HUMAN FACTORS
and ERGONOMICS SOCIETY

HFES Policy Statement:
Improving Accessibility to Healthcare and Overcoming Health Disparities

Background

The healthcare system is becoming increasingly digitized, with the development and utilization of different modes of treatment, such as virtual healthcare, accelerated through necessity during the COVID-19 pandemic. This digital transformation provides great potential to expand opportunities for patient engagement in the healthcare system and for patients to be more actively involved in their care. Engagement is shown to improve autonomy and patient self-management behaviors, thereby improving treatment outcomes (Franklin et al., 2021; Muscat et al., 2021). However, the usefulness and utility of these digital tools is largely contingent on how comfortable patients are with technology interaction, how well they understand health information, and their access to the healthcare system, each of which varies widely among the diverse US patient population. The ability to better deliver care to the highly diverse patient population in the United States will significantly improve health outcomes in general, as well as during future pandemics and health emergencies.

Providing effective healthcare to patients is challenging due to the paucity of patient-centered healthcare systems. Inherent to this challenge is an assumed or expected reliance on patient-self management capabilities, the use of instructions provided across a range of media, and an increasing reliance on digital tools to achieve out-patient treatment goals (Gonçalves et al., 2023). Health technology commonly suffers from low perceived usability and patient adoption, thereby providing insufficient support for patient care and jeopardizing patient safety. Examples include some telehealth software and a wide range of patient self-management devices (e.g., blood pressure monitors, glucometers, CPAP machines, etc.). This challenge is exacerbated by high variability in the patient population (including health literacy, digital literacy, and healthcare accessibility), leading to an exacerbation of existing inequities in health outcomes.

Challenges That Lead to Healthcare Inequity and Accessibility Barriers

Several barriers to healthcare equity and accessibility exist that should be addressed, with a focus on identifying and accommodating patients' individual needs and acknowledging the risks associated that arise from ineffective healthcare system engagement across a diverse patient population.

Many Patients Have Limited Access to Health Technologies

Cloud-based software and systems that sync to a network are now quite pervasive, which has opened doors to many technological innovations and further digitization of the healthcare system. A large subset of patient engagement occurs over the internet and on mobile platforms. Patients now have a wide variety of options based on their diagnostic or treatment needs with the option to synchronize data across healthcare providers within, and sometimes between, health care systems. For example, patients can often manage and access their visit data, diagnostic tests, and doctors' notes, as well as educational information, in one consolidated portal. Most importantly, a wide range of health monitoring devices are now available for patients to self-manage their condition, and automatically send or upload their results to their healthcare provider.

While the expansion of patient engagement through online options has enhanced the healthcare experience for a subset of the patient population, it has paradoxically degraded treatment outcomes for other high-risk patient groups with computer or internet accessibility limitations (e.g., low-income patients, older patients, rural patients) (Nouri et al., 2020; Ramsetty & Adams, 2020):

a) Access to health technology may be limited by access to personal computing devices, webcams, or high-speed internet, which cannot be assumed among many high-risk patient groups.
b) Knowledge of the existence and utility of these digital tools are not widely known across the patient population.
c) Training, instructional support, and tech support technicians are limited, which may discourage widespread adoption and use of these technologies.

Patient Populations are Highly Variable in their Ability to Use Health Technologies

Within many healthcare technologies, it is assumed that patients are homogeneous and will interact with technology and health information in the same manner. These systems are designed to reflect this belief. However, patients are highly diverse, and have variable needs due to several reasons (Knisely et al., 2021):

1) Patients are an untrained population, with no formal education or training requirements to seek healthcare services; and
2) Patients who would not naturally gravitate towards digital tools are now required to engage with them in order to seek care and manage their conditions. This variability inherent to the patient population triggers a digital divide, which widens existing disparities in health care access and outcomes.
3) Patients may have language barriers that affect their ability to understand instructions or displays.

Further complicating this issue is the absence of national databases comprehensively capturing factors that directly impact patient-technology interaction. While existing efforts of this type for the civilian population, such as the CDC's National Health and Nutrition and Examination Survey (2023), include detailed medical records, other factors that directly impact technology interaction are not being tracked, including:

1) **Health literacy**, the ability to understand and apply health information, plays a large role in defining patient heterogeneity. Because critical health information is being communicated on digital platforms, patients with low health literacy may not effectively understand and translate this information into action, thereby compromising treatment outcomes (Stormacq et al., 2019).
2) **Technological factors** such as digital literacy are inherently linked to health literacy (Dunn & Hazzard, 2019). Patients must be able to understand medical device instructions, perceive themselves to be capable of successfully using the device, and expect a positive outcome for device interaction.
3) **Physical or cognitive limitations or disabilities** can also significantly impact outcomes, with many of these limitations related to diagnosed medical conditions (Knisely et al., 2021; Pinelli et al., 2022). For example, patients with mobility impairment (e.g., arthritis, diabetic neuropathy, etc.) may have difficulty physically interacting with technologies and engaging with the healthcare system more broadly. In addition, patients with sensory issues (such as hearing loss, glaucoma, cataracts, etc.), cognitive impairments, or neurodiversity issues can have similar technology engagement limitations.

