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Integration of electronic health records in multidisciplinary health teams: Review

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Abstract --- This review examines the incorporation of patient-reported outcomes (PROs) into electronic health records (EHRs) to advance patient-centered care and enhance population health. The study highlights the necessity of creating strong governance frameworks that balance centralized and decentralized models to achieve standardization alongside flexibility. Considerations of ethics and legality, especially in relation to patient privacy and data security, are essential for the responsible utilization of data in research and public health monitoring. The selection of suitable PRO measures necessitates a systematic methodology, taking into account both customized, condition-specific outcomes and population-wide metrics for comprehensive comparisons. Engaging stakeholders, including patients, clinicians, researchers, and IT specialists, is crucial for the successful implementation and utilization of data. The review emphasizes the establishing clear objectives, necessity of

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implementing a structured selection framework, and providing comprehensive training to guarantee high-quality data collection and actionable insights. Effective integration necessitates a balance between operational efficiency and ethical considerations, with the ultimate goal of enhancing health outcomes and promoting a more responsive, data-driven healthcare system. A universal approach is not yet achievable; however, the potential benefits justify considerable investment in time and resources.

Keywords---Electronic Health Records (EHRs), Patient-Centered Care, Healthcare Governance, Health Data Integration, and Patient-Reported Outcomes (PROs).

1. Introduction

The growing utilization of patient-reported outcomes (PROs) in healthcare, coupled with the extensive implementation of electronic health records (EHRs), presents a significant opportunity to improve patient-centered care, enhance clinical outcomes, and promote population health. Patient-reported outcomes (PROs) are firsthand accounts from patients regarding their health status, symptoms, functioning, or quality of life, presented without clinical interpretation. Insights are obtained through validated instruments, questionnaires, or surveys, enabling patients to convey their health perspectives in a structured and quantifiable manner (1, 2). EHRs are digital records of patient interactions and clinical information accessible to patients, providers, and payers across various locations and devices, thereby facilitating continuous and coordinated care. Incorporating patient-reported outcomes (PROs) into electronic health records (EHRs) can enhance the connection between patient experiences and clinical decision-making, thereby improving care quality, facilitating research, and tracking health trends in populations (3).

To achieve these benefits, several challenges must be addressed, including the establishment of governance structures, navigation of ethical and legal issues, selection of relevant PRO measures, engagement of stakeholders, and design of effective data-sharing mechanisms. This paper examines these factors and offers recommendations for health systems seeking to integrate patient-reported outcomes (PROs) into electronic health record (EHR) systems, with the goal of enhancing engagement for both patients and providers, while ensuring data privacy and fostering interoperability.

2. Governance of PRO-EHR Integration

Governance is crucial for determining the individuals responsible for the selection, implementation, analysis, sharing, and utilization of PRO data within EHRs. A key issue in governance is the degree of centralization: a centralized model assigns decision-making power to a singular governing body, whereas a distributed model allows departments or individuals to make localized decisions (4). Each approach presents distinct advantages and trade-offs. Centralized governance facilitates standardized initiatives across the system and streamlines

regulatory oversight; however, it may inhibit local innovation and postpone the implementation of specialized PRO measures due to bureaucratic procedures. A distributed model promotes flexibility and responsiveness; however, it may lead to inconsistent practices and reduced oversight throughout the system (5).

A critical governance decision pertains to stakeholder diversity. Some health systems may opt to utilize the current EHR governance body for decisions related to patient-reported outcomes (PRO), while others may broaden the governing team to incorporate a wider array of stakeholders, including patients and advocates, quality improvement officers, researchers, IT experts, and senior administrators (6). A broader approach, although complex, enhances decision-making by integrating diverse perspectives that promote patient-centered care and improve the value of patient-reported outcome data collection and application (7).

