Strategies for Integrating Technology as a Team Member

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Interdisciplinary health care teams have numerous opportunities to investigate more efficient health care delivery mechanisms using technology that bridges information science and human-centered care. At the onset of team formation, technology can be strategically integrated to enhance health care delivery for patients and providers using multiple strategies.

Technology as a Team Member for Patients

In the shift toward consumerism and patient-centered care in health institutions and systems, technology that supports patient engagement and behavior change has the potential to revolutionize the way health care professionals and patients interact and communicate. Individuals engaged and actively involved in their health care have better outcomes and incur lower costs [1]. For patients and their families or caregivers, technology that is convenient, accessible, and easily incorporated into the activities of daily living offers the most promise for better communication and participation, especially when designed with literacy levels in mind.

According to an industry white paper, text messaging is one of the few communication channels that is actively used by nearly all segments of the population, with 95% of the adult population owning mobile phones and 98% of those owners sending text messages regularly, including those over 75 years of age [2]. In fact, marketing research shows SMS (short message service) messaging has a final read rate of 98%, and 90% of SMS texts are read within the first 3 seconds of receipt. In comparison, direct mail, print, and e-mail typically see response rates of just 6% or less [3]. This powerful mode of communication can be used to harness and manage reminders, engage patients, and provide information to improve or reinforce messages important to health status or condition; it is both convenient and seamless.

The benefits to engaging patients through text messaging include relatively low cost, readily accessible interactions, and availability to patients and the patient care team. This reduces patients' personal burden as in many cases it will not incur additional time or money and can increase the likelihood of being in compliance with recommendations, thereby improving outcomes. Although text messaging pro-

vides a possible technical solution, not all patients have cell phones, texting plans, or access to strong cellular networks. For example, older adults living in rural areas may prefer technical solutions involving Internet access and computers in the home, community centers, or public libraries [4].

Mobile Phones as a Patient Education and Decision-Making Tool

One way that technology tools can be used in human-centered care is to improve communication with patients. Mobile phones and apps can be used to facilitate patient education and clinical decision-making since they can guide patients to easily accessible sources of reliable health information.

Over 72% of the United States population own a smartphone and use it at least once per month, with this number expected to grow to over 80% by 2022 [5]. With so many health consumers using smartphones regularly, this is a familiar technology tool for most patients and one they are likely already using for health information-seeking, a behavior that has been increasing in the adult population [6].

Mobile phone apps are now available for many health information tools designed for physicians, such as UpToDate and Micromedex. There are also apps specifically designed to improve provider-patient communication, such as the Canopy Speak medical translator app, which helps to improve communication between clinicians and patients with varying levels of English familiarity. While there are less reliable phone apps designed specifically for health consumers, there are many website versions optimized for mobile phone access, such as MedlinePlus from the National Library of Medicine and NC Health Info from the Health Sciences Library at the University of North Carolina at Chapel Hill.

Technology is also integrated into patient-centered care through telehealth initiatives. Telehealth enables virtual "house calls" and is a "rare instance where innovation is moving at the same speed as consumer comfort [7]."

Nearly three-quarters of United States consumers (74%) use telehealth services, 76% of patients prioritize access to care over the need for in-person interactions with their health care providers, and 70% of patients are comfortable with communicating with providers via text, email, or video instead of in person [7]. Additionally, many rural counties in North Carolina could benefit from expanding access to health care via telehealth technology. According to a report from the North Carolina Department of Health and Human Services, "technology is evolving quickly and our ability to assist our most vulnerable citizens through creative uses of this tool has vastly increased [8]." In the case of telehealth, providing convenient access to health care regardless of geography might help to reduce health disparities and could provide care to many underserved areas of North Carolina. Besides reducing health disparities in access to care, telehealth can reduce disparities in patients' knowledge and health outcomes [9, 10], increase compliance, and improve continuity of care across a wide range of settings and age groups [11].

Integrating technology tools like text messaging, mobile apps, and telehealth can be a convenient way for physicians to engage patients in their health care. This is particularly true for patients with low health literacy or limited access or experience with technology as it allows equal participation and engagement from both health care providers and health consumers, provided it is employed thoughtfully.

In addition to mobile apps for bedside and patient teaching, mobile technology can be incorporated into bedside and office clinical decision-making. Tools such as online algorithms, calculators, body mass index charts, screening recommendations, care guidelines or pathways, and drug information can be utilized by physicians and practitioners to make quick and decisive therapeutic decisions at the bedside [12]. These online tools can also be used to enhance the teaching of students and residents at the point of care. Evidence-based medicine and teaching at the bedside are necessities for medical education and are increasingly incorporated in interprofessional education and practice. Some of these tools are available through the electronic health record (EHR), while others are available via mobile apps free of charge. Most national organizations have developed mobile apps for the bedside, one example being the American College of Physicians Clinical Guidelines [13]. Clinicians need to become familiar with available tools prior to patient encounters so that access and usage at the bedside or in the office are seamless, successful, and time-saving rather than becoming a hindrance.

