBHC in ophthalmology has shown a positive impact on enhancing patient value and reducing healthcare costs. Nevertheless, the study highlighted that no provider or healthcare system has fully embraced and implemented VBHC, comprehensively addressing the entire value agenda.

WHAT IS ALREADY KNOWN ON THIS TOPIC?

- ⇒ Value-based healthcare (VBHC) is an emerging paradigm in healthcare that focuses on achieving the best possible patient outcomes.
- ⇒ However, implementation of VBHC in the field of ophthalmology is not extensively documented.

WHAT THIS STUDY ADDS?

- ⇒ It provides a comprehensive overview of the current literature that implements VBHC in the field of ophthalmology.
- ⇒ It specifically highlights relevant measures and its impact on improving patient value in the field of ophthalmology.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY?

- ⇒ It provides evidence to inform healthcare policy decisions related to VBHC, especially within the field of ophthalmology.

INTRODUCTION

Porter and Teisberg introduced the concept of value-based healthcare (VBHC) in 2016 as a strategy to reform the current healthcare system, which is experiencing increasing costs each year. The primary focus of implementing VBHC is to enhance value for patients, with value defined as the health outcomes that patients receive relative to the cost of care.¹ Value can be increased by improving outcomes, minimising the cost of healthcare or both. This concept shifts the healthcare paradigm from being volume-driven to value-driven. Outcomes should be measured across the entire care cycle that a patient undergoes for their medical condition, not separated by procedures. The goal is to achieve desired outcomes effectively, rather than achieving pseudo-efficiency through reduced tariffs and service restrictions. Because value depends on outcomes, not inputs, value in healthcare

is measured by the achieved outcomes rather than the number of services provided.^{2–4}

The transition from volume-based to value-based healthcare comes with its own set of challenges.⁴ To implement VBHC, several strategic steps must be taken, collectively known as the value agenda: organise into integrated practice units (IPUs), measure outcomes and costs for every patient, move to bundled payment for care cycles, integrate care delivery across separate facilities, expand excellent services across geography and build an enabling information technology platform.⁵

Numerous providers have successfully implemented the value agenda.⁶ It is intriguing to observe how the conceptual framework of the value agenda is translated into practical implementation and its subsequent impact on transforming healthcare. The widespread adoption of VBHC will encourage healthy competition among providers, determining those capable of delivering optimal outcomes at the lowest



© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Doctoral Program in Public Health, Faculty of Public Health, Universitas Indonesia, Depok, Indonesia

²Department of Administration & Health Policy, Universitas Indonesia, Depok, Indonesia

³JEC Eye Hospitals & Clinics, Jakarta, Indonesia

⁴Hasanuddin University School of Medicine, Makassar, South Sulawesi, Indonesia

Correspondence to

Dr Zulkarnain Abubakar;
zulkarnain.abubakar@ui.ac.id

cost for a patient's medical condition. This mirrors how competition fosters better value for consumers in various sectors. With an increasing number of patients treated by high-outcome, low-cost providers and fewer patients by poor-outcome, high-cost providers, simple arithmetic ensures that average outcomes will rise across the system, while average costs will decline.¹

Since its introduction in 2006, the VBHC concept has garnered adoption across numerous medical specialties with different approaches.⁶ VBHC has been introduced as a robust vision for healthcare; however, a practical guideline or scientific evidence supporting the success of the proposed strategic agenda is lacking. Consequently, various aspects of VBHC are only superficially understood and interpreted in different ways.^{7,8}

The field of ophthalmology, characterised by high cost, high tech, high volume and high variation, requires special attention in the application of VBHC, so that the services provided in addition to being cost-effective can also increase value for patients. To assist organisations in implementing VBHC, it is crucial to comprehend how the VBHC concept and strategic agenda have been applied in various contexts and evolved, especially within the field of ophthalmology. Therefore, it is necessary to provide an overview of the ongoing implementation of VBHC in ophthalmology and evaluate its impact on improving the quality of care and value for patient. Thus, we conducted a scoping review to answer the research question: What is the proposed or ongoing implementation of VBHC in the field of ophthalmology, and what impact does it have on improving value?

METHOD

This scoping review was in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).⁹ A scoping review was deemed more suitable to address the research question of this study due to the heterogeneity of research on VBHC, and methodologies to study VBHC differ.

Search strategy

In this scoping review, a literature search was conducted starting January 2006 (the year Porter and Teisberg introduced VBHC)¹ up to 31 December 2023 by two reviewers (ZA and MAGM) from multiple electronic databases, including PubMed, Science Direct, ProQuest and Scopus. All databases were searched for the same timeframe. The search terminology was set up as follows: ('Value-Based Health Care' OR 'Value-based healthcare' OR 'value based health care' OR 'value based healthcare' AND 'Ophthalmology'). In addition, some valid studies outside of the database will be included if eligible to meet the criteria.

Eligibility criteria

The main eligibility criteria of the included articles needed to be VBHC in line with Porter and Teisberg

definition.¹ Full-text articles in English that described the implementation of VBHC in a hospital setting or health-care system in the field of ophthalmology were included. In order to create a complete comprehensive overview of VBHC that has been implemented and proposed to be implemented in the VBHC literature, we included empirical and non-empirical articles. No restrictions were made with regard to the type of study design or the outcomes measured. Literature reviews were excluded, but their references were evaluated for eligible articles. To align with the concepts of Porter and Teisberg, we narrowed down article selection to studies explicitly using the terms VBHC or value-based care with a clear reference to Porter and Teisberg. Articles not using these terms were excluded.

