


# The Use of Patient-Reported Measures Collected Data in Primary Care: A Systematic Review

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**Abstract:** This systematic review aims to explore the utilization of patient-reported measures (PRMs) in primary care, focusing on healthcare providers' use of PRM data and factors influencing its effectiveness. Following the PRISMA 2020 guidelines, we registered the review in PROSPERO (CRD420251030695) and screened 2465 records, ultimately including eight studies. Data extraction and quality appraisal were conducted using a structured approach and the Mixed Methods Appraisal Tool (MMAT). Findings suggest that effective PRM data use depends on integration into electronic health records (EHRs) and clinical workflows, with barriers including technical limitations and organizational culture. PRM data can support clinical decision-making, shared decision-making, and communication and support professional empowerment and resource optimization. However, evidence quality was moderate, and conclusions should be interpreted with caution due to the small number of studies. Differences in health systems and study heterogeneity further constrain generalizability. This review highlights the need for seamless EHR integration, streamlined instruments, and active professional engagement to optimize PRM implementation, while identifying a critical research gap and calling for future studies on cost-effectiveness and equity impacts.

**Keywords:** patient-reported outcome measures, electronic health records, clinical decision-making, patient-centered care

## Introduction

Patient-reported measures (PRMs), including patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs), are increasingly recognized as valuable tools in healthcare for improving patient-centered care and enhancing the quality of services.<sup>1,2</sup> The shift towards patient-centered care has been driven by several factors, including the growing recognition that patients are experts in their own health and well-being. Traditional clinical measures, while essential, often fail to capture the full spectrum of a patient's health experience. PRMs bridge this gap by providing insights into how patients perceive their health and the impact of medical interventions on their quality of life.<sup>3</sup> These measures are typically collected through standardized questionnaires, allowing for the systematic gathering of data on patients' symptoms, functional status, and overall health-related quality of life.<sup>4,5</sup> Beyond individual patient care, PRM data can inform broader health system improvements. Aggregated PRM data can reveal trends and patterns in patient experiences and outcomes, providing valuable insights for health care organizations and policymakers.<sup>6</sup> This information can guide quality improvement initiatives and policy interventions aimed at reducing health inequities and enhancing the overall performance of the health system.<sup>7</sup> While PRM collection focuses on gathering patient-reported information through standardized tools, the actual utilization of this data involves integrating these insights into clinical decision-making, quality improvement, and policy development.<sup>4,8</sup>

PRMs have already been used in many different healthcare settings, and there is evidence about the benefits of using them in routine care.<sup>9,10</sup> Studies in other healthcare fields, such as oncology, have shown that PRM data can guide symptom management and improve patient-provider communication, yet similar evidence in primary care remains scattered.<sup>9,11</sup> The importance of validated PRMs in clinical assessment has been demonstrated across various specialties.<sup>12</sup> The possibilities of PRMs are increasingly globally acknowledged, but the use and implementation requires recognizing both global research and local and cultural factors<sup>1,13</sup>. In resource-limited health systems, challenges such as limited digital infrastructure and language diversity may introduce biases, for example by excluding patients with low literacy or limited access to technology.<sup>14</sup> Despite the identified benefits of PRM usage, there are also supporting evidence of the challenges and barriers of PRM use.<sup>2,14</sup> These unique features in healthcare systems and patient groups and the identified barriers highlight the need for healthcare field specific studies.

In primary health care settings, PRMs have the potential to transform the way care is delivered. Primary care is often the first point of contact for patients within the health system, making it a critical area for implementing PRM data.<sup>15</sup> However, primary care patients have often divergent health issues which causes complexity to the collection of PRMs.<sup>16</sup> Application of PRMs in primary care has the possibility to bring various benefits on individual, organizational and societal levels. By integrating PRMs into routine care, primary care providers can gain a deeper understanding of their patients' needs and preferences, fostering more personalized and effective treatment plans.<sup>15</sup> Moreover, PRMs can facilitate shared decision-making, enabling patients to actively participate in their care and collaborate with their providers to achieve optimal health outcomes.<sup>17</sup> With the accurate data utilization, PRMs even have the possibility to provide insight on population level health planning.<sup>15</sup> While, the possible barriers and enablers of developing and implementing PRM are widely recognized in various medical contexts,<sup>18</sup> gaps still exist in understanding how PRM data is utilized in primary care settings and what affects the effective utilization of patient-generated data. Proper use of PRM-collected data requires more practical and experiential evidence.<sup>19</sup>

To our knowledge, none of the previous studies synthesized evidence about the use of PRM provided data in the context of primary care. Existing literature often emphasizes barriers and facilitators of PRM implementation rather than examining how collected data informs clinical practice or system-level decisions. While most synthesized evidence has focused on specialty and hospital settings,<sup>8</sup> comparatively little efforts were made to collect and review evidence about how data generated by PRMs is used in primary health care. The limited research on PRMs in primary care may be due to the diversity and complexity of primary care settings, where standardized workflows and resources challenge routine PRM collection. There is a need to collect the existing evidence on the utilization of data provided by the PRMs in the primary care settings to build consensus on the best practices and strategies for overcoming challenges related to PRM data usage. Despite the growing adoption of PRMs, there is limited synthesized evidence on how the data they generate is practically used in primary care. Understanding utilization is critical for realizing the full potential of PRMs in improving patient-centered care.<sup>20</sup> In this study, we systematically reviewed the literature on the utilization of PRM data in primary care. The aim of this study is to identify how PRM data is utilized by healthcare providers, explore the possible factors that affect the effective use of PRM data and explore current practices of PRM data utilization.

## Materials and Methods

In this present research we followed the guidelines presented in the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines 2020 (PRISMA 2020).<sup>21</sup> The protocol of this review project is registered in the Prospective Register of Systematic Reviews (PROSPERO) database (CRD420251030695). Deviations from protocol, if any, are stated below.

## Eligibility Criteria

In this systematic review, primary health care is defined as the foundation of healthcare, providing comprehensive, integrated and accessible public health services. It focuses on the community and family context, health promotion and disease prevention, and serves as the first point of contact in the healthcare system.<sup>22</sup> Primary health care aims to improve overall health, reduce health inequalities and provide continuous and coordinated care for all population groups.<sup>23</sup> This definition was used in the application of the eligibility criteria. The definition and scope of primary health care depends

on the area of work and can vary depending on the context. In our study, we focus on the Nordic country primary health care definition.<sup>24</sup>

Eligible studies for inclusion focused on primary care settings, covering a broad spectrum of services such as health promotion, counselling, checks, oral care, rehabilitation, occupational and environmental health care, outpatient and inpatient care, mental health, and substance abuse services. Studies from other health care fields and specialized care were excluded. The review included studies that involved primary care providers at both individual and organizational levels and examined the use of PRM data by healthcare providers. For this review, PRMs are operationalized as any validated or non-validated instrument, questionnaire, survey, or self-report tool completed by patients to assess health outcomes or care experiences. This includes PROMs, PREMs, and related patient feedback tools. The focus was on identifying tools, practices, barriers, facilitators, or examples related to PRM data utilization and its integration into clinical practice, decision-making, patient management, and communication. Studies that identified various purposes for using patient-reported information were also included. Conversely, studies were excluded if they did not focus on primary care, did not involve PRMs, or did not utilize PRMs in routine care. Exclusions also applied to studies reporting solely on one-time survey procedures without evidence-based knowledge or practical experience regarding PRM utilization, as well as those focusing solely on the development, relevance, quality, and validity of PRMs without implementation in routine clinical settings. Research plans, study protocols, and non-English publications were also excluded. A detailed list of inclusion and exclusion criteria is available in [Supplementary Material 1](#).

## Search Strategy

The literature search followed the PRESS (Peer Review of Electronic Search Strategies) 2015 guideline.<sup>25</sup> One researcher (OT) developed the primary search strategy, which was reviewed by another researcher (AC). The search strategy was tested and modified until the most compatible results compared to the research objectives were found. We chose the following relevant databases in healthcare for the initial search on 18 March 2025: Pubmed, CINAHL, Scopus, Web of Science, Cochrane Library, and PsycArticles, using controlled vocabulary and keywords for healthcare providers, primary care settings, PRMs/PROMs/PREMs, and utilization/implementation/integration. The full strategy of the initial search conducted in different databases is provided in [Supplementary Material 2](#). Reference lists of included studies were hand-searched for additional records.

## Selection Process

Studies retrieved from the identified databases were imported into Endnote 21 for screening. After the removal of duplicates, we moved onto forming the review database by screening the titles. Researcher OT evaluated the studies using predetermined exclusion criteria, categorizing them into “removed after title screening” and “remaining after title screening” groups for verification by researcher AC. Consensus was achieved through discussions. Following this, an abstract screening was conducted. Two researchers, AC and OT, independently reviewed the abstracts of the remaining studies after title screening and classified them into three categories: included, excluded, or not sure. Inter-rater agreement was first assessed using Cohen’s Kappa statistic, yielding a moderate agreement ( $\kappa = 0.40$ ). Following a discussion to refine and clarify inclusion/exclusion criteria, both reviewers independently re-screened the abstracts. The Kappa improved substantially to  $\kappa = 0.81$  described in [Supplementary Material 3](#), indicating strong agreement. Any disagreements between researchers AC and OT during this step were resolved through discussion or consultation with a third reviewer. The title and abstract screening process resulted in a list of potentially eligible studies. The full texts of these studies were then retrieved and assessed by three researchers, AC, KV and OT, against the inclusion and exclusion criteria. After several rounds of full-text reading and discussions, a review database was compiled. After full-text screening, studies meeting all eligibility criteria were included.