Many additional processes can be completed at the bedside with the use of mobile devices and laptops: plan of care, medication ordering, access to the EHR, laboratory testing, and order entry are just a few [14]. By 2022, 98% of physicians will be using mobile technology at the bedside [15]. About 72% of surveyed decision-makers said mobile devices are already improving the quality of patient care while giving clinicians actionable intelligence at the bedside, according to a recent study [15]. However, using mobile devices and laptops at the bedside can reduce the amount of time spent directly interacting with patients as clinicians are focused on documentation and information-seeking rather than solely on the patient. To ease this burden and increase the opportunity for clinicians to capitalize on in-person interaction time with the patient, clinical librarians can be integrated as virtual or remote members of care teams. Clinical librarians are trained to assist with the incorporation of evidence and technology whereby they can suggest tools or resources to the patient care team, which can enable clinicians to place greater focus on direct patient care.

Best Practices for Integrating Technology as a Team Member

Information and communication technology has the potential to make patient care more efficient, coordinated, and safe, and to improve communication between patients and providers [16-18]. However, technology is not a solution in and of itself. To ensure adoption, technology needs to be user friendly for both patients and clinicians, and it must be strategically integrated to enhance the experience or process. To that end, there are several best practices to consider.

Assess Patient Engagement Needs

Before implementing technology into patient care, first consider the patient's needs, preferences, digital literacy or fluency, technology access, and information-seeking behaviors and attitudes (see Figure 1). Although it is now common for US adults to search online for health information, patients can have different approaches to information-seeking and communicating about health information with their health care team. A study of cancer patients classified these different information-seeking orientations into 4 categories: the "questioners" who often distrust physician-provided information; the "undecided" who need time to process information and make decisions; the "cross-checkers" who prefer to double check information they receive; and the "experience-oriented" who prefer information from other health consumers over that from providers or research [19]. While these categories may not be generalizable to all types of patients, knowing that patients can approach information-seeking in different ways and that a patient's information-seeking behavior is related to their view of the physician as "information-giver" illustrates the importance of strong physician-patient communication [19]. Information provided to patients should be customized to the existing patient-physician relationship and to the individual patient's information needs and preferences.

Develop Digital Expertise

Just as clinicians consider the technology skills and preferences of patients, they must also do so for themselves.

Clinicians need to familiarize themselves with available tools prior to the patient encounter and consider the available evidence for their use, as well as any potential safety and security concerns that may raise.

Clinicians should also assess whether technologies will need to be incorporated with the involvement of multiple team members. In some cases, the technology will enable patient care teams to better collaborate, such as by documenting and sharing changing patient goals and rationales for decisions made [20]. In these cases, the technology should be built alongside teams rather than forced upon them [21]. When relying on already existing technologies, clinicians and patient care teams should acquire training when necessary and understand options for troubleshooting.

Clinicians can involve librarians and informatics health care professionals in technology training and in application of technologies to information workflows. As team members, information scientists can align technology use with high-quality evidence [22], information flow and clinicians' workflow [23], patient health literacy [24], and more.

Decide Implementation Strategy

Once clinicians understand patient needs and their own expertise, they can begin to choose optimal technology for different patient care scenarios. While doing so, they must match technology with the needs and preferences of the patients and their desired level of involvement. Then, clinicians need to have an open discussion with their patients, using an approach that can eliminate the fear of losing patient-centered interactions. The Agency for Healthcare Research and Quality recommends using Health Literacy Universal Precautions, assuming that all patients benefit from simplified communication that is easy to understand [25]. If agreeing to use technology for future communication purposes, it is equally important for providers to use plain, easy-to-understand language, be specific, and encourage

FIGURE 1.