3. Considerations of Ethics and Law

The collection and reuse of PRO data within EHRs present ethical and legal challenges, particularly when the data is utilized for research or public health monitoring beyond the scope of individual patient care. Organizations must address patient privacy and data protection in accordance with the intended use of the data and relevant legal and ethical guidelines (8). Offering PRO assessments without clarifying their purpose may facilitate data collection; however, it poses a risk to patient trust and engagement. Conversely, implementing research-level informed consent practices may enhance transparency and uphold patient autonomy, yet it could also lead to decreased participation rates, consequently affecting the representativeness of the collected data. Health systems must achieve a balance that aligns ethical principles with operational objectives, potentially considering intermediate solutions like the provision of PRO-specific information sheets (9).

4. Data Sharing and Pooling for Population Health and Research

Integrating patient-reported outcomes into electronic health records facilitates data aggregation across institutions, thereby enhancing research and quality improvement efforts. Data pooling necessitates a data warehouse for the storage of shared data and a standardized data model to integrate data from various sources (10). Centralized data warehouses facilitate efficient cross-group analyses; however, they require stringent protections to ensure the security of patient information and to mitigate potential competitive issues among healthcare organizations. Distributed data warehouses address certain privacy risks by localizing data storage and sharing only aggregated summaries. Nonetheless, this method presents technical challenges and may impede thorough analysis across organizations. Standardizing data formats and adopting a compatible data model, such as PCORnet, CCDA, SHRINE, or custom project-specific models, is essential for effective data pooling and meaningful analysis, irrespective of the chosen model (11).

5. Selection of Patient-Reported Outcomes for Electronic Health Record Integration

The selection of suitable PRO measures for EHR integration necessitates a systematic framework aimed at identifying specific patient populations and assessing pertinent outcomes. There are two primary approaches for targeting patients: a tailored approach that emphasizes specific health conditions or treatments, and a population-wide approach that implements PROs across larger patient groups, including those in primary care or specialty clinics. Each approach possesses unique advantages (12). Tailored patient-reported outcomes provide data that closely aligns with individual patient management, thereby enhancing clinical relevance; however, they may be limited in their utility for system-wide comparisons. Population-wide patient-reported outcomes (PROs) promote a culture of PRO collection and are appropriate for quality improvement and public health monitoring; however, they may not provide the condition-specific insights that are often more relevant to patients and clinicians (13).

Options for selecting PRO domains encompass symptoms, functional status, social health/support, general health perceptions, and health-related quality of life. Symptom-focused patient-reported outcomes (PROs) are generally more actionable, whereas measures of general health perception or quality of life provide broader insights but may lack immediate clinical relevance. Health systems must evaluate the trade-offs between condition-specific patient-reported outcomes (PROs), which are highly pertinent to individual patient care, and generic PROs, which facilitate comparisons across populations but may lack strong resonance with patients. Balancing these factors ensures that the selected PROs align with clinical and operational objectives (14).

6. Engagement of stakeholders

Engagement among patients, providers, researchers, administrators, and IT specialists is essential for the success of PRO-EHR systems. Different stakeholder groups engage with the system in distinct ways, necessitating tailored engagement strategies to meet their specific needs. Patient engagement is essential for the collection of high-quality data. Methods including the synchronization of questionnaires across clinical domains, provision of remote completion options, and implementation of computer adaptive testing can mitigate patient burden. The presentation of PRO data in the EHR through accessible formats, including graphs or trend lines, enhances patient engagement with their health information and supports care planning discussions with clinicians (15).

Clinicians must establish an efficient workflow for utilizing PRO data, incorporating suitable notification mechanisms. Notifications may vary from passive entries in the medical record to active alerts initiated by designated PRO thresholds. Balancing timely notifications with the reduction of interruptions is essential to prevent "alert fatigue" in clinicians. Furthermore, determining the recipients of notifications—be it the ordering provider, the primary care physician, or a patient navigator—can affect the timeliness of responses and the clinical utility of the information provided (16).

7. Guidelines for Health System Executives and Information Technology Professionals

Successful PRO-EHR integration requires health system leaders and IT specialists to concentrate on three fundamental areas: planning, selection, and engagement. Health systems must establish explicit objectives for PRO-EHR integration and involve essential stakeholders from the beginning. Initial engagement from clinicians, IT personnel, and patients can strengthen dedication to the initiative and increase the probability of enduring integration (17).