Two reviewers independently screened titles/abstracts and full texts against eligibility criteria, resolving disagreements through discussion or a third reviewer. Reasons for exclusion at the full-text stage were recorded.

## Data Extraction

The data collection process for this systematic literature review involved a structured and standardized approach to ensure the accuracy and comprehensiveness of the extracted information. A pre-designed data extraction form was developed and tested to systematically gather relevant information from each study included. The Excel-form was developed based on the research questions and outcomes of interest identified in the review protocol and research objectives. An extraction form captured study characteristics (for example author, year, country/setting, design, participants), PRM data utilization setting and characteristics, practices, tools and barriers and examples of data usage, key findings, author-proposed recommendations and suggestions for PRMs data usage and author-identified limitations and future research opportunities. [Supplementary Material 4](#) lists all the items defined in the data extraction form. In the formal extraction process, data extraction was conducted by researcher OT and KV and checked for accuracy by researcher AC. Both reviewers worked independently to extract data from each report, which minimized bias and ensured reliability in the data collection process. After the initial extraction, the two reviewers compared their findings and resolved any discrepancies through discussion. If needed, a third researcher, PT, was consulted to reach a consensus on any conflicting data. For each outcome domain, all results compatible with the specified outcomes were sought. This included collecting data on all relevant measures, time points, and analyses reported in each study. If a study did not provide comprehensive results for a particular outcome, the reviewers followed a systematic approach to decide which results to include, prioritizing those that were most relevant to the research questions and aligned with the predefined outcomes. In cases where critical data were missing and could not be confirmed through investigation, the reviewers documented these gaps and noted them in the final review.

## Quality Appraisal

The methodological quality of the studies included in this systematic literature review was assessed using the Mixed Methods Appraisal Tool (MMAT). This tool is designed to evaluate the quality of qualitative, quantitative, and mixed-method studies, ensuring that the included research meets a certain standard of rigor. The quality appraisal process involved a systematic review of each study based on specific criteria outlined in the MMAT. Each study was categorized according to its design, and two screening questions were applied: (1) Are there clear research questions? and (2) Do the collected data allow addressing the research questions? Following the screening, the studies were rated on a scale from 1 to 5, with points awarded based on the presence of strong methodological features as per the MMAT guidelines. Studies were appraised using MMAT and categorized as low (1–2/5), moderate (3–4/5), or high quality (5/5) based on MMAT criteria. No formal sensitivity analyses were performed given the qualitative synthesis approach; however, study quality and design were considered during thematic synthesis to ensure that findings were not disproportionately influenced by lower-quality studies.

## Synthesis Methods

This systematic literature review employed a qualitative synthesis strategy to analyze the findings from the studies included. We implemented a deductive-inductive thematic synthesis approach, which allowed us to derive utilization themes from the data while also being open to emerging insights from the studies. We began by identifying predefined topics relevant to the utilization of PRM data. The topics we identified by team discussions and initial readings. These topics included the utilization of PRM data by healthcare providers, examining how they incorporate PRM data into their practice; factors affecting effective use of PRM data, which involved identifying barriers and facilitators that influence the successful implementation of PRM data in clinical settings; purposes for using PRM data, aimed at understanding the various objectives for which healthcare providers utilize PRM data; and concrete examples and outcomes of PRM data use, highlighting specific instances and the resultant impacts of utilizing PRM data. Each study's findings were systematically mapped under the relevant predefined topics. This process allowed for a comprehensive overview of how PRM data is utilized across different contexts and settings, facilitating a clearer understanding of the overarching themes. Due to the heterogeneity of included studies in terms of design, setting, and outcomes, a meta-analysis was not feasible.

Instead, we used a deductive-inductive thematic synthesis to explore patterns and potential sources of variability in PRM data utilization, including differences across healthcare settings, study populations, and study designs.

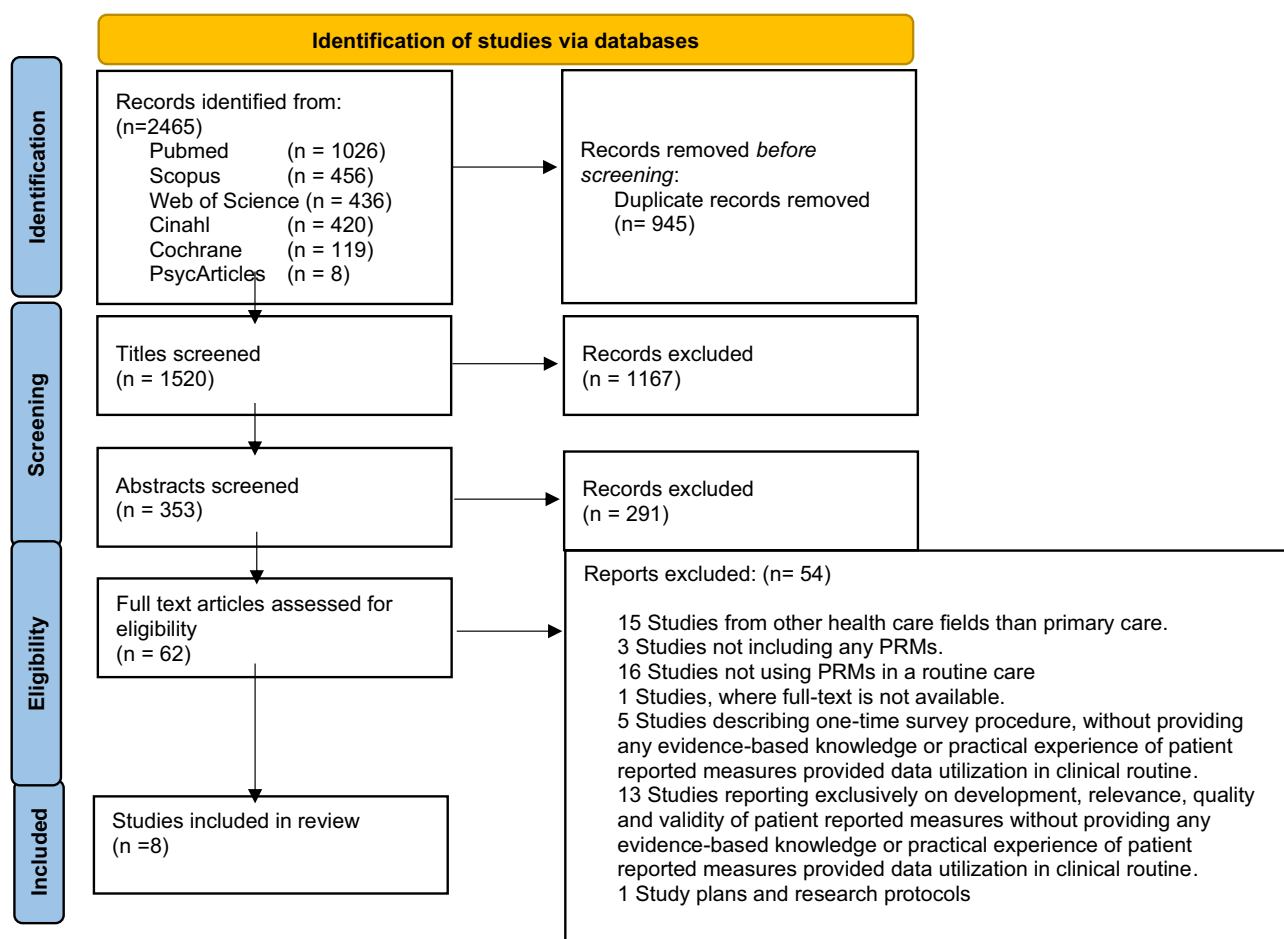
## Results

### Selection and Inclusion of Studies

Altogether 2465 records were identified from Pubmed (1026), Scopus (456), Web of Science (436), Cinahl (420), Cochrane (119) and PsycArticles (8). After removing duplicates, title and abstract screening, sixty-two full texts were assessed, and eight studies were included in the final analysis. The PRISMA 2020 flow diagram is presented in Figure 1.

### Characteristics of Studies Included in the Review

The eight studies (2016–2021) spanned the United States (n=3)<sup>26–28</sup> the United Kingdom (n=2),<sup>29,30</sup> the Netherlands (n=1),<sup>31</sup> Sweden (n=1)<sup>32</sup> and Denmark (n=1).<sup>33</sup> Designs included qualitative descriptive/interpretive studies, cross-sectional surveys, and mixed-methods (surveys with interviews). Participants included general practitioners/primary care providers, physiotherapists, nurses, and other primary-care clinicians. Reported PRMs spanned mental health screens, pain/function measures (for example VAS, NRS, PSFS), and multi-domain screening bundles embedded in electronic health record (EHR). An overview of these studies with selected basic information and the data utilization context is provided in Table 1.



