Application of electronic patient-reported outcomes (ePROs) for quality measure reporting in outpatient mental health care

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Abstract

Objective: Healthcare systems are progressively adopting data-driven strategies for value-based care efforts, resulting in quality measure initiatives that address a variety of domains. As demand for these measures increase, opportunities to leverage technology to enhance data collection continue to grow. This study examines the implementation of an electronic patient-reported outcomes (ePROs) system to improve compliance with Centers for Medicare & Medicaid Services (CMS) quality payment program (QPP) metrics.

Methods: The study occurred at multiple outpatient mental health clinics of Sheppard Pratt, a large, private, non-profit mental health service provider in the United States. ePROs were introduced as a method for quality metric data collection in 2022. The ePRO system utilized application programming interfaces (APIs) to enable full integration into any electronic health record (EHR), allowing automated ePRO notifications and immediate reporting in the electronic medical record (EMR). The ePRO battery addressed several CMS QPP process metrics, some using PROMIS measures: depression screening (QPP #134), unhealthy alcohol use (QPP #431), tobacco use (QPP #226), elder falls (QPP #155), and elder maltreatment (QPP #181). Patient ePRO completion status, demographics, and diagnostic history generated quality metric status reports. Data completeness and performance were calculated.

Results: In 2024, 3 out of 5 metrics reached 100% data completeness and 80-100% performance rate. Data completeness for QPP #134 and QPP #181 decreased below 75% due to a change in QPP patient eligibility requirements that were not changed until later in the year (otherwise performance rate reached 100%). Clinicians highlighted that the quality measure-ePRO integration reduced documentation burden and increased overall visibility of ePROs.

Conclusion: The integration of ePROs for quality metrics demonstrated a scalable approach to quality improvement initiatives, simultaneously streamlining data collection, reducing clinical burden, and improving compliance with QPP metrics. Future initiatives will expand the ePRO system to assess outcome metrics, develop novel quality metrics, and develop process solutions for addressing changes to patient eligibility criteria. This study highlights the potential of ePROs to enhance quality measurement and promote data-driven decision-making.

Background & Aims

Interest in measurement-based care initiatives, particularly patient-reported outcomes (PROs) is growing and endorsed by the American Psychiatric Association (1), the Patient-Centered Outcomes Research Institute (PCORI) (2), the National Committee for Quality Assurance (3), and the Joint Commission (4). With evidence of its efficacy for both patients and providers when used (5, 6), including its utility for treatment process monitoring and enhancing patient-provider communication (7), PROs provide significant opportunities to be used for measuring healthcare quality. This provides important opportunities for psychiatry and mental health care, fields that are believed to avoid objective measurement of a person's health and wellbeing. Additionally, implementation of PROs in psychiatric settings is currently limited (8). Technological advances in the form of electronic PROs (ePROs) provide ample opportunity to leverage real-time electronic medical record (EMR) data reporting, automated scoring, and brief, multi-format validated measures for quality metric (QM) participation, with the added benefits of improving data collection, reducing response burden, and increasing patient reach (11,12). Using open-source technology, our study explores the implementation of an ePRO system to increase patient reach for compliance with Centers for Medicare & Medicaid Services (CMS) quality payment program (QPP) metrics.

Methods

Sheppard Pratt, a large U.S.-based nonprofit mental health provider, manages over 20,000 new admissions annually for psychiatric and substance use treatment. Its outpatient clinics serve over 15,000 patients across pediatric, adult, geriatric, and specialty service lines.
Using APIs and open-source technology such as HL7 and REDCap, the ePRO system featured automated notifications via email and SMS/text, real-time EMR reporting, dedicated ePRO dashboards.

Integration of the ePRO system and quality metrics began in 2022. With a team of clinical experts (including a board-certified psychiatrist and several licensed social workers/therapists) and a digital services team (including several data engineers and EMR specialists), CMS QPP metrics were reviewed to determine which were appropriate for a psychiatric patient population and could be completed through the ePRO system. Table 1 displays the QMs selected and the associated ePROs.

Table 1. Selected QMs and ePROs reviewed in 2022

Quality ID	Name	ePROs used
134	Preventive Care and Screening: Screening for Depression and Follow-Up Plan	PROMIS Short Form v1.0 - Depression 4a PROMIS Pediatric Short Form v2.0 - Depressive Symptoms 8a
226 (NQF 0028)	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	Tobacco Use Screen
402	Tobacco Use and Help with Quitting Among Adolescents	Tobacco Use Screen
431 (NQF 2152)	Preventive Care and Screening: Unhealthy Alcohol Use: Screening & Brief Counseling	AUDIT-C
182 (NQF	Functional Outcome Assessment	PROMIS Short Form v2.0 - Physical Function 4a
155 (NQF	Falls: Plan of Care	Fall Screen
181	Elder Maltreatment Screen and Follow-Up	Vulnerability to Abuse Screening Scale (VASS)

Using patient ePRO data, demographic data, and diagnostic history, QM reports were developed for each patient to show the completion status of the QMs. QMs were generated on the day of an appointment, and re-generated once an ePRO was completed. Incomplete ePROs resulted in manual data entry for all QM forms and associated ePROs in service notes. Status codes within the QM reports triggered specific fields in service notes to:

1. Inform the provider that the QM was completed,
2. Instruct the provider to address any positive screens that require additional treatment planning and documentation

Results

2023

Over 31,100 outpatient appointments were completed for approximately 12,516 care episodes. Nearly 14,000 ePROs were completed across 7,048 care episodes.

