

Challenges identified or discussed and associated strategies

First Author, Publication Year	Technical Issues ^a	System Usability Issues ^b	Patient Lack of Comfort with Technology	Incomplete/Missing Data	Lack of Patient Use of System ^c	Other Patient Issues ^d	Difficulties Timing with Clinical Processes	Lack of Clinical Staff Involvement/Engagement ^e	Lack of Clinician Comfort with PRO Data Use	Authors' strategies (suggested or attempted) to address the challenges
Abernethy, 2009 (55)	X					X	X			Upgrade IT system in some areas to minimize "dead zones". Nurse champion to help facilitate, guide processes, troubleshoot, and respond to patient concerns. Make it clear that responses are confidential. Clarifications needed to wording of PRO questions. Specify what happens to symptoms reports when patient is not scheduled to be seen by a provider.
Andikyan, 2012 (56)		X		X	X	X				For patients who are unwilling or unable to complete electronic questionnaires, back-up data collection methods such as automated telephone interactive voice response merit further investigation. Provide normative data of symptom reports for comparison, in the same population.
Basch, 2005 (57)	X				X					Technical improvements needed to system. Technical problems may resolve over time across patient populations as patients become progressively familiar with computers.
Basch, 2007 (60)	X			X	X		X	X		Need to systematically involve clinicians in the patient-reporting process, both in terms of reminding patients to log in and in providing active feedback about patient reports. Integration of electronic self-reporting into the flow of routine clinical care improves completion rates.
Basch, 2016 (38)			X	X						Earlier or more frequent data collection is warranted for patients who have advanced cancer. Participants lacking computer experience may have less-developed health communication skills and thereby benefit more from a structured program for eliciting symptom reports. Upgrade system with recommendations to patients or clinicians about management of reported symptoms.
Basch, 2017A (61)	X			X	X		X	X		A downloadable application will address common problems experienced with poor internet connectivity. System could be enhanced to allow collection of symptoms between hospital/clinic visits. A central data manager who contacts patients directly for reminders and backup data collection could enhance system use.
Basch, 2017B (58)	X			X	X			X		Adherence rates could be boosted through centralized monitoring of adherence and automated reminders. Virtually all U.S. oncology clinics now have high-speed internet in waiting areas and most patients own a wireless device. The authors anticipate that internet connectivity problems will be less of a barrier in the future.
Basch, 2018 (59)	X			X	X	X				Development of a downloadable application to overcome issues with internet connectivity. Reduce reliance on a centralized coordinator to monitor for completion of symptom reports, as this required a 0.5 FTE in this study.
Berry, 2014 (50)				X	X					Adapt the instruments for the specific needs of the clinic patient population. Allow the system to be used on a variety of remote devices.
Bryant, 2020 (51)				X						Not provided, concluded missing data was from high symptom burden.
Cowan, 2016 (62)	X				X	X		X		Comment sections are needed. The answer options provided did not allow the patient to elaborate. Clinicians should be involved in the development and implementation of such a system in order to appropriately incorporate it into current workflow, thus reducing burden.
Fromme, 2016 (53)				X						Not provided.
Graetz, 2018 (54)						X				Weekly reminders needed to enhance use of the app, particularly with participants who had lower literacy levels.
Lucas, 2017 (63)	X									A smartphone application or interactive voice response system that would provide reminders and allow patients to complete surveys anywhere could improve response rates. Shorter length patient-reported outcome measures (take less than 15 minutes to complete) could increase response rates.
McCleary, 2013 (64)			X			X	X			A brief computer tutorial should be included initially describing how the system works.
Snyder, 2013 (65)	X			X	X		X		X	Tailor questions to be applicable to the individual patient Provide a clear explanation of the meaning of the symptom report scores Have higher scores consistently indicate either better or worse symptoms. Develop consensus suggestions for how clinicians can respond to symptom reports.
Stukenborg, 2014 (66)	X	X	X			X				System improvements needed to make it clear to the user when a button has been selected. Ensure high-quality wireless connections are available. Provide patients with instructions on the system and individual assistance to address questions and concerns.
Tran, 2020 (67)	X			X	X	X	X			Personalize questions so patients are not asked questions about symptoms that do not apply. Identify a patient's high priority concerns, and focus questions on those symptoms to reduce the burden of answering questions. Upgrade system with a data summary component showing data analytics to predict symptoms and personalize the system.
Wolfe, 2014 (52)						X		X	X	Use of a web platform to permit more versatile administration and email reporting. Strengthen the system with additional components that can enhance provider responsiveness to symptom reports and provide patients and families with potential symptom management techniques.
Wright, 2018 (68)	X			X	X					Encourage active patient engagement with the system since access to mobile health applications alone does not lead to sustained engagement. Clearly word alerts to encourage patients to call clinicians (e.g., "Contact your clinician immediately. Your [symptoms] require medical attention").
Frequency Reported	12	2	3	12	11	9	6	5	2	

^aInternet connectivity, device malfunctions, forgotten login information; ^bEase of use, satisfying to use; ^cDid not see the point, did not feel well enough, too overwhelmed; ^dHealth literacy, PRO questions not understood; ^eClinicians forgot, did not follow through or see the point.