Study selection

All search results were exported to Rayyan.¹⁰ Duplicates were removed before screening. After duplicates were removed, eligibility screening was initiated. Initially, titles and abstracts were independently reviewed by two reviewers (ZA and MAGM), who subsequently resolved conflicts through discussion on completing the title and abstract screening process. Afterwards, full-text literature studies that meet the eligibility criteria will be included, while those that do not meet the criteria will be excluded and reasons for exclusion will be provided. The results of the full screening will be reported using the updated PRISMA guidelines.¹¹

Data extraction and synthesis

Data collection will be carried out in all included studies. Data extraction and evaluation were performed together by two reviewers (ZA and MAGM). We used the following extraction data to organise and summarise study findings: (1) author, (2) year, (3) country, (4) settings, (5) study design, (6) VBHC agenda, (7) VBHC implementation/proposed VBHC implementation and (8) reported impacts (for empirical studies). Implication of VBHC was classified based on value agenda implementation and its reported impact to improving the quality of care and value for patient in the field of ophthalmology. Data synthesis collection will be presented in table form.

RESULT

Search and screening results

The initial database search identified 1.077 records; outside of the database, we found 4 studies that are also related to the topic, so we found a total of 1.081 studies. After duplicate removal, 984 potentially relevant records remained for title/abstract screening. The title and abstract screening resulted in 23 full-text articles. Four articles were excluded because full text was not available. Eleven articles were excluded after full text inspection for the following reasons: was not implementing VBHC in the field of ophthalmology in four articles or did not mention VBHC in the introduction or methods section in seven articles. After screening these, we selected 12

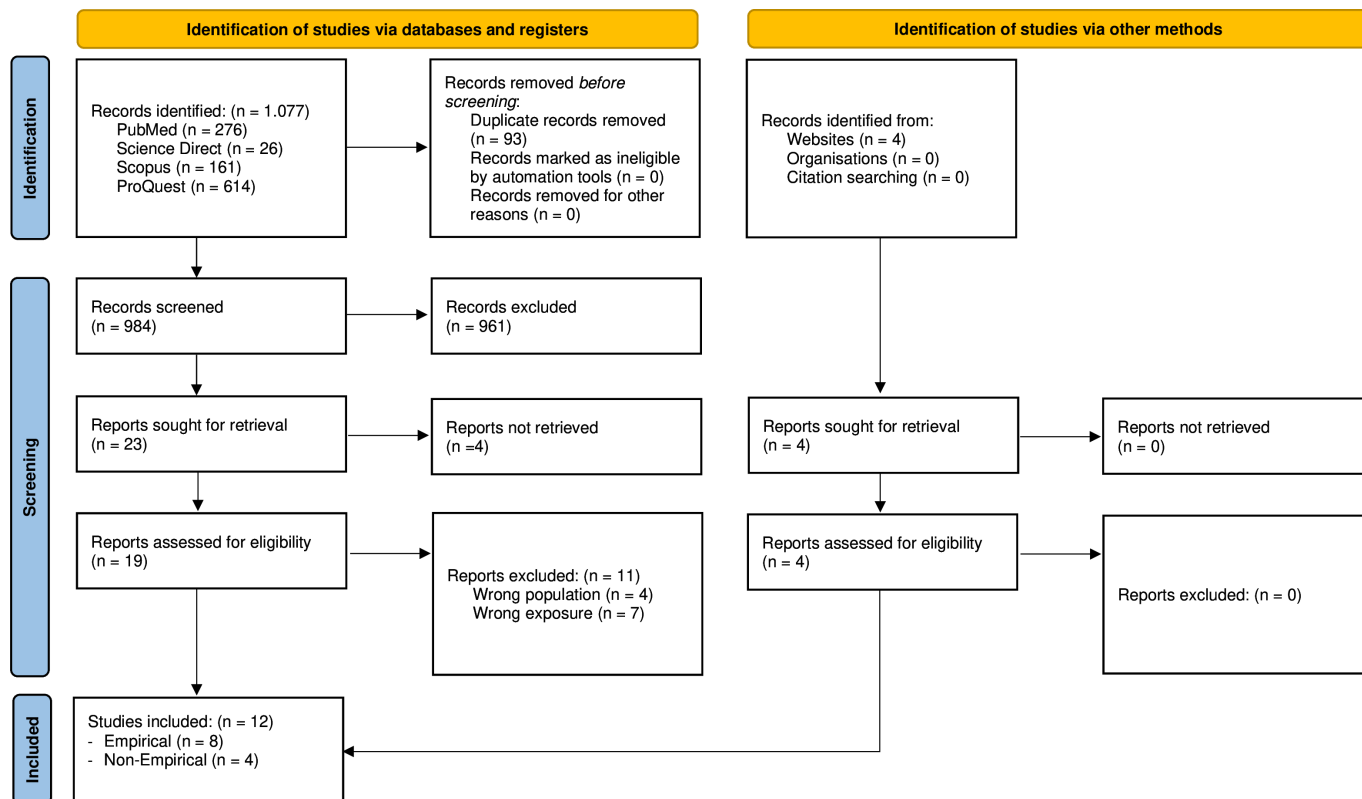


Figure 1 Flow diagram of literature search and selection based on Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA).

original articles for inclusion (eight empirical and four non-empirical). An overview of the article selection is shown in figure 1.

