Brief Opinion

A Facile Electronic System for Collection and Analysis of Patient Reported Outcomes

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The import of patient-reported outcomes (PROs) in radiation oncology is well-described,¹ yet facile means for collection, tabulation, and analysis are lacking.² Often due to the technical difficulties of integration of third party data collection platforms into the medical record, PROs in many clinics remain collected on paper and later digitized.³ This sequential process of digitization (either via hand or scanning machine) is cumbersome and introduces potential for error and cost. Paper questionnaires are also frequently discarded or misplaced by patients. Significantly, because in such cases there is a single physical form, not all team members have ready access to these patient data, hindering interprofessional communication and patient care.

Here, we present a platform for PRO collection that is fully electronic, customizable, and efficient. Though 1 specific solution is described, nearly all of the elements can be adapted (or are available at little to no cost) for specific clinical use. Notably other electronic means for PRO collection have been described previously,² often with significant cost or implementation barriers. The unique elements of this platform as it pertains to clinic flow and adaptation are enumerated herein.

At each on-treatment visit and follow-up visit, patients are given cards with their medical record number, a simplified (Tinyurl) website, and a Quick Response (QR) code (Fig 1) immediately after being roomed. Both the website Uniform Resource Locator (URL) and QR code link to a PRO questionnaire (eg, the MD Anderson Symptom Inventory-Head and Neck; Fig 2). Patients fill out the questionnaire using their smartphone (either by scanning the QR code or entering the website into their phone browser). For those who don’t have a smartphone or are unable to use one, each examination room workstation has a desktop shortcut to the survey. In some cases, the medical assistant rooming the patient assists with completing the survey.

The survey is housed within Qualtrics, but could be built in any protected health information-secure platform and linked as a webpage. Upon completion, the software saves the data and emails a copy of the results to the attending physician and any other team members prespecified. These data are immediately reviewed, cut and pasted into the patient’s medical record as official documentation, and forwarded to other members of the treatment team seeing the patient that day (eg, resident/medical student, nursing staff). The receipt of the email also serves as a reminder to the team that the patient is ready to be seen.

Tabulated data (Fig 3) within the system can then be interrogated to investigate trends in a particular patient over time or for research studies where specific PROs are correlated to dose and intervention. Over the first 6 months of implementation, patient completion rates within our clinic exceed 90% and subjective satisfaction rates are high. Most patients have reported being prompted by the questions to remember symptoms they had recently but not currently. The time spent with the team during the visit often is, consequently, more focused, efficient, and productive. No patients or staff have complained about the survey.

The advantages of this approach are several. First, this platform has enabled more comprehensive care through systematic review of multiple, well-validated symptom

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domains. As opposed to haphazard verbal patient questioning, which can be of variable effectiveness and reproducibility, this platform allows data to be obtained uniformly and consistently across time and patient groups. The system was straightforward to set up, required no cost, and is readily adaptable to the clinical situation at hand. The electronic nature enables quick communication, data analysis, and data handling, reducing clinic time and increasing staff engagement.

The electronic nature does have limitations. Although access to a smartphone and computer savviness are not prerequisites, such skills certainly do help and may be associated in the long run with increased adherence to survey completion. In cases where patients have a functional limitation or other access issues, the medical assistant team often provides support. Such a system increases their workload and requires their engagement, which may not be tenable within all clinics. Finally, construction and maintenance of the system, though straightforward (ours was constructed by a high school student, author M.L.), do require basic computer and survey skills. In most institutions, a protected health information-protected platform like Qualtrics may be available for research, and multiple free or low cost alternatives (eg, Google Forms) also exist.

Multiple future directions for this platform are envisaged, including collection of data from patients at home; incorporation of smart technology to increase automation, provide prompting, or collect biometric data; and in patient education/communication through more
sophisticated questions and prompts. The effect of this approach on the length and nature of patient visits will also be investigated.

In summary, this platform for electronic PRO collection offers 1 potential electronic solution that can be readily implemented in most clinics. Because of the access to high quality PRO data, patient care can be enhanced, potentially leading to increased satisfaction and better outcomes.

References

1. Grewal AS, Berman AT. Patient-centered outcomes in radiation oncology. *Hematol Oncol Clin North Am*. 2019;33:1105–1116.
2. Bennett AV, Jensen RE, Basch E. Electronic patient-reported outcome systems in oncology clinical practice. *CA Cancer J Clin*. 2012;62:337–347.
3. Gensheimer SG, Wu AW, Snyder CF. PRO-EHR Users’ Guide Steering Group. PRO-EHR users’ guide working group. Oh, the places we’ll go: Patient-reported outcomes and electronic health records. *Patient*. 2018;11:591–598.

Figure 3  Example data set collected for a single patient over time.