**Figure 1** PRISMA 2020 flow diagram of search, screening and selection process of studies included in the systematic review.

**Table 1** An Overview of Included Studies with Selected Basic Information

Study	Country	Type of Publication	Study Designs (MMAT)	Primary Health Context	PRM data Utilization Context	Study Participants
K. Hinami et al 2016 <sup>26</sup>	United States	Brief communication	Quantitative descriptive study – Retrospective cohort study	A primary care clinic of an urban health system	Physicians had access to results of the standardized assessments during the encounter	145 primary care patient's physician notes
J. Knoop et al 2020 <sup>31</sup>	Netherlands	Research article	Quantitative descriptive study – survey	Physiotherapists in primary care working with patients with LBP.	The measurement instruments were most often completed by the patient online (58%) or by the physiotherapist after interviewing the patient (44%)	85 physiotherapists
I. Litchfield et al 2021 <sup>30</sup>	United Kingdom	Research article	Qualitative studies –Qualitative description	Primary care practices across England, representing 21 different clinical commissioning groups (CCGs), exploring PROMs use as part of routine clinical care	The group described how the majority of PROMs were completed as paper copies	25 general practitioners
C. T. Mejdahl et al 2018 <sup>33</sup>	Denmark	Research article	Qualitative study –interpretive description	AmbuFlex/Epilepsy tool that was implemented in three different outpatient clinics in the Central Denmark Region, and it is now the standard follow-up for 54% of patients with epilepsy in these clinics	AmbuFlex is a generic web-based PRO system that supports demand-driven outpatient follow-up as opposed to follow-up with regular fixed consultation.	13 clinicians: eight nurses and five physicians.
D. Mou et al 2021 <sup>27</sup>	United States	Research article	Mix method study – a sequential explanatory design where the quantitative data (survey) are further explored with the qualitative data (a semi structured questionnaire)	Massachusetts General Hospital which has 19 affiliated PCP clinics that serve over200000patients.	All of organisation's PCP practices launched the Primary Care Screening Bundle (PCSB), a standardised 70-item questionnaire that is administered at annual visits and new patient visits. PROs are administered through electronic health record (EHR) on both a digital patient portal and tablets in clinic. Results are immediately available for review within the patient chart. The organisation uses this platform for its PRO collection.	172 primary care physicians
G. M. Turner et al 2020 <sup>29</sup>	United Kingdom	Research article	Mixed method studies – a mixed methods design comprising a survey and qualitative interviews.	Primary care practices across England, representing 21 different clinical commissioning groups	GPs most frequently accessed PROMs through clinical systems	125 general practitioners
D. B. Wesley et al 2019 <sup>28</sup>	United States	Research article	Qualitative studies –Qualitative description	Ambulatory care facilities and physician offices located in the mid-Atlantic region of the United States	Seven of the nine healthcare providers focused on the presentation of the PRO data within the EHR, stressing it needed to be easy to access and easy to understand and interpret in a short timeframe once viewed. All nine healthcare providers expressed a preference for PRO data to be auto-populated in the EHR. All nine healthcare providers expressed concern with the level of integration of PRO data within the EHR, and the extent to which this enabled use of the data without impacting time or workflow. For four of the nine, the key concern was the time potentially taken to search for, retrieve and review the PRO data in the EHR.	9 Primary healthcare providers
S. Östhols et al 2019 <sup>32</sup>	Sweden	Research article	Quantitative descriptive study –a non-experimental cross-sectional survey	Primary health care physiotherapy, focusing on physiotherapists who regularly meet patients suffering from low-back pain	Primary health care physiotherapy,focusing on physiotherapists who regularly meet patients suffering from low-back pain	1217 physiotherapists

## Findings About PRM Data Utilization in Primary Care

We identified themes and relevant findings under each overarching topic for presenting how PRM data are used and what are the factors affecting that use in primary care. The findings concerning the previously mentioned research objectives are detailed below with separate quality assessment and confidence in findings. [Table 2](#) describes the synthesized empirical evidence that shows the emerged findings.

### Purposes and Examples from PRM Data Utilization in Primary Care

Based on five studies,<sup>28,29,31–33</sup> currently PRM data is used to support clinical decision-making and three studies<sup>28,29,32</sup> contributed to the finding that PRM data enhance shared decision-making and communication. PRMs support clinical decision-making by aiding in screening, diagnosis, treatment planning, and monitoring patient progress across the continuum of care.<sup>29</sup> They are used to identify patients who require clinical attention, to evaluate symptoms, track rehabilitation outcomes, and measure treatment effect over time.<sup>31–33</sup> Clinicians reported using PROMs for areas such as mental health screening and physical function assessment, as well as to inform referrals and justify treatments.<sup>28</sup> PROMs also facilitate shared decision-making and enhance communication during visits by providing quantitative insights that prompt discussion. Although usage varies, most providers acknowledged that the results often influence their clinical decisions and help tailor care to individual patient needs.<sup>31</sup>

The findings from three studies<sup>30,31,33</sup> underscore the significant role that PRMs play in enhancing communication between patients and healthcare providers, particularly in the context of shared decision-making. PRMs enhance shared decision-making and communication by facilitating patient engagement, guiding discussions during visits, and improving collaboration among healthcare providers.<sup>24,25,27,30,31,33</sup> Evidence indicates that the utilization of PRMs facilitates prioritization of conversation topics, allowing healthcare professionals to engage patients in discussions about sensitive issues such as anxiety and impotence. For instance, nurses reported that PRMs empower patients to initiate dialogues about these challenging subjects, fostering a more open and supportive environment for communication.<sup>33</sup>

Two of the studies<sup>31,33</sup> highlighted that the use of PRM data contributes to professional empowerment among healthcare providers, serving as a clinical aid. Nurses reported that the implementation of PRO-based follow-ups not only refined their nursing care but also increased the visibility and importance of their roles within the healthcare system. Clinicians also experienced improvements in their practice, as the continuous collection of PRO measures allowed for a comprehensive overview of patients' health statuses over time.<sup>33</sup> Healthcare providers indicated that the insights gained from these instruments frequently influenced their clinical choices.<sup>31</sup>

Two studies<sup>27,33</sup> supported the evidence that the utilization of PRM data can result in efficiency and resource optimization within healthcare settings. Evidence from one study<sup>33</sup> highlights how tools like AmbuFlex facilitate demand-driven outpatient follow-up, ensuring that patients who require the most attention receive timely care. Clinicians actively utilize patients' self-reported PRO data as decision aids, enabling them to identify individuals in need of clinical intervention effectively. The algorithmic processing of PRO responses further streamlines this process, categorizing patients into different statuses based on their needs. This triaging system allows for efficient management of patient follow-ups. Some primary care providers reported improvements in clinic operations, as PROs aid in meeting regulatory screening requirements and enhance EHR documentation. Conversely, others expressed concerns that the implementation of PROs could disrupt clinic flow, suggesting a nuanced relationship between PRM data usage and operational efficiency.<sup>27</sup>

### PRM Data Utilization Practices

Six studies<sup>27–30,32,33</sup> contributed to the evidence that the utilization of the collected PRM data was affected by its format, presentation and usability. The extent to which healthcare providers could utilize PRM data was heavily dependent on how well these measures were integrated into existing EHR systems. PRMs were often inaccessible or poorly presented in existing platforms, making them difficult for clinicians to locate or interpret.<sup>32</sup> Many emphasized that when PRM data was integrated into the EHR in a clear graphical overview or dashboard, it was far more useful—especially if it could be reviewed quickly before a patient visit.<sup>30</sup> Electronic delivery through patient portals and tablets improved PRM questionnaire completion rates and usability, but only when the system was user-friendly for both patients and