Included articles' characteristics

The 12 included articles were published between 2006 and 2023. Three articles were conducted in the UK,^{12–14} two articles in the Netherlands^{15 16} and the remaining in Sweden,¹⁷ Portugal,¹⁸ Bulgaria,¹⁹ Singapore,²⁰ Canada,²¹ the USA²² and Wales.²³ Among the included publications, eight studies described empirical research, as illustrated in figure 2. These studies were predominantly distributed in Europe,^{15–19} with one study each conducted in the USA,²² Canada²¹ and Singapore.²⁰ Of these empirical studies, three were categorised as descriptive study,^{17 19 21} three as case control study^{15 18 22} and two as cohort study.^{16 20} All of the included empirical studies (100%) reported that the implementation was a success improved value. Implementation initiatives were considered successful if the authors indicated in the discussion and/or conclusion section that the implementation had led to value improvement and/or decreased healthcare cost. The main characteristics of the included publications are described in tables 1 and 2.

Items and implementation of the VBHC agenda

All of the included empirical studies implemented VBHC agenda 'measure outcomes and costs for every patient'.^{15–22} From these studies, only four

studies^{15 18–20} simultaneously measured outcomes and costs, two studies^{21 22} exclusively focused only on cost measurement using time-driven activity-based costing (TDABC), while another two studies^{16 17} concentrated only on leveraging outcome data for value improvement. In the non-empirical study, the most frequently mentioned VBHC agenda was 'measuring costs and outcomes for every patient'.^{12 13 23} Each article described the agenda 'organising care into IPUs',¹⁴ 'integration of care delivery across separate facilities'¹² and 'building an enabling information technology platform'.²³

DISCUSSION

The main objective of this scoping review was to provide practical evidence based of the VBHC implementation and its effect on value improvement or VBHC proposed implementation in the field of ophthalmology. The results suggest that application of VBHC may have a positive impact on clinical outcomes, patient-reported outcomes, cost-efficiency and healthcare utilisation. Previous review on the effects of VBHC suggests that it might have a positive effect on hospital admissions, readmissions and patient satisfaction.^{24 25}

The study results indicate a notable absence of comprehensive VBHC implementations covering the entire VBHC agenda. The majority of implementations were identified within hospital/clinic settings, with only a few

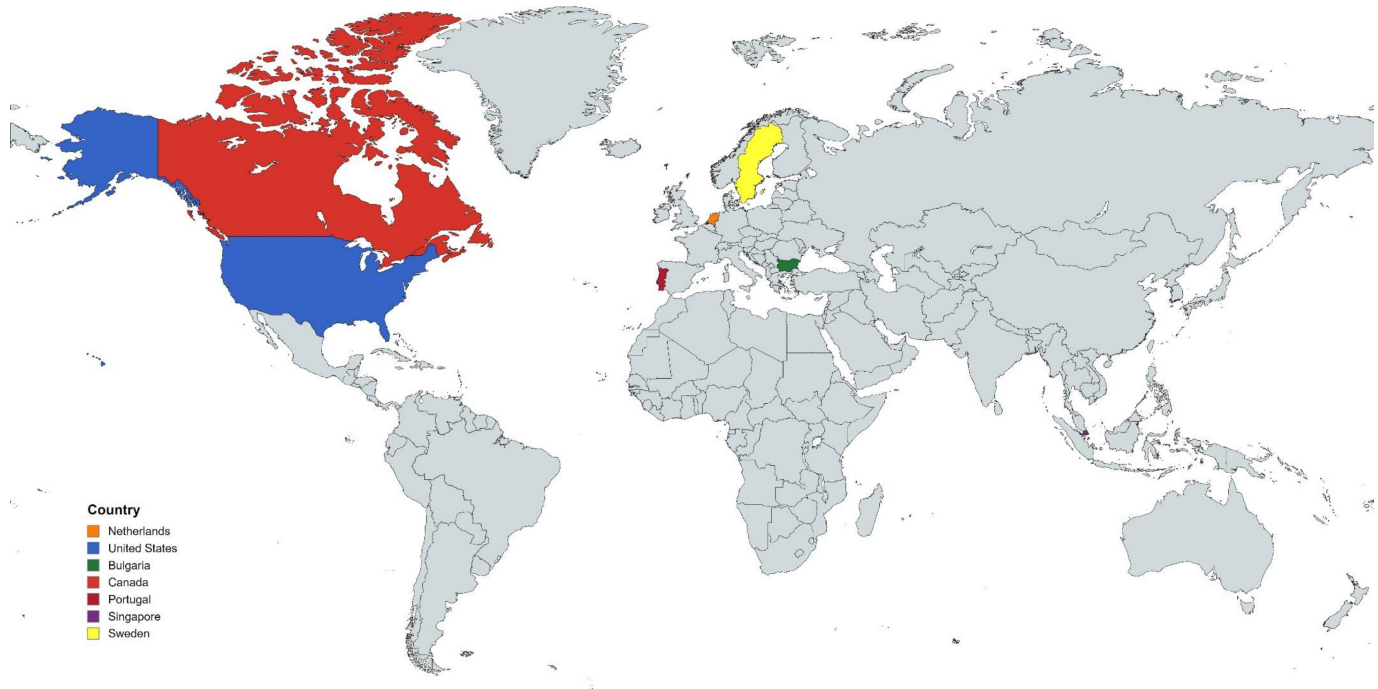


Figure 2 The distribution of countries that have implemented value-based healthcare in ophthalmology.

countries, such as UK and Sweden taking initial steps to integrate VBHC into their healthcare systems.

