**Patient-reported Outcome Measures (PROMS) in Radiology: Embracing the Metrics of Change**

**Abstract**

Measuring the quality of what we do in radiology and our impact and contribution to patient care is challenging. Patient reported outcome measures (PROs) are surveys that assess the quality of care delivered to patients from the patient's perspective. PROs provide an understanding of the impact that a condition or treatment has on a patient's life and activities. PROs could potentially be used to develop and improve imaging services for and with patients, to allow commissioners a greater depth of information about the efficacy of potential services, and to improve funding streams for radiology nationally.

**The Background and Context for PROMS**

Measuring the quality of what we do in radiology and our impact and contribution to patient care is challenging. Patient reported outcome measures (PROs) are surveys that assess the quality of care delivered to patients from the patient's perspective. PROs provide an understanding of the impact that a condition or treatment has on a patient's life and activities.

The use of patient reported outcome measures in imaging can provide a way to measure patient satisfaction and the effectiveness of treatments. They can help determine the most important aspects of diagnostic imaging for patient outcomes, drive collaboration and improved communication between clinicians within different specialities who treat a similar patient population, resulting in improved patient care, and help to identify areas of improvement in imaging services.

Metrics for imaging quality and performance have traditionally consisted of reporting turnaround times, image quality metrics traditionally measured as the x-ray rejection rate, and, latterly, data relating to reporting accuracy. Those involved in imaging must be cognisant, however, that the direction of travel is inexorably toward more person centred and individualised care. This is an evolving expectation for healthcare services, both from commissioning bodies, be they local or national, and also from patients themselves.

PROMS provide an understanding of the impact that a condition or treatment has on an individual’s life and activities. This concept has been used effectively to answer research questions about the effectiveness of specific interventions in medicine. In the context of research, a generic and comprehensive toolbox of measurements has been constructed and provided as a resource in the form of the Patient-Reported Outcomes Measurement Information System (PROMIS), developed by the US Department of Health, which is a set of over 300 measures of physical, mental, and social health for use with the general population and with individuals living with chronic conditions. To date, there have been few attempts to apply the same rationale to diagnostic tests, including imaging investigations.

Patient Reported Experience Measures (PREMs) are a similar tool and are also questionnaires for patients, but these questionnaires focus on the patient's experiences of the care they receive instead of their health status and physical and psychological symptoms. (2)

**How do PROMS fit into radiology?**

 In imaging, the idea that diagnostic tests can impact patients' well-being has been explored primarily in the context of the impact of false-positive screening results. (3)

There have been few attempts to assess which PROMs are important to patients undergoing diagnostics tests for symptoms, whether these are common and shared over a range of diagnostic tests, and how these outcomes can be used in decision making between clinicians and patients. (4,5)

Currently, there is no consensus on what represents a patient-reported outcome (PRO) in diagnostic radiology or which PROMS to collect. This could be seen as a deficiency but also represents a substantial opportunity to develop these measures and tools in collaboration with patients. Early attempts to develop imaging specific PROMS have proved illuminating; these insights may better inform our working relationships with clinicians as well as patients. Schwartz et al(6) developed a prospective registry for the documentation of imaging findings and symptoms. They found significant discrepancies between clinically documented and patient reported outcome measures. Schwartz et al do allude to the perception that imaging is in a triangular relationship with clinical services and patients, receiving information which may be conflicting from one or both partners.

Potentially, the measures of a PROM for radiology could encompass the whole patient journey in radiology from the pre-investigation information provided to booking methods in the radiology department or imaging centre, to the experience of the investigation itself to the communication of the content of the report, and how this is managed.

Also, the scope of imaging PROMS could be expanded from the data provided by the patient to measuring the impact of diagnostic imaging findings on treatment decisions. PROMS could be a vehicle, as multidisciplinary meetings have been for twenty years, which could further drive collaborative working and improved communication between radiology and clinicians resulting in improved patient care.

Indeed, one could point out that one of the weaknesses of widespread, almost ubiquitous, multidisciplinary meetings and working with extensive radiologist input is that the impact on patient care of this intervention (which healthcare professionals universally believe to be positive) has never been accurately measured. PROMS could present the imaging community with an opportunity to rectify this.

For radiologists working in collaboration with clinicians, this could mean defining the imaging findings that help make the best treatment decisions based on PROMs. PROMs can also help determine appropriate imaging by providing patient-specific information that could supplement (or potentially even replace) current markers of appropriateness such as congruence with established imaging algorithms.

**How are PROMS developed?**

As there are no national PROMS in radiology, these could be developed locally in Trusts, at the Integrated Care Board ( regional) level or between radiologists with a common speciality interest as part of the role of the imaging SIGS which are affiliated with the Royal College of Radiologists.

Although relatively little has been published on the methodological basis for the development of imaging-based PROMS, there have been several varying approaches. Adopting a pragmatic process-driven approach, Gyftopoulos et al(10) describe their approach to the development of a PROMS database for anterior shoulder instability (ASI) patients, a local initiative in their institution.