**Table 2** Synthesized Empirical Evidence of the Utilization of PRM Data

Deductive Theme	Original Evidence Extracted from the Studies	Coded Data	Emergent Themes	Findings
Utilization of PRM Data by Healthcare Providers	<p>Further barriers, were that PROMs were not accessible in the clinic's internal web system, meaning more administration and paperwork, which was not possible.<sup>32</sup></p> <p>The PRO overview is presented graphically to the clinician within the electronic health record system.<sup>33</sup></p> <p>the preferred format for GPs recording PROM results was electronic: as part of the electronic health record.<sup>29</sup></p> <p>Some felt that although PROMs had the potential to be digitally integrated into existing systems, they were currently poorly packaged and presented.<sup>30</sup></p> <p>The group described how the majority of PROMs were completed as paper copies. One GP described how being able to capture patient responses electronically would enhance their usability:</p> <p>'I think they clearly need to be captured in a coded way; they need to be capturable, potentially independent of the consultation. So I don't think a PROM captured as a result of "how I've done your diabetic check, are you satisfied with it?" is necessarily a valid or appropriate way of doing it. I know that there are quite a lot of systems used for texting patients to remind them of their appointments or to ask them to book appointments, and I would think building the PROMs into those platforms so it's automated and not time consuming to collect them is probably the best way to go.' (GP1, female, 29-years qualified, South East)<sup>30</sup></p> <p>In 2014, our organisation implemented a system-wide PRO initiative that has since collected over five million questionnaires across 231 clinics, 56 specialties and 98 geographical locations. PROs are administered through our electronic health record (EHR) on both a digital patient portal and tablets in clinic (Epic, Verona, Wisconsin, USA). Results are immediately available for review within the patient chart. Our organisation uses this platform for its PRO collection.<sup>27</sup></p> <p>PCPs also remarked that the PRO platform is not user-friendly for clinicians, both in terms of accessing the data and interpreting the data: he frustration of even finding the PROs is pretty high. [Once I find the data] I cannot even tell which [PRO question] is which because they are just all like shoved down there into one big blob of text. I wish there were a way to just visually tell like a like a good dashboard in your car if it's a red light that means there's something wrong. (PCP 5)<sup>27</sup></p> <p>In 2019, 114,521 out of 154,758 qualifying patients (74%) successfully completed the PCSB. The high patient completion rate of PROs is due to several factors. First and foremost, all PROs are available electronically at the time of the visit and also within the online portal in the week prior to the visit. Immediately on completion, they are available for the clinician to use in the EHR.<sup>27</sup></p> <p>Seven of the nine healthcare providers indicated that they would prefer to review the PRO data immediately prior to a patient visit and all agreed that the data would need to be in a format easily reviewed in under five minutes prior to the patient encounter.<sup>28</sup></p> <p>One major theme that emerged for healthcare providers was the criticality of optimal EHR visualization. Seven of the nine healthcare providers focused on the presentation of the PRO data within the EHR, stressing it needed to be easy to access and easy to understand and interpret in a short timeframe once viewed. All nine healthcare providers expressed a preference for PRO data to be auto-populated in the EHR.<sup>28</sup></p>	<p>PROMs not accessible in the clinic's internal web system</p> <p>The PROs overview presented graphically in the electronic health record system</p> <p>Preferred format as part of the electronic health record</p> <p>PROMs were poorly packaged and presented</p> <p>Capture patient responses electronically would enhance their usability</p> <p>PROs are administered through electronic health record (EHR) on both a digital patient portal and tablets in clinic</p> <p>PRO platform is not user-friendly for clinicians, both in terms of accessing the data and interpreting the data</p> <p>High patient PRO completion rate is because PROs are available electronically at the time of the visit and also within the online portal in the week prior to the visit</p> <p>Preferred way to review the PRO data immediately prior to a patient visit</p> <p>Data would need to be in a format easily reviewed in under five minutes prior to the patient encounter</p> <p>The presentation of the PRO data within the EHR, stressing it needed to be easy to access and easy to understand and interpret in a short timeframe once viewed</p>	<p>Format, Presentation, and Usability of PRM Data:</p> <p>To what extent PRMs are embedded into health IT systems and workflows.</p>	<p>The effective utilization of PRM data hinges significantly on its format, presentation, and usability</p>

<p>Utilization of PRM Data by Healthcare Providers</p>	<p>AmbuFlex is a generic web-based PRO system that supports demand-driven outpatient follow-up as opposed to follow-up with regular fixed consultation.<sup>33</sup> The group described how the majority of PROMs were completed as paper copies. One GP described how being able to capture patient responses electronically would enhance their usability: 'I think they clearly need to be captured in a coded way; they need to be capturable, potentially independent of the consultation. So I don't think a PROM captured as a result of "now I've done your diabetic check, are you satisfied with it?" is necessarily a valid or appropriate way of doing it. I know that there are quite a lot of systems used for texting patients to remind them of their appointments or to ask them to book appointments, and I would think building the PROMs into those platforms so it's automated and not time consuming to collect them is probably the best way to go.' (GP1, female, 29-years qualified, South East)<sup>30</sup></p> <p>One GP noted that current processes already produce an abundance of patient data and there was little incentive to collect more.<sup>30</sup></p> <p>First and foremost, all PROs are available electronically at the time of the visit and also within the online portal in the week prior to the visit. Immediately on completion, they are available for the clinician to use in the EHR. This standardises the workflow throughout our practices and ensures that physicians know where to find the results.<sup>27</sup></p> <p>The existing PRO platform may further promote clinic efficiency by facilitating EHR documentation – However, not all PCPs agree that the current PRO platform promotes efficiency. This variation appears to stem from different office clinic workflows and clinician habits.<sup>27</sup></p> <p>The healthcare providers stressed the need for valid, accurate PRO data. Two of these providers explicitly stated they would want the option for someone to verify and validate the data before they are permanently entered into the patient's record.<sup>28</sup></p> <p>Three of the healthcare providers indicated that they do not currently use PROs to inform their clinical care and decisions at all, stating that the subjective nature of PROs and the time required to collect and interpret these data were major deterrents.<sup>28</sup></p> <p>Notably, none of these PRO data were directly entered by the patient, rather they were administered by the healthcare provider to inform Activities of Daily Living (ADL) decisions and other referrals.<sup>28</sup></p> <p>Physiotherapists generally use screening tools during (or even before) intake (94%) and, in some cases, during (34%) or at the end of treatment (47%) as well.<sup>31</sup></p> <p>In this analysis of PROs joined with electronic health records, we confirmed that the majority of symptoms elicited from standardized assessments were not documented by physicians. We newly demonstrated that documented symptoms were more severe, on average, than undocumented symptoms, and that specific symptoms (pain, shortness of breath, and weight loss) were more frequently recognized.<sup>26</sup></p> <p>Physicians authoring the notes had access to results of the standardized assessments during the encounter. These clinical notes were not constrained by uniform structured templates and included narrative and outline elements that followed the traditional subjective-objective assessment-plan (SOAP) format.<sup>26</sup></p>	<p>Web-based PRO system that supports demand-driven outpatient follow-up as opposed to follow-up with regular fixed consultation</p> <p>Emerging PROM collection to existing platforms so it's automated and not time consuming to collect them</p> <p>Current processes produce an abundance of patient data and there was little incentive to collect more</p> <p>Immediately on completion, they are available for the clinician to use in the EHR, which standardises the workflow throughout our practices and ensures that physicians know where to find the results</p> <p>PRO platform may promote clinic efficiency by facilitating EHR documentation, depending on clinic workflows and clinician habits</p> <p>The healthcare providers stressed the need for valid, accurate PRO data. Want an option for someone to verify and validate the data before they are permanently entered into the patient's records</p> <p>Subjective nature of PROs and the time required to collect and interpret these data effect the use of PROs</p> <p>PRO data not directly entered by the patient, but administered by the healthcare provider to inform Activities of Daily Living (ADL) decisions and other referrals</p> <p>Use of screening tools in different phases of treatment</p> <p>The majority of symptoms elicited from standardized assessments were not documented by physicians</p> <p>Physicians had access to results of the standardized assessments during the encounter</p>	<p>PRM data as a part of clinical workflow: How the design, packaging, and readability of PRMs affects clinical use</p>	<p>The incorporation of PRM data into clinical workflows is crucial</p>
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(Continued)

Table 2 (Continued).

Deductive Theme	Original Evidence Extracted from the Studies	Coded Data	Emergent Themes	Findings
Factors Affecting Effective Use of PRM Data	<p>Lack of time in the consultation to complete, analyse and integrate an additional source of information was described and one GP felt this was a barrier to their routine use.<sup>29</sup></p> <p>A number of participants felt that the time it takes to complete, analyse, and usefully integrate the additional sources of information provided by PROMs could impact on their use.<sup>30</sup></p> <p>Patients completing these screens prior to the visit saves time during the clinical encounter, as the results will have already been documented in the EHR.<sup>27</sup></p> <p>All nine healthcare providers expressed concern with the level of integration of PRO data within the EHR, and the extent to which this enabled use of the data without impacting time or workflow. For four of the nine, the key concern was the time potentially taken to search for, retrieve and review the PRO data in the EHR.<sup>28</sup></p>	<p>Lack of time was a barrier to PROM routine use</p> <p>The time it takes to complete, analyse, and usefully integrate the additional sources of information provided by PROMs could impact on their use</p> <p>Patients completing screens prior to the visit saves time during the clinical encounter, as the results will have already been documented in the EHR</p> <p>concern with the level of integration of PRO data within the EHR and its effect to the use of the data without impacting time or workflow</p>	<p>Time and Workflow Efficiency:</p> <p>Time-related constraints and workflow disruptions significantly influence the uptake and integration of PRM data</p>	<p>Time-related constraints and workflow disruptions significantly influence the uptake and integration of PRM data</p>
Factors Affecting Effective Use of PRM Data	<p>The participants described several barriers, such as restrictions in the electronic journal system, which means extra administration to include PROMs. Further barriers, were that PROMs were not accessible in the clinic's internal web system, meaning more administration and paperwork, which was not possible. The respondents also found that the routines at their work place prevent them from using PROMs, and that if a license was needed to use PROMs this would have a cost implication.<sup>32</sup></p> <p>Lack of integration with clinical systems was also identified as a potential barrier; in some cases PROMs were integrated in clinical systems but they were not easy to use.<sup>29</sup></p> <p>PCPs ranked the top three barriers to using PROs descending order of importance 'difficult data format', 'survey too long' and 'iPad technical problems'<sup>27</sup></p> <p>PCPs discussed the need for more detailed patient history questions (eg, family story, smoking, history) and better data formatting that readily highlights concerning or abnormal PRO findings to clinicians.<sup>27</sup></p> <p>All nine healthcare providers expressed concern with the level of integration of PRO data within the EHR, and the extent to which this enabled use of the data without impacting time or workflow. For four of the nine, the key concern was the time potentially taken to search for, retrieve and review the PRO data in the EHR.<sup>28</sup></p>	<p>restrictions in the electronic journal system, which means extra administration to include PROMs</p> <p>PROMs were not accessible in the clinic's internal web system, meaning more administration and paperwork</p> <p>Lack of integration with clinical systems</p> <p>top three barriers to using PROs: data format, survey too long and iPad technical problems</p> <p>PCPs discussed better data formatting (53) that readily highlights concerning or abnormal PRO findings to clinicians</p> <p>concern with the level of integration of PRO data within the EHR and its effect to the use of the data without impacting time or workflow</p>	<p>EHR Integration and Data Accessibility:</p> <p>The effectiveness of PRM data is closely tied to how well it's embedded into the EHR and clinical systems.</p>	<p>The effectiveness of PRM data is closely tied to how well it's embedded into the EHR and clinical systems.</p>