The most frequently found agenda item of this scoping review was measuring outcomes and/or costs. Furthermore, this agenda item had a relatively high ratio in our included empirical studies, meaning that outcomes and costs were actually measured. Other agenda items were reported in non-empirical included articles in a more conceptual way, without actually implementing or applying the agenda. All of VBHC agenda item found in the inclusion study is discussed separately in the next section.

Organise into IPUs around the patient's medical condition

At the core of the value transformation, a shift towards a value-driven organisation involves restructuring the way clinicians deliver care. This restructuring entails organising healthcare around patient needs rather than specialty departments and discrete services, a model referred to as IPU.⁵ An IPU is a dedicated team comprising both clinical and non-clinical personnel collaborating to deliver the full care cycle for a group of patients with the same medical or behavioural condition, or a set of closely related conditions. This approach differs from organising around specialties or specific interventions.²⁶ IPU consolidates patient volume for a specific medical condition, enabling its multidisciplinary team to develop profound expertise and capabilities for proactive patient care across the entire care cycle or within a targeted patient segment. This method engages an experienced multidisciplinary team in patient education, fostering adherence to treatment protocols and reducing the occurrence of adverse events.²⁷

In this review, we found only one article that discussed an IPU in the field of ophthalmology.¹⁴ This non-empirical article discussed a concept of IPUs through redesign of comprehensive care pathway for cataract services post-COVID-19 using the principles of VBHC through the development of a cataract IPUs. This article suggests a division of cataract services into two IPUs: routine cataract IPU and complex cataract IPU. This categorisation is based on both patient characteristics (comorbid factors, American Society of Anesthesiologists (ASA) grade, mobility issues and overall operating room time) and surgery-related factors (surgeon competency, Polymerase Chain Reaction (PCR) risk score and required surgical time). The proposed approach aims to enhance the effectiveness and patient-centredness of cataract care within the National Health Service (NHS), ultimately increasing value for patients.

Despite not finding any studies related to the implementation of IPU in ophthalmology, it is noteworthy that several eye hospitals, such as JEC Eye Hospital and Singapore National Eye Centre, have established centres for various eye conditions, including Myopia Centre, Glaucoma Centre, Dry Eye Centre and Age-related Macular Degeneration Centre. The absence of relevant studies in the search results may be attributed to the keywords not explicitly using the terms 'Integrated Practice Units' or 'IPU.' Consequently, reports related to the implementation of the IPU concept in ophthalmology might exist without explicit references to the VBHC concept, potentially leading to their exclusion from this review. Therefore, further studies are needed to assess the effectiveness of IPUs in ophthalmology in enhancing value for patients.

Table 1 Collection data of studies (empirical studies)

No.	Author	Year	Country	Settings	Study (design)	VBHC agenda	VBHC implementation	Reported effect
1.	de Korne et al ¹⁵	2009	Netherlands	Rotterdam Eye Hospital	Case control	Measuring costs and outcomes for every patient	Creating patient value through redesign and development of glaucoma care processes using QCM and CDVC models.	Reduced costs per service, coupled with increased patient satisfaction and outpatient visits and surgeries.
2.	Larsson et al ¹⁷	2012	Sweden	Swedish ophthalmology clinics	Descriptive Study	Measuring costs and outcomes for every patient	Using data outcomes from Sweden cataract registry to the development of Sweden clinical guideline for prevention of postoperative endophthalmitis after cataract surgery.	Postoperative endophthalmitis incidence in Sweden decreased from 0.11% in 1998 to 0.02% in 2009 for all cataract surgery cases.
3.	Chou et al ²²	2018	USA	Massachusetts Eye and Ear	Case control	Measuring costs and outcomes for every patient	Perform cost analysis comparison for managing common ocular disorders in an eye emergency department compared with urgent care setting using TDABC analysis	TDABC facilitates transparent cost analysis, allowing targeted cost-reduction strategies without compromising care quality. Treating non-emergent ocular problems outside the ED results in shortened visit times, boosts patient satisfaction and reduces overall costs.
4.	van der Rejs et al ¹⁶	2020	Netherlands	Two tertiary centres and two secondary eye centres in the Netherlands	Retrospective cohort study	Measuring costs and outcomes for every patient	Analyse and evaluate data outcomes and process from nAMD patients medical records to support data-driven quality improvement regarding the treatment of nAMD.	Enhance nAMD patient value by minimising delays, improving diagnostic accuracy, using antiVascular Endothelial Growth Factor (anti-VEGF) treatment and optimising follow-up frequency.
5.	Queirós et al ¹⁸	2021	Portugal	Portuguese Institute of Oncology-Porto (IPO-Porto)	Case control	Measuring costs and outcomes for every patient	Implementing ICHOM standard set for cataract surgery to evaluate clinical outcomes, quality of life and costs of patients with cataract.	The ICHOM standard set enables a comprehensive assessment and provides insights into cataract surgery outcomes at IPO-Porto, facilitating global comparisons and enhancing the foundation for improved patient care.
6.	Sadri et al ²¹	2021	Canada	Kensington Eye Institute	Descriptive study	Measuring costs and outcomes for every patient	Apply TDABC analysis for cataract surgery.	TDABC accurately calculates cataract care costs, offering data-driven support to optimise resources and reduce expenses without compromising outcomes.
7.	Dacheva et al ¹⁹	2022	Bulgaria	Bulgarian ophthalmic clinic	Descriptive study	Measuring costs and outcomes for every patient	Using PROMs and TDABC	The application of PROM and TDABC allows the ophthalmology clinic to optimise the care process with focus on the outcomes.