QM data completeness (the number of eligible patients who completed assessment) and performance rate (the number of eligible patients with completed assessments who meet the QM requirements) ranged from 95-100% for each metric.

Provider feedback collected during monthly governance meetings revealed that the ePRO integration was helpful for reducing documentation burden.

2024

Over 32,700 outpatient appointments were completed for approximately 12,721 care episodes. Over 14,500 ePROs were completed across 8,069 care episodes. QM data completeness and performance were calculated (Table 2).

Several changes occurred during the collection of metrics for 2024, both intended and unintended (Table 3).

Table 2. QM calculations for 2024

Quality ID	Name	Data Completeness	Performance
134	Preventive Care and Screening: Screening for Depression and Follow-Up Plan	58%	100%
226 (NQF 0028)	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	100%	100%
431 (NQF 2152)	Preventive Care and Screening: Unhealthy Alcohol Use: Screening & Brief Counseling	100%	100%
155 (NQF 0101)	Falls: Plan of Care	100%	80%
181	Elder Maltreatment Screen and Follow-Up Plan	70%	98%

Table 3. QM changes documented in 2024

QM change	Issue caused/Reason	Resolution
QPP 182 (NQF 2624) Functional Outcome Assessment removed from data collected	Several providers were concerned about the clinical utility for the associated ePRO (PROMIS Short Form v2.0 - Physical Function 4a) as the symptomatic range was too low, resulting in false positives and additional documentation to meet the WM requirements	The ePRO was removed from the data collection cycle. Providers could still add the ePRO for their patients on the ePRO dashboard, but this was no longer a requirement and not reported as a QM.
QPP 226 (NQF 0028) Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention minimum age decreased to 12 years	Since the QM reduced the minimum age, the previously reported, QPP 402 Tobacco Use and Help with Quitting Among Adolescents, was retired. QM reporting teams were not aware of this until completing a QM metric check-in in June 2024.	QM reporting teams manually adjusted the QM codes so that pediatric patients that qualified for QPP 402 would qualify for QPP 226.
QPP 181 Elder Maltreatment Screen and Follow-Up Plan minimum age decreased to 60 years.	Since the QM reduced the minimum age, patients who were previously ineligible for the metric became eligible, but were automatically excluded. QM reporting teams were not aware of this until completing a QM metric check-in in June 2024.	These updates were not caught in time to increase data completeness to the required 75%. Despite this, the performance rate remained high. The organizational teams developed a process to review all QMs at the start of each year to prepare any needed changes to ePROs, patient eligibility, and QM reporting.
QPP 134 Preventive Care and Screening: Screening for Depression and Follow-Up Plan changed diagnostic exclusion criteria.	The QM updated the exclusion criteria to only exclude bipolar disorder diagnoses (previously excluded depression and bipolar diagnoses). Patients who were previously ineligible for the metric became eligible, but were automatically excluded. QM reporting teams were not aware of this until completing a QM metric check-in in June 2024.	

Discussion & Conclusions

Facilitators Integration of the ePRO system with QM reporting received positive feedback from providers. We previously learned that administrative burden was reduced significantly by the automation of the ePRO system. Extending this automation to the QM report system and triggering specific QM fields within service notes also helped providers to easily determine any outstanding documentation needed to meeting reporting requirements.

Providers noted that since patients completed ePROs before the appointment and were fed directly into the QM report fields of their service notes, they were able to spend more time focusing on the patients' treatment planning and concerns, instead of dedicating several minutes (of their limited 20-30 minute appointments) to completing each PRO and QM manually with the patient.

Barriers Although ePRO and QM automation significantly improved data collection, manual review of the available QM criteria and provider feedback are still required. Decreased data completeness could have been avoided if criteria changes had been caught earlier in the year, allowing more time to update the QM report system, EMR fields, and capture another data point from eligible patients. This is presents an area for improvement for QM systems to accommodate notifications of any major changes to the metrics to the appropriate parties.

Provider feedback was also critical for determining any issues with implementation. Learning about the sensitivity of the physical function ePRO and its associated QM helped improve the selection of clinically relevant ePROs for future reporting.

Practical Applications and Future Directions The findings of this study demonstrate the feasibility of using ePROs for quality measure reporting. This integration of systems streamlined data collection while reducing administrative and documentation burden for clinic staff and providers. Developing organizational teams to regularly review QM standards also assisted with ensuring that all systems were updated as needed. Table 4 displays some QM calculations for 2025 as of September.

For upcoming years, our team has already developed plans for collecting additional clinically relevant ePROs for QMs including the World Health Organization Disability Assessment Schedule 2.0 12-item (WHODAS-12) and Columbia-Suicide Severity Rating Scale (C-SSRS). Additionally, our team has utilized provider feedback to begin developing internal quality metrics on the clinic and provider levels.

The overall high data completeness and performance across several QMs demonstrate the feasibility of utilizing novel technology to improve healthcare quality and can ultimately enhance quality measurement and data-driven decision-making.

Table 4. QM calculations for 2025

Quality ID	Name	Data Completeness	Performance
134	Preventive Care and Screening: Screening for Depression and Follow-Up Plan	91%	100%
226 (NQF 0028)	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	100%	100%
431 (NQF 2152)	Preventive Care and Screening: Unhealthy Alcohol Use: Screening & Brief Counseling	100%	100%

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