<p>Factors Affecting Effective Use of PRM Data</p>	<p>The respondents also found that the routines at their work place prevent them from using PROMs, and that if a license was needed to use PROMs this would have a cost implication. – Yet another statement was that, since there is no obligation to use PROMs, they are not prioritized. Some said that other caregivers do not know these instruments and therefore do not know how to handle the result.<sup>32</sup> There appeared little impetus for changing existing ways of working to incorporate PROMs and their training meant they could gather the same information without using PROMs, which could actually impede patient-focused conversations.<sup>30</sup> GPs described uncertainty about the efficacy of PROMs and whether they offer any advantage over more traditional patient consultations. Concerns were also voiced about the reliability of a single tool when used on patients with varied needs, abilities, and comorbidities.<sup>30</sup></p>	<p>other caregivers do not know these instruments and therefore do not know how to handle the result the routines at workplace prevent from using PROMs little impetus for changing existing ways of working to incorporate PROMs Uncertainty about the efficacy of PROMs and whether they offer any advantage over more traditional patient consultations</p>	<p>Knowledge, Attitudes, and Organizational Culture: Lack of familiarity, skepticism, and resistance to change hinder PRM use</p>	<p>The knowledge, attitudes, and organizational culture surrounding PRM data play a significant role in its effective use</p>
<p>Purposes for Using PRM Data</p>	<p>They were used to assess and diagnose and to follow-up the progress of rehabilitation and to evaluate interventions. The PROMs were also used to capture those with so called “yellow flags” to be taken into consideration in the management.<sup>32</sup> Clinicians use the patients’ self-reported PRO data as a decision aid to identify those who need clinical attention.<sup>33</sup> the most common areas GPs considered PROMs could provide the most benefit were to aid clinical management (n = 66), as a screening/diagnostic tool (n = 62) or facilitate shared-decision making.<sup>29</sup> Six of the nine of the healthcare providers currently used PROs in their clinical practice, at least occasionally. Two of the providers reported using PROs for mental health screening while four healthcare providers used physical function PROs.<sup>28</sup> The nine healthcare providers indicated they would use PRO apps to facilitate care (n = 3), gain quantitative insight regarding function (n = 7), inform referrals (n = 2), and justify treatments for their patient (n = 1). Only one healthcare provider stated that they would not use PRO data at all, while remaining eight reported there was value in PRO apps and the data generated to improve communication with patients, and to provide content for discussion during visits.<sup>28</sup> Treatment effect evaluation (53%) and symptom assessment (51%) were the most frequently reported reasons for using these instruments.<sup>31</sup> More than a quarter (28%) of the respondents reported that the outcome of the instrument often or always influenced their clinical decision-making.<sup>31</sup></p>	<p>PROMs were used to assess and diagnose and to follow-up the progress of rehabilitation and to evaluate interventions PROMs were used to capture those with so called “yellow flags” to be taken into consideration in the management PRO data as a decision aid to identify those who need clinical attention aid clinical management as a screening/diagnostic tool using PROs for mental health screening use of physical function PROs gain quantitative insight regarding function inform referrals Treatment effect evaluation Symptom assessment Result would effect clinical decision making</p>	<p>Clinical Decision-Making — Management, Screening &amp; Diagnosis PROMs support clinical decision-making by aiding in screening, diagnosis, treatment planning, and monitoring patient progress across the continuum of care.</p>	<p>PRM data is used to support clinical decision-making</p>

(Continued)

Table 2 (Continued).

Deductive Theme	Original Evidence Extracted from the Studies	Coded Data	Emerged Themes	Findings
Purposes for Using PRM Data	<p>The results of the PROMs were compared to the physiotherapists' findings from the clinical testing in order to validate whether the clinical assessment and what the patient reported corresponded.<sup>32</sup></p> <p>PROMs were considered helpful when communicating with other health professionals about the patients' condition, when, for example, giving feed-back to physicians.<sup>32</sup></p> <p>the most common areas GPs considered PROMs could provide the most benefit were to aid clinical management (n = 66), as a screening/diagnostic tool (n = 62) or facilitate shared-decision making.<sup>29</sup></p> <p>The nine healthcare providers indicated they would use PRO apps to facilitate care (n = 3), gain quantitative insight regarding function (n = 7), inform referrals (n = 2), and justify treatments for their patient (n = 1). Only one healthcare provider stated that they would not use PRO data at all, while remaining eight reported there was value in PRO apps and the data generated to improve communication with patients, and to provide content for discussion during visits.<sup>28</sup></p>	<p>the results of the PROMs were used to validate whether the clinical assessment and what the patient reported corresponded</p> <p>communicating with other health professionals about the patients' condition</p> <p>facilitate shared-decision making</p> <p>healthcare providers would use PRO apps to facilitate care</p> <p>justify treatments for their patient</p> <p>the generated data improved communication with patients, and provides content for discussion during visits</p>	<p>Shared decision making and communication</p> <p>PROMs enhance shared decision-making and communication by facilitating patient engagement, guiding discussions during visits, and improving collaboration among healthcare providers.</p>	<p>PRMs enhance shared decision-making and communication</p>
Concrete Examples and Outcomes of PRM data Use	<p>PRO measures made it easier to prioritise conversation topics, and PRO measures enhanced discussions of sensitive issues with the patient. Nurses found that PRO made it easier for some patients to initiate dialogues concerning sensitive problems like impotence or anxiety.<sup>33</sup></p> <p>77% of PCPs reporting that they reviewed PRO responses with their patients.<sup>33</sup></p> <p>PROMs helped provide a framework for shared decision making: It does help direct the discussion regarding future management, especially the mental health patients because it allows them to objectively score how they feel and what's going on, and allows me to help discuss treatment options with them.<sup>30</sup></p> <p>Almost two-thirds (65%) of the respondents reported discussing the outcome of the instrument with most or all of their patients.<sup>31</sup></p>	<p>PRO measures made it easier to prioritise conversation topics, and PRO measures enhanced discussions of sensitive issues with the patient</p> <p>Review PRO responses with patients</p> <p>PROMs helped provide a framework for shared decision making</p> <p>Discussing the outcome of the instrument with patients</p>	<p>Patient-professional communication and shared decision making</p>	<p>PRM response utilization enhances communication between patients and healthcare providers</p>
Concrete Examples and Outcomes of PRM data Use	<p>Nurses emphasised that PRO-based follow-up had yielded a refined nursing care, as the nursing assignments and responsibility embedded in the system made nursing more visible and important. Due to the questions about psychosocial problems, the nurses experienced assignments to be aligned with the "core of nursing".</p> <p>Additionally, nurses found that their nursing practice improved, given that the PRO questionnaire guided the dialogue with the patient during telephone conversations.<sup>33</sup></p> <p>Clinicians found that a patient's repeatedly collected PRO measures improved the clinicians' overview and assessment of the patient's health status over time.<sup>33</sup></p> <p>More than a quarter (28%) of the respondents reported that the outcome of the instrument often or always influenced their clinical decision-making.<sup>31</sup></p>	<p>PRO-based follow-up had yielded a refined nursing care, as the nursing assignments and responsibility embedded in the system made nursing more visible and important</p> <p>Patient's repeatedly collected PRO measures improved the clinicians' overview and assessment of the patient's health status over time.</p> <p>Outcome of the instrument often or always influenced clinical decision-making</p>	<p>Professional empowerment and clinical aid</p>	<p>The use of PRM data contributes to professional empowerment among healthcare providers, serving as a clinical aid</p>