Continued

Table 1 Continued

No.	Author	Year	Country	Settings	Study (design)	VBHC agenda	VBHC implementation	Reported effect
8.	Hoong <i>et al</i> ²⁰	2023	Singapore	The National University Hospital (NUH)	Observational prospective cohort study	Measuring costs and outcomes for every patient	VDO programme for cataract surgery episodes between January 2015 and December 2018	The application of VDO programme demonstrated a cost reduction without compromising quality outcomes for cataract surgery patients in NUH.
CDVC, care delivery value chain; ICHOM, International Consortium for Health Outcomes Measurement; nAMD, neovascular age-related macular degeneration; PROMs, patient-reported outcome measures; QCM, quality cost model; TDABC, time-driven activity-based costing; VBHC, value-based healthcare; VDO, value-driven outcome.								

Measure outcomes and costs for every patient

Despite being the most widely implemented agenda, only four studies^{15 18–20} concurrently measured outcomes and costs. de Korne *et al*'s study stands out as one of the earliest VBHC implementation adoption in the field of ophthalmology, predating the use of TDABC in health-care. This 5-year case study in Rotterdam Hospital showcased the use of quality cost model (QCM) and care delivery value chain (CDVC) as tools for hospital management to oversee both quality and cost in glaucoma care as data driven to improve patient value (cost reduction per service with increasing in patient satisfaction and number of outpatients visit and surgery).¹⁵ It also highlighted that the VBHC agenda concept is interpreted using different tools. Another study in Bulgaria demonstrated the use of health outcomes data (clinical and patient-reported outcomes) and TDABC in optimising the care process for patients with AMD and macular oedema.¹⁹ This approach focuses on improving patients' quality of life based on the care provided. Aligning with Kaplan and Wolberg, healthcare outcomes encompass clinical and functional aspects of the condition, along with patient-reported outcomes reflecting improvements in their quality of life and ability to perform normal activities.²⁸

A study in IPO-Porto Hospital conducted a comprehensive measurement of cataract service outcomes using the International Consortium for Health Outcomes Measurement (ICHOM) standard, aiming to enhance value in cataract services.¹⁸ However, cost measurement did not use TDABC, as recommended by Kaplan and Porter.²⁹ The ICHOM standard, incorporating Porter's The Outcomes Hierarchy,³⁰ makes it suitable for a comprehensive measurement of cataract care outcomes by considering patient risk factors. In a separate study, Hoong *et al* illustrated how this VBHC agenda implementation through the value-driven outcome (VDO) programme for cataract surgery at the National University Hospital (NUH) in Singapore, achieved cost reduction without compromising the quality of cataract surgery outcomes. The VDO programme, with its straightforward data reporting tool, identifies underlying factors of cost variability, serving as a crucial starting point for targeted process improvements or standardisation.²⁰ Systematic outcome assessment, measuring outcomes relevant to the patient for a specific medical condition, can incentivise providers to innovate and offer more effective treatments.²⁸

In addition to the four aforementioned studies, two studies^{21 22} exclusively focused only on cost measurement using TDABC, while another two studies^{16 17} concentrated only on leveraging outcome data for value improvement. These studies demonstrated that TDABC, besides accurately calculating the actual cost of cataract surgery,²¹ can also be used to compare efficiency between two eye services in different settings.²² However, both studies did not exhibit the use of TDABC for cost measurement in full care cycle, as recommended by Kaplan and Porter.²⁹ This aspect is essential in preparing providers for the

Table 2 Collection data of articles (non-empirical studies)

No.	Author	Year	Country	Settings	VBHC agenda	Proposed implementation
1	Malik <i>et al</i> ¹²	2013	UK	NHS	1. Measuring costs and outcomes for every patient. 2. Integrate care delivery across separate facilities.	Adopting population-based and value-oriented approach to eye care delivery NHS system involves engaging clinical teams and the public for pathway redesign, transitioning to integrated clinical networks, implementing programme budgeting, focusing on clinical outcomes over process-driven targets and emphasising prevention and early detection.
2.	Oliver <i>et al</i> ¹³	2019	UK	NHS	Measuring costs and outcomes for every patient.	This perspective suggests to emphasis the value-based healthcare concept into elective cataract surgery policy that surely needs to inform shared decision-making based on conversations with individual patients, not based on visual acuity threshold.
3.	Withers <i>et al</i> ²³	2020	Wales	NHS Wales	1. Measuring costs and outcomes for every patient. 2. Build an enabling information technology platform.	Developed an integrated electronic platform to collect PROMs and PREMs from patients with cataract by unifying the collection and linking patient outcome data with clinical and administrative data, which aims to help involve patients more in decision-making about their care.
4.	Lin <i>et al</i> ¹⁴	2021	UK	NHS	Organise care into integrated practice units (IPUs)	Redesign of comprehensive care pathway for cataract services using the principles of value-based healthcare through the development of a cataract integrated practice unit.

