Lessons Learned: Implementing patient-reported outcomes (PROs) in clinical settings

Michael Bass, MS¹; Nan Rothrock, PhD¹; Chris Dasilva²; Joshua Spuhl, MS³; Darrel Brodke, MD⁴; Jimmy Johnson⁵; Christian Oncken⁵; Jason Guattery, MS⁶;
¹ Department of Medical Social Science, Northwestern University, Chicago, IL
² UR Health Lab, University of Rochester, Rochester, NY
³ Enterprise Data Warehouse, The University of Utah Health System, Salt Lake City, UT
⁴ Department of Orthopaedics, The University of Utah Health System, Salt Lake City, UT
⁵ Washington University School of Medicine, Saint Louis, MO
⁶ University of Pittsburgh, Pittsburgh, PA

Introduction

Until recently, Electronic Health Record systems (EHRs) were developed to house clinician-provided, lab, and imaging data. Patients’ experiences and perspectives were typically in providers’ ambiguous, non-standardized clinical note¹. The interest in capturing patient-provided data for clinical care has increased to facilitate symptom management, improve patients’ quality of life and enhance patient-clinician communication². To this end, the administration of patient reported outcome (PRO) measures are considered the “gold standard” approach in capturing the patient perspective. Unfortunately, EHRs were not necessarily designed to utilize a patient centered workflow and therefore the collection of patient-provided data including PROs is not always supported. Frequently, the addition of this functionality by EHR vendors is slow due to competing health record system functional requirements. Three large-scale academic medical centers have successfully integrated the collection of PRO measures throughout their clinics using a PRO API system. Guided by implementation science framework constructs, this study identifies common barriers and facilitators to the implementation and adoption of PRO data collection into the workflow of these busy clinics.

Methods

Three large-scale academic medical centers, University of Utah Health Care, University of Rochester Medical Center and Washington University School of Medicine, committed to the collection of PRO data in their clinics. These healthcare systems integrated the Assessment Center API³ into their existing patient portal in order to administer, score, and report PROMIS⁴ measures. Each site evaluated technical feasibility and impact on clinical workflow, before expanding institution-wide. Collaborative teams (i.e. clinical, IT and administrative staff) carried out these integration efforts addressing issues such as software integration, data storage and retrieval as well as impact on clinical workflow.

Software integration of the Assessment Center API enables the following tasks of PRO administration:

- List all available PRO measures so clinicians can select the appropriate measure.
- Generate a PRO assessment similar to an order that can be integrated with EHR scheduling.
- Administer a PRO assessment that can be integrated into a patient-facing interface.
- Score PRO measures and integrate scores in the clinician-facing interface.

All centers pilot tested the PRO data collection workflow in their Orthopaedic clinic(s), collecting PRO measures of physical function, pain interference, and depression. After obtaining high capture rates of PRO assessments (> 80%), all centers expanded the workflow to multiple clinics.

Results

All institutions had successful implementations with >80% patient assessment completion rates and minimal disruptions to clinical workflow. At the University of Rochester Medical Center, PRO data collection workflow is currently used in over 30 specialties. It has captured data on over 220,000 unique patients across 830,000 patient visits. Over 2.2 million assessments have been collected. At Washington University School of Medicine, the patient registration process takes less than 15 seconds to complete and the average time for a patient to complete assessments is between 30-60 seconds allowing most patients to complete the assessment prior to departing the waiting room to a clinic room. Over 2.25 million assessments have been collected. At the University of Utah Health Care, a QR code
A scanning process was implemented, which decreased the time spent setting up the assessment per patient introduction of intervals by instrument/assessment. This allowed for scheduling an assessment by a pre-determined window, easing the burden on patients and staff when the assessment is not required for that patient. Over 1.3 million assessments have been collected.

**Discussion**

These case studies demonstrate not only the feasibility but also the pathway for the integration of PRO data collection into the EHR and routine clinical care, with the intention of gaining clinician acceptance and improved communication between clinicians and patients. Using implementation science frameworks in order to evaluate these EHR implementations will support dissemination efforts and hopefully lead to best practice guides for PRO EHR integrations. Facilitators to PRO data collection adoption that map to constructs from the Unified Theory on the Adoption and Use of Information Technology (UTAUT)\(^5\) and the Consolidated Framework for Implementation Research (CFIR)\(^6\) include leadership engagement, minimal changes to workflow and perceived usefulness. All centers had institutional commitment with buy-in from center leads. The disruption to the existing clinical workflow, especially the patient registration was minimum in part to the use of QR coding to link scheduling information to PRO assessments. Since PRO scores are integrated into the EHR system in real time, perceived usefulness is positive with clinicians and patients because results can be discussed during the encounter. Barriers to PRO data collection adoption include lack of educational material both for patients and clinicians. More work is needed in order to provide meaningful interpretation of PRO scores. A limitation of this study is the retrospective nature of the study. As with many clinical HIT implementations, studies are often conducted after the completion of the implementation and there is potential for unreliable qualitative data\(^7\).

**References**