<p>Concrete Examples and Outcomes of PRM data Use</p>	<p>They emphasised that AmbuFlex supported demand-driven outpatient follow-up implying that the patients with the greatest need of attention did, in fact, receive this attention.<sup>33</sup></p> <p>Clinicians use the patients' self-reported PRO data as a decision aid to identify those who need clinical attention. Nurses or physicians refer patients to PRO-based follow-up after having assessed their health status and their ability to fill in PRO questionnaires<sup>33</sup></p> <p>The patients' PRO responses are automatically processed according to a specific algorithm and given a "green", "yellow" or "red" status. A red status indicates that the patient needs or wishes contact, a yellow status indicates that the patient may need contact, and a green status indicates that the patient has no current need or wish of attention. A green status is automatically handled by the server software and a new PRO assessment is scheduled, whereas a clinician has to decide whether a yellow status patient needs contact or not.<sup>33</sup></p> <p>Certain PCPs found that PROs improve clinic efficiency by facilitating completion of screening questions required by regulatory bodies and expediting EHR documentation, whereas others claimed that PROs worsen clinic efficiency by obstructing clinic flow<sup>27</sup></p>	<p>AmbuFlex supported demand-driven outpatient follow-up implying that the patients with the greatest need of attention did, in fact, receive this attention</p> <p>PRO data as a decision aid to identify those who need clinical attention</p> <p>Automatic processing of patients' PRO responses</p> <p>PROs improve clinic efficiency by facilitating completion of screening questions</p>	<p>Efficiency and resource optimization</p>	<p>The utilization of PRM data can result in significant efficiency and resource optimization within healthcare settings</p>
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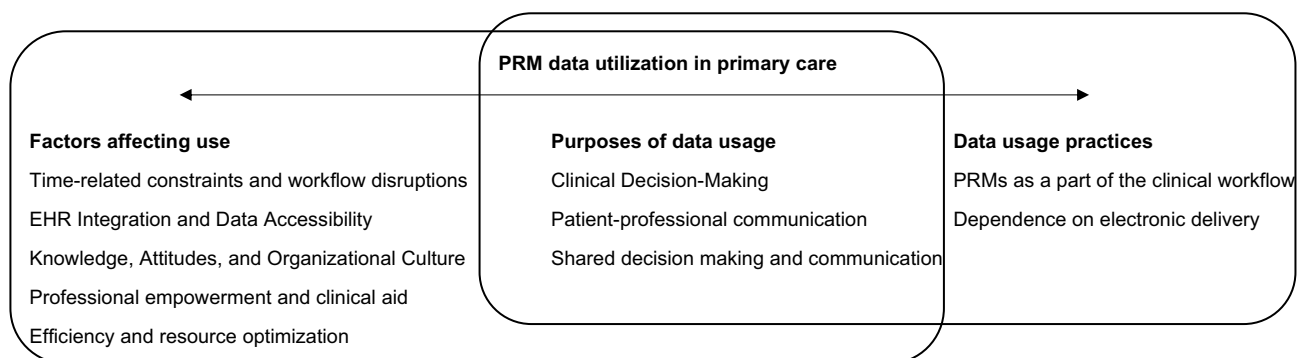
clinicians.<sup>27</sup> Overall, clinicians preferred PRM data to be embedded directly in the EHR in an easy-to-read, concise format that can be interpreted in under five minutes and immediately inform clinical decision-making.<sup>28</sup> The studies highlighted the negative impact of technical constraints, such as malfunctioning digital devices or incompatibilities between systems, which hindered efficient access to patient input. Therefore, system-level accessibility was a foundational determinant of PRM usage in practice. Six studies<sup>26–28,30,31,33</sup> also contributed to the evidence that the effective integration of PRMs into clinical workflows was essential for enabling healthcare providers' utilization of patient data. When PRM data was effectively integrated into EHRs, it facilitated smoother workflows and enhanced the ability of clinicians to make timely, informed decisions based on patient feedback.<sup>27</sup> PRM data that was detached from core clinical systems or accessible only through separate platforms imposed additional administrative burden and often remained underused.<sup>26,30</sup>

### Factors Affecting the Use of PRM Data

Four studies contributed to the finding that time-related constraints and workflow disruptions significantly influence the uptake and integration of PRM data.<sup>27–30</sup> Many clinicians reported that collecting and interpreting PRM data added to consultation time and disrupted established workflows, leading to inconsistent use.<sup>28,30</sup> However, when patients completed PRMs prior to visits and results were automatically available, the measures helped streamline conversations and focus the interaction.<sup>27</sup> Thus, PRMs had the potential both to burden and to optimize workflows depending on their level of integration.

Four studies<sup>27–29,32</sup> provided evidence that the effectiveness of PRM data is closely tied to how well it's embedded into the EHR and clinical systems. Barriers included poor integration with electronic journals,<sup>28</sup> a lack of access to PROMs within clinical software,<sup>29</sup> and increased administration due to paper-based workflows.<sup>32</sup> Technical issues such as incompatible data formats, long surveys, and device problems were also frequently reported.<sup>27</sup> Clinicians emphasized that without streamlined integration into existing systems that presents PRM results in a clear, actionable format, the data is time-consuming to use and unlikely to be adopted in routine care.

Two studies<sup>30,32</sup> provided evidence that the knowledge, attitudes, and organizational culture surrounding PRM data play a significant role in its effective use. Lack of familiarity, skepticism, and resistance to change hinder PRM use. Respondents reported that PRMs are not prioritized in daily practice, as existing workflows do not support their use. Many clinicians noted that their colleagues are unfamiliar with these instruments and therefore unsure how to interpret or act on the results.<sup>32</sup> Some felt that their current training already enables them to gather the same information during regular consultations, sometimes even more effectively than structured questionnaires, which they felt could hinder personalized, patient-focused conversations.<sup>29</sup> Variations between studies were noted, reflecting heterogeneity in primary care settings, study population, and integration of PRM systems. For example, workflow constraints and technical integration differed across studies, influencing PRM utilization. A visual synthesis of PRM data utilization is presented in Figure 2.



**Figure 2** A visual synthesis of the emerged themes.

## Quality Assessment and Confidence in Findings

Overall, the eight included studies were of moderate quality. The results of the quality assessment are summarized in [Supplementary Material 5](#). MMAT ratings were high for several qualitative studies and moderate for some surveys and mixed-methods studies, primarily due to non-response bias, limited representativeness, and insufficient integration of mixed-methods components. No study was excluded based on quality appraisal. Confidence in the core findings was generally moderate, with some concerns arising from moderate MMAT ratings in certain surveys and mixed-methods studies, limited geographical and professional diversity and heterogeneity in implementation and outcomes across studies. The small evidence base limits the strength and generalizability of the conclusions, and findings should therefore be interpreted with caution.

The Confidence in Evidence from Reviews of Qualitative research (CERQual) approach was employed to evaluate the confidence in the review findings derived from the included studies. This evaluation focused on four key domains: methodological limitations, coherence, adequacy, and relevance of the evidence. While the findings were supported by a solid body of evidence, minor concerns regarding methodological limitations, representativeness, and generalizability were noted. These insights underscore the importance of considering both the strengths and limitations of the evidence when interpreting the review findings and making recommendations for practice. The detailed assessment of the GRADE-CERQual is documented in the [Supplementary Material 6](#) which outlines the specific studies contributing to each finding and the rationale for the confidence ratings assigned.

Given the diversity in study designs, populations, and outcome measures, we qualitatively examined possible sources of heterogeneity and present these considerations in the synthesis of findings. Furthermore, we conducted sensitivity analyses to explore the robustness of our synthesized results, particularly in relation to study quality and methodological limitations. Finally, we assessed the potential risk of bias due to missing results (arising from reporting biases) for each synthesis. These evaluations are documented in [Supplementary Material 6](#), alongside the CERQual assessments.

## Discussion

This systematic review examined the utilization of PRM data within primary care settings and identified that its effective use was contingent upon seamless integration into both clinical workflows and EHRs. The synthesized evidence indicated that the real-world application of PRM data was both achievable and valuable when its collection and use were embedded within existing clinical routines, automatically ingested into the EHR, and presented in a concise, interpretable format. These design choices enabled clinicians to deploy PRM data as a valuable asset across a range of critical functions, including triage, management, screening, diagnosis, treatment planning, monitoring patient progress, and fostering collaborative decision-making. Conversely, the review identified that technical barriers, suboptimal presentation formats, lengthy instruments, low usability, and a lack of organizational support significantly hindered adoption. These factors not only suppressed utilization but also risked exacerbating administrative burdens and widening documentation gaps, ultimately limiting the potential of PRMs to enhance patient-centered care.