Steps to Integrate Technology as Team Member
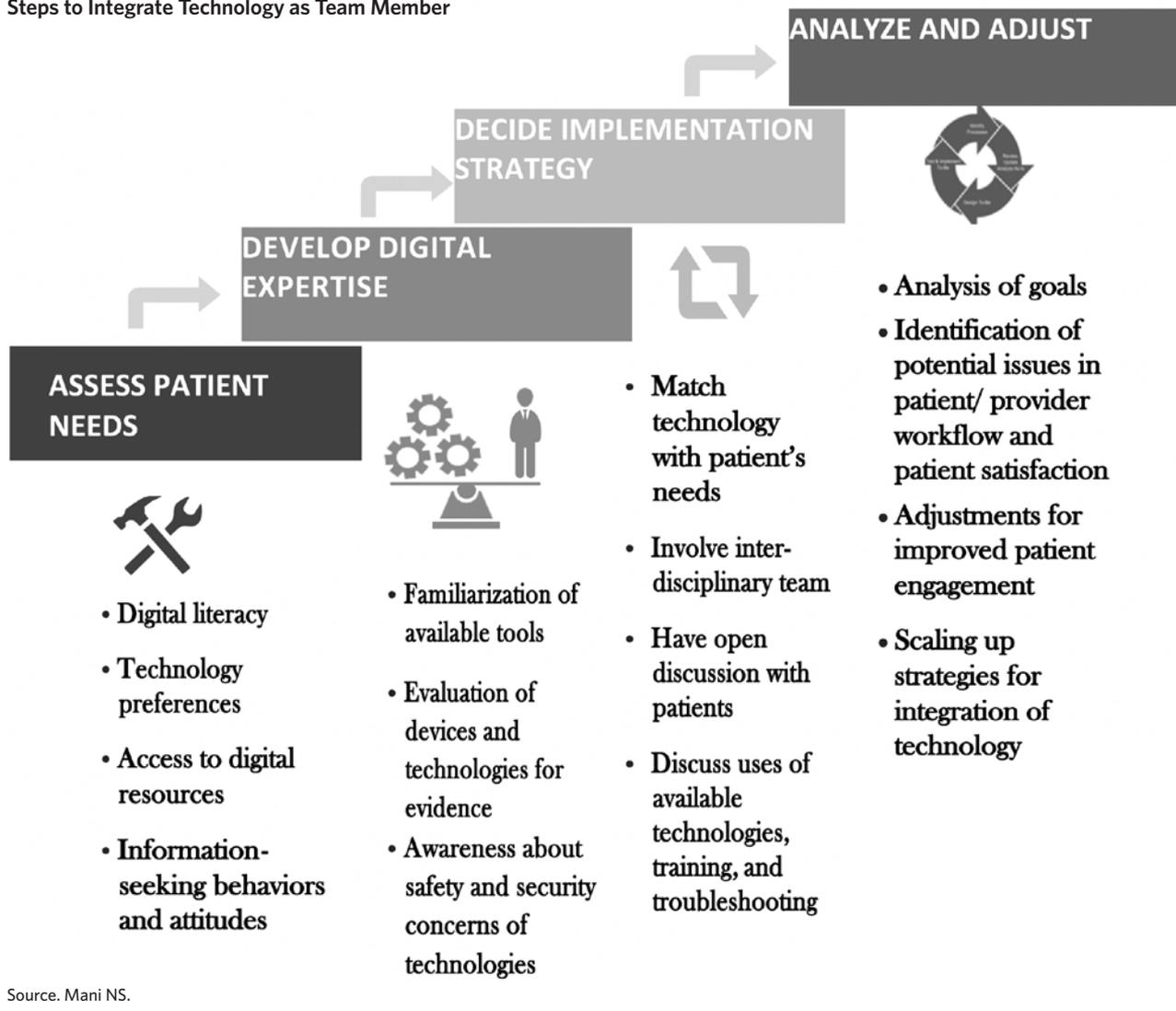
Source. Mani NS.

questions [25]. Providers can explain which technologies are available and how they can be used, invite the patient to share preferences regarding technology use, and if technology is part of an intervention, strategize with the patient about a plan for its use, needed training, and troubleshooting. Clinicians should think through the timeline of technology use with the patient. For example, if patient portals are to be used, providers need to be aware that patients will sometimes gain quicker access to test results, thereby increasing anxiety if explanations are not readily available. Patients with low health literacy or numerical skills might be confused by test results, so engaging the patient to set up a time to meet and discuss results prior to them potentially seeing bad news through a patient portal is a great strategy for busy clinicians.

At times, patients may use a technology, such as an app or a self-monitoring device, of which the clinician is unaware, or that causes concern. Patients who over-rely on smart technologies may experience anxiety, compromise their safety, or distrust provider recommendations of care [26]. Patients who often search for their own health information should also be educated on the risks of new health resources and encouraged to discuss any information found with their health providers [27]. Clinicians should recommend reliable information resources and technologies that meet the high standards applied to evidence-based tools in health care.

Analyze and Adjust

Fully integrated technology holds immense promise in supporting coordinated care, improving workflow efficiencies, and creating more personalized patient experiences [28]. However, technology is also likely to introduce unintended adverse effects and risks to patients. Thus, technology has often been described as "both part of the problem and part of the solution for safer health care [29]."

Following integration of technology in the patient care process, it is critical to analyze whether the goals of enhanced patient satisfaction and improved health outcomes have been achieved. A periodic assessment would help in identifying the potential factors impeding the patient/provider workflow and possible reasons for poor patient satisfaction. Evaluation of these factors is likely to provide crucial insights on the adjustments required to enhance patient engagement. Subsequently, the strategies for integrating technology in patient care may be scaled up to provide for patients' existing and future needs.

Technology as a team member is an enabler for better care and is not meant to supplant either the processes or the people who deliver care. Strategies for integrating technology as a team member should therefore be implemented effectively to enhance patients' access to health care, improve quality of care, and promote health savings. NCMJ

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