NHS, National Health Service; PREM, patient-reported experience measure; PROMs, patient-reported outcome measures.

value-based bundle payment model,^{3 31} akin to a study illustrated in another field such as Total Hip and Knee Arthroplasty Service.³²

Larsson *et al* underscored the significance of using a country's disease registry, specifically data from the Swedish cataract registry, in developing clinical guidelines to prevent endophthalmitis after cataract surgery. This approach resulted in a substantial reduction in endophthalmitis rates in Sweden over 10 years.¹⁷ On the hospital level, van der Reiss *et al* demonstrated success in using clinical data from medical records linked to patient satisfaction to improve the value of patient care with neovascular age-related macular degeneration (nAMD) in hospitals in the Netherlands.¹⁶

In the review of non-empirical studies regarding this agenda, the proposed VBHC implementation primarily revolved around integrating the VBHC concept into the healthcare system within the NHS settings. These efforts included redesigning eye care pathways to focus on achieving outcomes and changing the financing model to programme budgeting,¹² making cataract surgery decisions based more on patient needs rather than visual acuity threshold,¹³ and integrating patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs)-based outcome data with patient administrative and clinical data.²³

Collectively, these studies emphasise that the 'measure outcomes and costs for every patient' agenda serves as

a foundational framework applicable not only at the hospital level but also across the broader healthcare system. The utilisation of outcome data and cost of patient care enables efforts directed at enhancing patient value.

Integrate care delivery across separate facilities

This agenda requires healthcare systems to integrate care delivery in their region so that patients are treated at the appropriate care site. Primary care and care for simple conditions should be delivered in low-cost, convenient clinics and community hospitals, while complex care is delivered only by IPUs located in one or two of the region's tertiary hospitals.²⁸ This concept was found in articles by Malik *et al*. The idea involves embracing a population-based, value-oriented approach to delivering eye care by enhancing primary care structures and their connections to hospital services. This aims to establish an integrated system or service with a shared set of objectives and quality standards. By doing so, the services encompass the entire spectrum of enhancing clinical outcomes, spanning from prevention to treatment. The cornerstone of this approach is the improved integration of services. Achieving stronger networks of care between individuals within communities and hospitals is vital to realising this vision.¹²

Enhancing eye care services in primary care facilities is essential for preventive measures, early detection and

prompt treatment of visual impairment and blindness within the community. This approach not only contributes to improved community health but also reduces overall healthcare costs. Patients who can be effectively treated in primary care settings may not require referrals to higher cost hospital treatments. Strengthening the structural components of primary care facilities involves enhancing the competency of providers and ensuring the availability of necessary diagnostic tools. Equally important is the establishment of a referral system from primary care facilities to secondary care facilities, emphasising quality principles such as effectiveness, safety, patient-centredness, timeliness, efficiency, equity and integration.

Build an enabling information technology platform

Withers *et al* serves as an exemplary illustration of the implementation of this VBHC agenda. Conducted in Wales, this study developed an integrated electronic platform to gather PROMs and PREMs from patients with cataract by unifying the collection and linking of patient outcome data with clinical and administrative information, which aims to actively involve patients in decisions about their care.²³ This model aligns with the characteristics of a value-enhancing IT platform as outlined by Porter and Lee, such as patient-centred, encompasses all

types of patient data and accessible to all parties involved in care.⁵

The platform development model proposed above can be an impactful initial step for adoption by both providers and within a health system. This simplifies the process for providers and policymakers to assess the achievements of health outcomes derived from patient care. The emphasis on being data-driven aligns with efforts directed at enhancing value and implementing VBHC.

In general, the results of this study are in line with the previous review of VBHC implementation in the broader field,^{6,8} which found that the most widely implemented VBHC agenda was measuring outcomes and costs. This suggests that this agenda is the easiest VBHC agenda to conceptualise and implement.

To successfully implement VBHC, healthcare providers may follow a strategic framework (figure 3) which begins by understanding patients' health needs and expectations regarding their conditions. This involves defining the medical conditions and health outcomes important to patients and outlining the entire care cycle necessary for achieving these outcomes in an integrated manner, involving various related multidiscipline and/or providers. Care should be based on best practices to optimise outcomes, considering patients' risk factors and comorbidities. Comprehensive measurement of health