While findings from specialized healthcare fields, such as oncology—where PRM implementation is more advanced—support the broader value of this approach<sup>34</sup>, this review underscores that successful integration in primary care requires tailored solutions for its unique context. Primary care is characterized by distinct constraints, including limited consultation time, a broad and undifferentiated case-mix, and the imperative for longitudinal tracking and population health management. These specific characteristics make efficient strategies, such as pre-visit data capture and automated triage, particularly salient. Currently, the evidence indicates that PRM data in primary care is utilized to enhance patient-clinician communication, support clinical decision-making, and, at its best, aid in resource optimization.<sup>27–29,31,33</sup> However, based on this review, its routine use remains limited. Strategically implementing PRMs to address the specific workflows of primary care presents a significant opportunity to optimize resources and meet growing future challenges, such as increasing patient volumes and the rising prevalence of chronic diseases.<sup>24</sup>

The utilization of PRM data in primary care represents a significant opportunity to enhance patient care and optimize clinical workflows. Achieving optimal and efficient usage of PRMs requires a critical examination of existing workloads and processes.<sup>27–30</sup> Effective data usage should be considered already during the implementation phase. Although data

utilization was examined as a separate entity in this systematic review, data usage and practices are crucial components of PRM implementation. A thorough assessment of current clinical workflows is vital to leverage PRMs effectively. Understanding existing workloads and identifying areas where PRMs can enhance data collection without increasing clinician burden is crucial, as established in previous studies. By streamlining processes, healthcare providers can ensure that PRMs augment rather than complicate existing practices, ultimately enhancing efficiency and the quality of care delivered. Seamless integration of PRMs with EHRs is essential for maximizing their utility.<sup>27–29,32</sup> Auto-population of data fields and the use of graphical summaries or alerts, such as color-coded thresholds, can aid clinicians in quickly interpreting patient-reported data. This integration reduces manual data entry, minimizes errors, and facilitates more informed decision-making. Furthermore, EHR integration ensures that PRMs are an integral part of the clinical workflow, rather than an additional task, thereby enhancing their adoption and effectiveness.

The factors affecting the utilization of PRM data align with previous findings from other healthcare fields regarding PRM data usage in clinical practice.<sup>2,5,8</sup> There is increasing interest in the use of overall patient-generated health data in clinical practice, and the identified barriers from this review are consistent with the broader challenges of patient-generated health data usage.<sup>35</sup>

To ensure that PRMs are both effective and efficient, it is crucial to adopt short, validated instruments specifically tuned for the intended purpose. These instruments should be easy for patients to complete and for clinicians to interpret. By focusing on validated tools, healthcare providers can ensure that the data collected is reliable and meaningful, supporting better clinical outcomes and patient experiences. Besides validated tools, the quality and equity of PRM data should be ensured with governance structures. This includes implementing verification options to maintain data accuracy and addressing language access and digital inclusion to ensure equitable participation. By prioritizing data quality and equity, healthcare organizations can ensure that PRMs are a reliable source of information that can better promote the value for organizations and patients. Governance frameworks also provide accountability, ensuring that PRM data is used ethically and responsibly. Our synthesis revealed that utilization practices and factors affecting use were closely intertwined. This overlap likely reflects the nature of PRM implementation in primary care: practices are shaped by contextual determinants such as technical integration, workflow design, and organizational culture. In many included studies, descriptions of how PRM data was used were inseparable from the conditions enabling or hindering that use. This suggests that PRM utilization is not a static activity, but a process influenced by system-level and behavioral factors, which may explain why the boundaries between practices and influencing factors appeared blurred.

One key strategy for effective PRM implementation is also the prioritization of pre-visit electronic capture.<sup>26–28</sup> This proactive approach not only improves data accuracy but also enhances patient engagement by involving them in their care journey from the outset. Training healthcare providers on the use and interpretation of PRM results is vital to building familiarity and perceived value.<sup>30,32</sup> Providing regular feedback loops can reinforce learning and highlight the impact of PRMs on patient care. This ongoing education ensures that clinicians are equipped to utilize PRMs effectively, fostering a culture of continuous improvement and data-driven decision-making. Additionally, highlighting successful case studies and sharing best practices can motivate clinicians to embrace PRMs as a valuable component of patient care.

Based on this review, currently PRM data usage can aid in resource optimization and improve efficiency in primary care,<sup>27,33</sup> but there is still a lack of studies that describe good experiences and practices in routine use in primary care. To evaluate the effectiveness of PRM implementation, it is essential to monitor utilization metrics such as completion rates, time to review, and actions taken based on the data. These metrics provide insights into the operational impact of PRMs and identify areas for improvement. Additionally, assessing downstream outcomes, including changes in care, patient and professional experience, safety, and equity, can demonstrate the value of PRMs in enhancing healthcare delivery. By systematically evaluating these outcomes, healthcare organizations can make informed decisions about the ongoing use and refinement of PRMs.

To our knowledge, this is the first systematic review about the utilization of PRM provided data in primary care. The review followed the PRISMA 2020 guidelines and the full PRISMA checklist can be found in [Supplementary Material 7](#). For this review, we carried out a comprehensive search for eligible studies, using multiple electronic databases relevant to the health care field. Although thorough and comprehensive searches were performed to identify potential studies for inclusion, the searches might still be inefficient. We assessed the search using Peer Review of Electronic Search

Strategies (PRESS) 2015 Evidence-Based Checklist [Supplementary Material 8](#). The eligibility criteria “routine use” turned out to be difficult. For the purposes of this review, “routine use” was defined as the systematic application of PRM data in everyday clinical practice, beyond isolated projects or research settings. This distinction was important to ensure that the included studies reflected real-life utilization rather than theoretical or preparatory phases. Due to this criterion, here was a limited amount of evidence concerning routine PRM data usage in primary care. Some of the studies studied PRM usage in pre-implementation phase, not real-life use. This could mean that there are evidence supporting the use but not enough of evidence from real-life usage. It is also important to note that the review only includes scientific studies, which likely represent a limited subset of the actual purposes and examples of PRM use in everyday primary care practice. This limitation should be considered when interpreting the findings.

While assessing the search strategy, we paid a lot of attention to the definition of primary care. The definition of primary care was based on the Nordic primary care setting. This focus is justified by the fact that our research context and future studies are situated within Nordic countries, where the organization and principles of primary health care align with other Nordic countries. However, only of the studies was done in Denmark which supports the evidence that PRM utilization is yet a little research topic in the Nordic countries. We adjusted the search terms so that we found the results concerning data utilization, not only PRM implementation, however evaluating PRM data utilization is a part of PRM implementation and brought challenges to the research setting.

The quality appraisal process was crucial in assessing the reliability and validity of the findings from the studies included. By applying the MMAT, we ensured that the studies selected for this review not only contributed valuable insights into the utilization of PRMs but also adhered to rigorous methodological standards. Our analysis was based on a well-developed and tested framework, ensuring a systematic examination of this topic. The review only included articles written in certain languages, which might limit its international scope and generalizability. Most of the included studies originated from the US and the UK, which may limit the transferability of findings to other health systems. Differences in healthcare organization, funding models, and patient-provider dynamics can influence how PRMs are implemented and perceived. Only a small number of relevant publications met the inclusion criteria, which restricts the robustness of the conclusions, and a meta-analysis was not possible. The inclusion of only eight studies represents a limitation of this review and restricts the generalizability of the findings. As such, the conclusions should be interpreted with caution, and further research is needed to validate and expand upon these findings in broader and more diverse primary care contexts. The included articles also varied in research setting and participants, making it hard to generalize the outcomes of the review. This lack of evidence highlights a clear research gap in the current literature, underscoring the need for more rigorous and comprehensive studies in this area. The results suggest that the use of PRM data in primary care does not significantly differ from other health care fields, but further evidence and research are needed to define specific issues concerning primary care. Future research should encompass thorough mixed-methods implementation studies that explicitly outline PRM data pipelines, including collection, ingestion, display, and action stages. These studies need to evaluate utilization fidelity—specifically who reviews the data, when, and how—while also linking these processes to clinical outcomes. Additionally, they should examine the cost-effectiveness and equity impacts. Future research should also explore the comparative effectiveness of PRM implementation across different healthcare systems and cultural contexts.

## Conclusion

The integration and utilization of PRM data in primary care settings holds significant potential for enhancing patient-centered care, but there are several barriers to consider prior implementation. Using PRM data in primary care is feasible and useful when thoughtfully embedded in digital workflows and presented for rapid clinical sense-making. Investment in EHR integration, concise instruments, timely collection, and professional engagement and training is likely to yield the greatest returns. These findings are significant because they demonstrate that PRMs can serve as a cornerstone for personalized care and quality improvement when supported by robust digital infrastructure. Despite the challenges and limitations identified in the reviewed studies, the findings underscore the importance of continued research and innovation in this field. Practical implications include embedding PRMs into EHRs with rapid visualization dashboards, adopting concise instruments, and implementing structured training models for clinicians on interpreting and applying

PRM data in decision-making. Future research should focus on developing scalable digital solutions, evaluating cost-effectiveness, and co-designing training frameworks with frontline providers to ensure usability and adoption. In the long term, effective PRM integration can accelerate digital health transformation by enabling data-driven decision-making and fostering equity in health service delivery.

## Abbreviations

PRMs, Patient-reported measures; PROMs, Patient-reported outcome measures; PREMs, Patient-reported experience measures; PRESS, Peer Review of Electronic Search Strategies.