Establishing a structured selection framework for patient-reported outcome (PRO) measures can facilitate the equilibrium of factors such as cost, patient burden, and clinical utility. Involving patients, clinicians, and researchers in the selection process enables health systems to ensure that selected PROs align with patient needs and improve clinical decision-making (18).

To achieve high-quality data collection and actionable insights, health systems must prioritize training and support for patients and clinicians. Granting patients access to PRO results and allowing flexibility in completing measures, along with clinician education on interpreting and utilizing PRO data, promotes a culture of patient-centered care and increases the value of the PRO-EHR system (19).

8. Conclusion

The integration of patient-reported outcomes (PROs) into electronic health records (EHRs) offers significant potential to advance patient-centered care, improve population health, and facilitate research and quality enhancement. This integration necessitates meticulous planning, effective governance, stakeholder involvement, and a balance between operational and ethical considerations. A well-structured PRO-EHR system that emphasizes the needs of patients and providers can improve health outcomes, facilitate coordinated care, and foster a more responsive and data-informed health system. A health system dedicated to optimizing patient care must invest the necessary time, resources, and expertise to fully leverage the potential of Patient-Reported Outcomes (PROs) in improving the quality and equity of health care delivery, despite the absence of a universal approach to PRO-EHR integration.

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دمج السجلات الصحية الإلكترونية في الفرق الصحية متعددة التخصصات: مراجعة

الملخص

تستعرض هذه المراجعة دمج نتائج المرضى المبلغ عنها (PROs) في السجلات الصحية الإلكترونية (EHRs) لتعزيز الرعاية المتمحورة حول المريض وتحسين صحة السكان. تسلط الدراسة الضوء على ضرورة إنشاء أطر حوكمة قوية توازن بين النماذج المركزية واللامركزية لتحقيق التوحيد إلى جانب المرونة. تعتبر الاعتبارات الأخلاقية والقانونية، خاصة فيما يتعلق بخصوصية المرضى وأمان البيانات، ضرورية للاستخدام المسؤول للبيانات في البحث ورصد الصحة العامة. يتطلب اختيار مقاييس PRO المناسبة منهجية منظمة، تأخذ في الاعتبار كلاً من النتائج المخصصة المحددة للحالة والمعايير الشاملة للسكان لإجراء مقارنات شاملة. إن إشراك أصحاب المصلحة، بما في ذلك المرضى، والأطباء، والباحثين، ومتخصصي تكنولوجيا المعلومات، أمر حاس النجاح في تنفيذ واستخدام البيانات. تؤكد المراجعة على ضرورة وضع أهداف واضحة، وتنفيذ إطار عمل منظم للاختيار، وتوفير تدريب شامل لضمان جمع بيانات عالية الجودة ورؤى قابلة للتنفيذ. يتطلب التكامل الفعال تحقيق التوازن بين الكفاءة التشي والاعتبارات الأخلاقية، مع الهدف النهائي المحمق في تحسين نتائج المحصول واضحة، والمعايير الشاملة للسكان لإخراء مقار تدريب شامل لضمان جمع بيانات عالية الجودة ورؤى قابلة للتنفيذ. يتطلب التكامل الفعل تحقيق التوازن بين الكفاءة التشيلية والاعتبارات الأخلاقية، مع الهدف النهائي المتمثل في تحسين نتائج الصحة وتعزيز نظم رعاية صحية أكثر استجابة واستذائ البيانيات. لا يزال من غير الممكن تحقيق نهج عالمي؛ ومع ذلك، فإن الفواند المحتملة تبرر استثمارًا كبيرًا في الوقار والمارد.

ا**لكلمات المفتاحية:** السجلات الصحية الإلكترونية (EHRs)، الرعاية المتمحورة حول المريض، حوكمة الرعاية الصحية، دمج بيانات الصحة، ونتائج المرضى المبلغ عنها ((PROs