They describe five phases, the first being the development of the PROMS team, which is multidisciplinary and would include clinical colleagues, a statistician and a coordinator to manage the PROMS database.

The team worked with a statistician to assess the sample size they needed which would demonstrate what they describe as “meaningful results” by determining whether there is an adequate number of patients with the condition of interest and who undergo the imaging study of interest within their institution. Sample size would present less of an issue if PROMS were to be developed nationally in the UK as the pool of patients with a specific condition undergoing a specific test or intervention would be much larger.

The authors describe in their paper the challenges with retrospective data extraction, coding, and exportation as well as reviewing, and cleaning, and validation of the collected data which was to form the basis of the PROM development. Their initiative was clearly a well organised quality improvement project with a systematic approach to implementation, but this approach at a local level does raise questions as to whether institutional level PROMS would sustainable without central support and funding.

There was little if any patient involvement described in the development of their approach to their PROM. This approach does seem contrary to the underlying objective of the exercise and therefore, their results should be viewed with caution. As a baseline, it would seem prudent that patients and carers should be involved in initial decisions about what information is collected in the PROM and the planning of how it will be collected, when, in what format and how it will be stored.

Another divergent methodological approach to the development of imaging PROMS is described by Thomason et al in the PROD ( Patient reported outcomes of Diagnostics) study. This is described as the first comprehensive attempt to define Patient Centred Outcomes (PCOs) of imaging tests and create a framework. (3) The authors divided PCOs from imaging into four domains: (1) information or knowledge yielded, (2) physical effects, (3) emotional outcomes and (4) test burden. They also noted that PCOs interact and influence each other in complex ways. Over three years, the authors used primary research, evidence syntheses and input from multiple stakeholders to describe and categorise PCOs from imaging tests and clearly describe the next steps needed to advance the use of PCOs in imaging.

In this commentary, we have introduced the basis for the concept of patient-reported outcome measures (PROMs) in imaging. Two approaches to the development of imaging patient reported outcomes, one pragmatic and the other highly methodological, have been discussed. The advent of PROMs provides the imaging community with a new opportunity to quantify the impact we make directly on patient care, through prompt and accurate reporting of imaging investigations, through multidisciplinary working with clinical colleague and through our direct interactions with patients. This is an opportunity we need to be ready to grasp with purpose.

References

1. Wees PJ van der, Verkerk EW, Verbiest MEA, Zuidgeest M, Bakker C, Braspenning J, et al. Development of a framework with tools to support the selection and implementation of patient-reported outcome measures. Journal of Patient-Reported Outcomes. 2019;3(1):75.

2. Kingsley C, Patel S. Patient-reported outcome measures and patient-reported experience measures. BJA Education. 2017;17(4):137–44.

3. Thompson MJ, Suchsland MZ, Hardy V, Lavallee DC, Lord S, Devine EB, et al. Patient-centred outcomes of imaging tests: recommendations for patients, clinicians and researchers. BMJ Quality & Safety. 2021 Oct 6;bmjqs-2021-013311.

4. Allport J, Ramaskandhan J, Alkhreisat M, Siddique MS. Patient-Reported Outcome Measures and Radiological Outcomes in Mobile-Bearing Total Ankle Arthroplasty With Varus or Valgus Deformity. Foot & Ankle International. 2021;42(2):176–82.

5. Lameijer CM, Duis HJ ten, Haag CMSC, Moumni M el, Sluis CK van der. The evolution of radiological measurements and the association with clinician and patient reported outcome following distal radius fractures in non-osteoporotic patients: what is clinically relevant? Disabil Rehabil. 2020;43(26):3777–88.

6. Schwartz C, Winchester DE. Discrepancy between patient-reported and clinician-documented symptoms for myocardial perfusion imaging: initial findings from a prospective registry. International Journal for Quality in Health Care [Internet]. 2021;33(2):1–5. Available from: https://academic.oup.com/intqhc/article/33/2/mzab076/6258102

7. Hoang NS, Hwang W, Katz DA, Mackey SC, Hofmann L v. Electronic Patient-Reported Outcomes: Semi-Automated Data Collection in the Interventional Radiology Clinic. Journal of the American College of Radiology. 2019;16(4):472–7.

8. Nandan AY, Nagesh NM, Lee MJ. Patient Reported Outcomes in Interventional Radiology: Time to Measure What We Do. Cardiovascular and Interventional Radiology. 2019;42(6):931–2.

9. Cazzato RL, Rubeis G de, Marini P de, Auloge P, Dalili D, Weiss J, et al. Interventional Radiology Outpatient Clinics (IROC): Clinical Impact and Patient Satisfaction. CardioVascular and Interventional Radiology. 2021;44(1):118–26.

10. Gyftopoulos S, Jacobs A, Samim M. Imaging-based patient-reported outcomes (PROs) database: How we do it. Skeletal Radiology. 2021 Mar 1;50(3):469–74.