MMAT, Mixed-methods appraisal tool; PRISMA, Preferred reporting items for systematic reviews and meta-analyses; EHR, Electronic health record.

## Data Sharing Statement

Full dataset is available upon request. Please contact the corresponding author to request original database, codes and other materials.

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## Disclosure

The author(s) report no conflicts of interest in this work.

## References

- Black N. Patient reported outcome measures could help transform healthcare. *BMJ*. 2013;346:f167. doi:10.1136/bmj.f167
- Chen A, Väyrynen K, Leskelä RL, et al. The acceptability of implementing patient-reported measures in routine maternity care: a systematic review. *Acta Obstet Gynecol Scand*. 2023;102(4):406–419. doi:10.1111/aogs.14506
- Shapiro L, Katz P, Stern B, Kamal R. Equitable integration of patient-reported outcomes into clinical practice—opportunities, challenges, and a roadmap for implementation. *J Am Acad Orthop Surg*. 2024;32(5):187–195. doi:10.5435/JAAOS-D-23-00798
- Gleeson H, Calderon A, Swami V, Deighton J, Wolpert M, Edbrooke-Childs J. Systematic review of approaches to using patient experience data for quality improvement in healthcare settings. *BMJ Open*. 2016;6(8):e011907. doi:10.1136/bmjopen-2016-011907
- Makhni E, Hennekes M. The use of patient-reported outcome measures in clinical practice and clinical decision making. *J Am Acad Orthop Surg*. 2023;31(20):1059–1066. doi:10.5435/JAAOS-D-23-00040
- Porter ME. What is value in health care? *N Engl J Med*. 2010;363(26):2477–2481. doi:10.1056/NEJMp1011024
- Øvretveit J, Zubkoff L, Nelson EC, Frampton S, Knudsen JL, Zimlichman E. Using patient-reported outcome measurement to improve patient care. *Int J Qual Health Care*. 2017;29(6):874–879. doi:10.1093/intqhc/mzx108
- Kynoch K, Ameen M, Ramis M-A, Khalil H. Use of patient-reported data within the acute healthcare context: a scoping review. *Int J Environ Res Public Health*. 2022;19(18):11160. doi:10.3390/ijerph191811160
- Chen J, Ou L, Hollis SJ. A systematic review of the impact of routine collection of patient-reported outcome measures on patients, providers, and health organisations in an oncologic setting. *BMC Health Serv Res*. 2013;13(1):211. doi:10.1186/1472-6963-13-211
- Chen A, Väyrynen K, Schmidt A, et al. The impact of implementing patient-reported measures in routine maternity care: a systematic review. *Acta Obstet Gynecol Scand*. 2022;101(11):1184–1196. doi:10.1111/aogs.14446
- Yang LY, Manhas DS, Howard AF, Olson RA. Patient-reported outcome use in oncology: a systematic review of the impact on patient-clinician communication. *Supportive Care Cancer*. 2018;26(1):41–60. doi:10.1007/s00520-017-3865-7
- Yetiş M, Ceylan İ, Canlı M, et al. Validity and reliability of Turkish version of the Munich wrist questionnaire in patients with wrist problems. *Eval Health Professions*. 2023;47(1):105–110. doi:10.1177/01632787231172276
- Chen A, Väyrynen K, Leskelä R-L, et al. A qualitative study on professionals’ attitudes and views towards the introduction of patient reported measures into public maternity care pathway. *BMC Health Serv Res*. 2021;21(1):645. doi:10.1186/s12913-021-06658-z
- Anderson M, van Kessel R, Wood E, et al. Understanding factors impacting patient-reported outcome measures integration in routine clinical practice: an umbrella review. *Qual Life Res*. 2024;33(10):2611–2629. doi:10.1007/s11136-024-03728-7
- Brower K, Schmitt-Boshnick M, Haener M, Wilks S, Soprovich A. The use of patient-reported outcome measures in primary care: applications, benefits, and challenges. *J Patient Rep Outcomes*. 2021;5(2):84. doi:10.1186/s41687-021-00361-7
- Murphy M, Salisbury C, Hollinghurst S. Can the outcome of primary care be measured by a patient-reported outcome measure? *Br J Gen Pract*. 2014;64(629):647. doi:10.3399/bjgp14X683017
- Philpot LM, Barnes SA, Brown RM, et al. Barriers and benefits to the use of patient-reported outcome measures in routine clinical care: a qualitative study. *Am J Med Qual*. 2017;33(4):359–364. doi:10.1177/1062860617745986

18. Campbell R, Ju A, King MT, Rutherford C. Perceived benefits and limitations of using patient-reported outcome measures in clinical practice with individual patients: a systematic review of qualitative studies. *Qual Life Res.* 2022;31(6):1597–1620. doi:10.1007/s11136-021-03003-z
19. Al Sayah F, Lahtinen M, Bonsel GJ, Ohinmaa A, Johnson JA. A multi-level approach for the use of routinely collected patient-reported outcome measures (PROMs) data in healthcare systems. *J Patient Rep Outcomes.* 2021;5(Suppl 2):98. doi:10.1186/s41687-021-00375-1
20. Wheat H, Horrell J, Valderas JM, Close J, Fosh B, Lloyd H. Can practitioners use patient reported measures to enhance person centred coordinated care in practice? A qualitative study. *Health Qual Life Outcomes.* 2018;16(1):223. doi:10.1186/s12955-018-1045-1
21. Page MJ, Bossuyt PM, Boutron I, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *PLoS Med.* 2021;18:e1003583. doi:10.1371/journal.pmed.1003583
22. Vanselow NA, Donaldson MS, Yordy KD. A new definition of primary care. *JAMA.* 1995;273(3):192. doi:10.1001/jama.1995.03520270026023
23. World Health Organization. Regional Office for Europe. *Declaration of Alma-Ata.* World Health Organization. Regional Office for Europe; 1978.
24. Olsen K, Anell A, Häkkinen U, Iversen T, Ólafsdóttir T, Sutton M. General practice in the Nordic countries. *Nord J Health Econ.* 2016;4(1):56–67. doi:10.5617/njhe.2801
25. McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C. PRESS peer review of electronic search strategies: 2015 guideline statement. *J Clin Epidemiol.* 2016;75:40–46. doi:10.1016/j.jclinepi.2016.01.021
26. Hinami K, Alkhalil A, Chouksey S, Chua J, Trick WE. Clinical significance of physical symptom severity in standardized assessments of patient-reported outcomes. *Qual Life Res.* 2016;25(9):2239–2243. doi:10.1007/s11136-016-1261-2
27. Mou D, Horn DM, Heng M, et al. Primary care physician's (PCP) perceived value of patient-reported outcomes (PROs) in clinical practice: a mixed methods study. *BMJ Qual Saf.* 2021;31(3):221–229. doi:10.1136/bmjqs-2020-012206
28. Wesley DB, Schubel L, Hsiao CJ, et al. A socio-technical systems approach to the use of health IT for patient-reported outcomes: patient and healthcare provider perspectives. *J Biomed Inform X.* 2019;4:100048. doi:10.1016/j.yjbix.2019.100048
29. Turner GM, Litchfield I, Finnikin S, Aiyegbusi OL, Calvert M. General practitioners' views on use of patient-reported outcome measures in primary care: a cross-sectional survey and qualitative study. *BMC Fam Pract.* 2020;21(1):14. doi:10.1186/s12875-019-1077-6
30. Litchfield I, Greenfield S, Turner GM, Finnikin S, Calvert MJ. Implementing PROMs in routine clinical care: a qualitative exploration of GP perspectives. *BJGP Open.* 2021;5(1):1–14. doi:10.3399/bjgpopen20X101135
31. Knoop J, van Lankveld W, Geerdink FJB, Soer R, Staal JB. Use and perceived added value of patient-reported measurement instruments by physiotherapists treating acute low back pain: a survey study among Dutch physiotherapists. *BMC Musculoskelet Disord.* 2020;21(1):120. doi:10.1186/s12891-020-3132-9
32. Östhols S, Boström C, Rasmussen-Barr E. Clinical assessment and patient-reported outcome measures in low-back pain: a survey among primary health care physiotherapists. *Disabil Rehabil.* 2019;41(20):2459–2467. doi:10.1080/09638288.2018.1467503
33. Mejdahl CT, Schougaard LMV, Hjollund NH, Riiskjær E, Lomborg K. Exploring organisational mechanisms in PRO-based follow-up in routine outpatient care: an interpretive description of the clinician perspective. *BMC Health Serv Res.* 2018;18(1):546. doi:10.1186/s12913-018-3352-y
34. Balitsky AK, Rayner D, Britto J, et al. Patient-reported outcome measures in cancer care: an updated systematic review and meta-analysis. *JAMA Network Open.* 2024;7(8):e2424793. doi:10.1001/jamanetworkopen.2024.24793
35. Lavalley DC, Lee JR, Austin E, et al. mHealth and patient-generated health data: stakeholder perspectives on opportunities and barriers for transforming healthcare. *Mhealth.* 2020;6:8. doi:10.21037/mhealth.2019.09.17

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