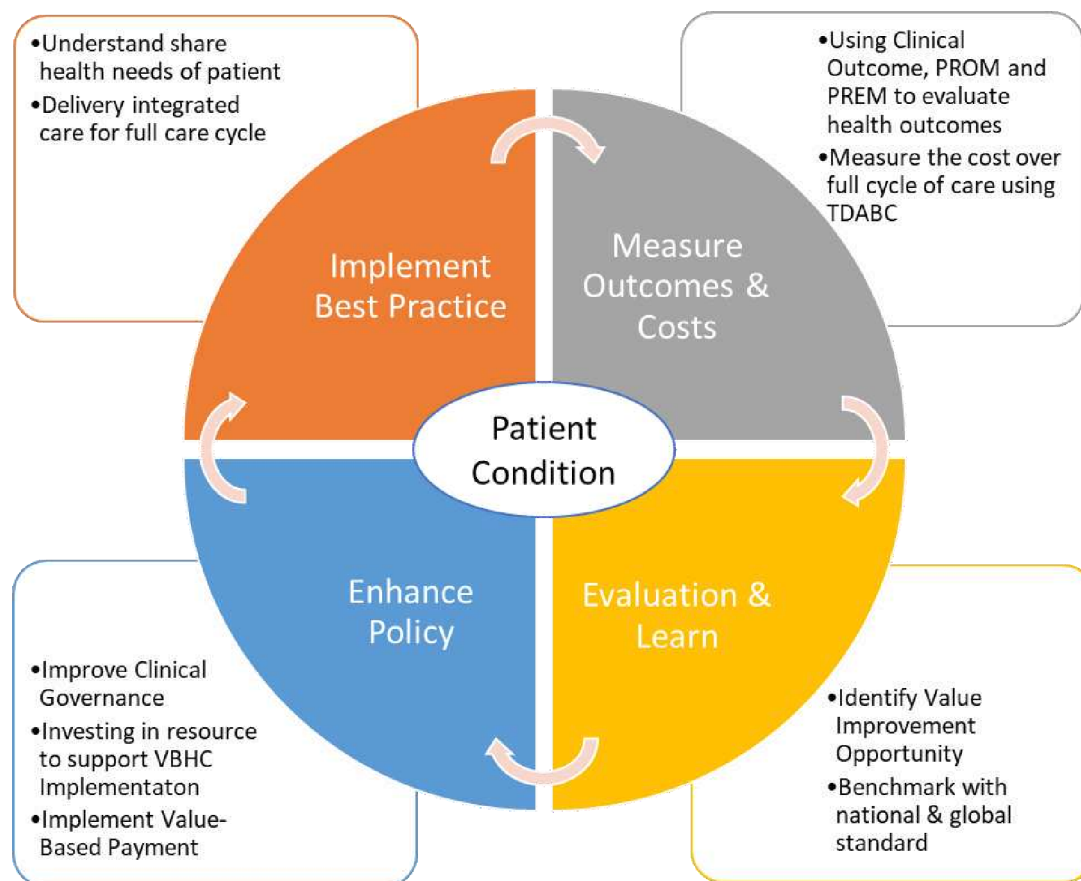


Figure 3 Strategic framework for value-based healthcare implementation. PREM, patient-reported experience measure; PROM, patient-reported outcome measure; TDABC, time-driven activity-based costing.

outcomes, including clinical outcomes, PROMs and PREMs, is essential. Accurate calculation of the actual costs incurred for the entire care cycle using TDABC is necessary. These data should be evaluated to identify opportunities for value improvement and benchmarked against both national and global standards. Improvement initiatives should be supported by policies aimed at enhancing patient value, including strengthening clinical governance (eg, clinical guidelines, integrated care pathways, standard operating procedures), investing in resources needed to improve patient outcomes (eg, medical equipment, IT systems), implementing value-based bundled payment and expand partnership as needed.^{33 34}

Strengths and limitations

Some limitations need to be considered when interpreting the results of this study. First, the search strategy did not specifically include search terms for each VBHC agenda item, which could have resulted in missing some of articles that fits the topic. Second, all of our empirical studies only discuss the VBHC agenda item ‘measure outcomes and costs for every patient.’ As a result, there is no evidence regarding the effects of implementing VBHC on other agendas in the field of ophthalmology that can be explained. Additionally, we failed to find existing literature that discussed two of Porter’s VBHC agendas in the field of ophthalmology: ‘moving to bundled payments for care cycles’ and ‘expanding excellent services across geography’. Third, the eligibility criteria in this study specifically focused on including related studies that explicitly referred to and used VBHC terminology. Consequently, if there were relevant studies with concepts aligned with one of the VBHC agendas but did not explicitly cite VBHC as the theoretical basis, they were not included in the review. The strength of this review lies in its pioneering exploration of the implementation and impact of VBHC within the field of ophthalmology. Being the first review into this specific area, it contributes significantly to the existing literature and offers a fresh perspective on the application of VBHC principles and their impact on ophthalmological practices.

CONCLUSION

The implementation of VBHC in ophthalmology has demonstrated a positive impact on improving patient value and reducing healthcare costs. However, the study also revealed that neither individual providers nor healthcare systems has fully adopted and implemented VBHC, covering the entire value agenda comprehensively. The review indicates that the current implementation of VBHC in ophthalmology primarily focuses on measuring outcomes and/or costs of services provided. This illustrates that, for most providers, the understanding of VBHC is largely conceptual, and the comprehensive strategic agenda has not been a priority for implementation in the system. Therefore, further studies are required to

assess the implementation of VBHC, specifically based on each value agenda.

Twitter Moh Anfasa Giffari Makkaraka @fasagifari

Acknowledgements There is no conflict of interest in writing this review. The authors received no specific funding for this work.

Contributors ZA, ACS and TDG conceived the concept of the study. ZA and MAGM conducted the study design, determination of eligibility criteria, literature searching, study screening, data collection, interpretation of results and drafting the manuscript. ACS and TDG supervised the study. All authors critically revised the manuscript and approved the submitted version. ZA responsible for the overall content as the guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Map disclaimer The depiction of boundaries on the map(s) in this article does not imply the expression of any opinion whatsoever on the part of BMJ (or any member of its group) concerning the legal status of any country, territory, jurisdiction or area or of its authorities. The map(s) are provided without any warranty of any kind, either express or implied.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; internally peer reviewed.

Data availability statement No data are available.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Zulkarnain Abubakar <http://orcid.org/0009-0001-1262-5759>

Moh Anfasa Giffari Makkaraka <http://orcid.org/0000-0003-1179-5366>

REFERENCES

- Porter ME, Teisberg EO. *Redefining Health Care: Creating Value-based Competition on Results*. Boston: Harvard Business School Publishing, 2006.
- Porter ME. A strategy for health care reform — toward a value-based system. *N Engl J Med* 2009;361:109–12.
- Porter ME, Kaplan RS. How should we pay for health care? 2015. Available: [http://www.hbs.edu/faculty/Publication Files/15-041_1af09bde-47f9-4364-bad6-aaac464be909.pdf](http://www.hbs.edu/faculty/Publication%20Files/15-041_1af09bde-47f9-4364-bad6-aaac464be909.pdf)
- Porter ME. What is value in health care *N Engl J Med* 2010;363:2477–81.
- Porter ME, Lee T. The strategy that will fix health care. *Harv Bus Rev* 2013;1277:1–18.
- van Staalduinen DJ, van den Bekerom P, Groeneveld S, et al. The implementation of value-based Healthcare: a Scoping review. *BMC Health Serv Res* 2022;22:270.
- Fredriksson JJ, Ebbevi D, Savage C. Pseudo-understanding: an analysis of the dilution of value in Healthcare. *BMJ Qual Saf* 2015;24:451–7.
- Vijverberg JRG, Daniels K, Steinmann G, et al. Mapping the extent, range and nature of research activity on value-based Healthcare in the 15 years following its introduction (2006–2021): A Scoping review. *BMJ Open* 2022;12:e064983.
- Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for Scoping reviews (PRISMA-SCR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
- Ouzzani M, Hammady H, Fedorowicz Z, et al. Rayyan—a web and mobile App for systematic reviews. *Syst Rev* 2016;5:210.
- Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
- Malik ANJ, Cassels-Brown A, Wormald R, et al. Better value eye care for the 21st century: the population approach. *Br J Ophthalmol* 2013;97:553–7.



- 13 Oliver D. David Oliver: are we seeing value based rationing clearly *BMJ* 2019;365:l1734.
- 14 Lin P-F, Naveed H, Eleftheriadou M, *et al.* Cataract service redesign in the post-COVID-19 era. *Br J Ophthalmol* 2021;105:745–50.
- 15 de Korne DF, Sol K, Custers T, *et al.* Creating patient value in glaucoma care: applying quality costing and care delivery value chain approaches: A five-year case study in the Rotterdam eye hospital. *Int J Health Care Qual Assur* 2009;22:232–51.
- 16 van der Reis MI, Elshout M, Berendschot TTJM, *et al.* A systematic approach to evaluate practice-based Process- and outcome data applied to the treatment of Neovascular age-related macular degeneration. *BMC Ophthalmol* 2020;20:21.
- 17 Larsson S, Lawyer P, Garellick G, *et al.* Use of 13 disease registries in 5 countries demonstrates the potential to use outcome data to improve health care's value. *Health Affairs* 2012;31:220–7.
- 18 Queirós L, Redondo P, França M, *et al.* Implementing ICHOM standard set for cataract surgery at IPO-Porto (Portugal): clinical outcomes, quality of life and costs. *BMC Ophthalmol* 2021;21:119.
- 19 Dacheva A, Vutova Y, Mekov E, *et al.* Implementation of the value-based Healthcare (VBHC) concept with a focus on outcome measurement. *J Heal Environ Res* 2022;8:170–9.
- 20 Hoong JM, Gibbons B, Loh B, *et al.* Impact of the value driven outcomes program among cataract surgery patients in Singapore: an interrupted time series analysis. *BMC Health Serv Res* 2023;23:486.
- 21 Sadri H, Sinigallia S, Shah M, *et al.* Time-driven activity-based costing for cataract surgery in Canada: the case of the Kensington. *Healthc Policy* 2021;16:97–108.
- 22 Chou J, Shah M, Watts A, *et al.* TDABC cost analysis of ocular disorders in an Ophthalmology emergency Department versus urgent care clinical experience at Massachusetts eye and ear. *J Acad Ophthalmol* 2018;10:e55–60.
- 23 Withers K, Palmer R, Lewis S, *et al.* First steps in Proms and Prens collection in Wales as part of the prudent and value-based Healthcare agenda. *Qual Life Res* 2021;30:3157–70.
- 24 Liljas AEM, Brattström F, Burström B, *et al.* Impact of integrated care on patient-related outcomes among older people – A systematic review. *Int J Integr Care* 2019;19:6.
- 25 Baxter S, Johnson M, Chambers D, *et al.* The effects of integrated care: A systematic review of UK and international evidence. *BMC Health Serv Res* 2018;18:350.
- 26 Porter ME, Lee TH. Integrated practice units: A Playbook for health care leaders. *NEJM Catalyst* 2021;2:1–17.
- 27 Kaplan BRS, Wolberg H. Voices on value: integrated practice units (Ipus). 2019;2:1–5.
- 28 Kaplan RS, Wolberg H. Voices on value: what is value-based health care? *Made-Up Self* 2018:45–59.
- 29 Kaplan RS, Porter ME. The big idea: how to solve the cost crisis in health care. *Harv Bus Rev* 2011;89:46–52.
- 30 Porter ME. Value-based health care delivery. *Ann Surg* 2008;248:503–9.
- 31 Porter ME, Kaplan RS. How to pay for health care. *Harv Bus Rev* 2016;94:88–98.
- 32 DiGioia AM, Greenhouse PK, Giarrusso ML, *et al.* Determining the true cost to deliver total hip and knee Arthroplasty over the full cycle of care: preparing for bundling and reference-based pricing. *J Arthroplasty* 2016;31:1–6.
- 33 Teisberg E, Wallace S, O'Hara S. Defining and implementing value-based health care: A strategic framework. *Acad Med* 2020;95:682–5.
- 34 EIT Health. Implementing value-based health care in Europe: Handbook for Pioneers. Munich, 2020.