Poor Technology Usability Negatively Affects Many Patients

In addition to the aforementioned patient-related factors, the design of technology has a large influence on treatment outcomes. Historically, patient-facing health technologies (such as glucometers, blood pressure monitors, patient portals, etc.) have been fraught with usability issues due to exclusion of a consideration of the patient end user in the design and product development process (Cheng et al., 2020). For example, many designers will take for granted that patient users understand home, menu, and basic software navigation buttons (which many do not). Frequently there are no instructions provided or training to engage with these common icons, which may not be easily recognized by those with low digital literacy. In addition, a consideration that is frequently not taken into account in the design process is that low health and digital literacy is more prevalent among underrepresented minorities, older adults, and low-income patients (Fleary & Ettienne, 2019; Li et al., 2022). Given that a large percentage of patients fall into these categories, baseline expectations for technology interaction, and engagement with the healthcare system more broadly, should be adjusted to account for this knowledge.

Treatment Interventions that Respect Patients' Culture and Needs are Most Effective

In the context of healthcare, cultural competence is the explicit use of health knowledge in sensitive and meaningful ways to deliver care, with consideration of cultural beliefs, behaviors and needs, as well as the impact of societal and organizational structures on the patient. For example, a patient's religious beliefs or access to transportation may affect which treatments they are willing or able to consider. A consideration of cultural factors by healthcare providers can play a significant role in reducing disparities in healthcare outcomes (Mora, 2022). Research has identified that factors such as race/ethnicity, gender, socioeconomic status, age, weight, and disability, among other factors, can affect clinical decision making and the behavior of healthcare providers toward patients (Handtke et al., 2019; Vella et al., 2022; Vieten & Lukoff, 2022). Identifying culturally responsive treatment interventions can help to improve health outcomes.

Policy Recommendations

(1) Direct the Federal Drug Administration (FDA) to:

- ***a. Support programs that promote tailored digital interventions*** to address differences among the patient population.
  - i. Create a new cross-cutting FDA Human Factors Advisory Committee to focus on consolidating and reporting effective design practices across different patient population groups, informed by empirical study data and post-market analytics. The membership should consist of academicians and industry representatives with expertise in Human Factor/Ergonomics or a related discipline, as well as representatives from consumer or community organizations.
- ***b. Create*** empirically-informed federal user-testing guidelines to enforce inclusive design practices for healthcare information technologies.
  - i. <u>Voluntary Guidelines for all Healthcare Related Devices</u>: The existing Human Factors summative testing guidelines for manufacturers seeking FDA approval should be enhanced to provide standardized recommendations for consideration of population variability. The guidelines should detail recommendations for different types of patient end users (disease states, mobility limitations, health and digital literacy) based on product categories and incorporate the required population groups in user testing.
  - ii. <u>Updated Guidelines/Testing Consideration for Regulated Devices</u>: New FDA 510(k) and Pre-Market Approval (PMA) submissions for medical devices, whose exclusion of usability testing is allowed through grandfathered predicates, should be required to perform Human Factors testing. This process will account for new knowledge of the patient population and effective design practices acquired in recent years.

(2) ***Direct the Centers for Disease Control (CDC) to:***

- a. ***Establish national databases that can house*** empirical data representative of the continuously changing US population to inform health technology design practices.
  - i. A national longitudinal database should reflect the range of characteristics in the U.S. population that is relevant for integration in patient-centered design efforts, including metrics for functional mobility, health literacy, digital literacy, and technological access.
  - ii. Critical characteristics in the patient population that directly impact technology interaction should be informed by national databases and proportionally represented in usability testing participants.

(3) Direct the Health Resources and Service Administration (HRSA) to:

a. ***Incentivize the promotion of patient training on digital tools*** to ensure patients are provided with a comprehensive suite of educational tools to support their engagement with the healthcare system.

  i. Healthcare provider board certification and state licensing should include education modules for patient training on technology use and the impact of training on treatment outcomes.
  ii. Healthcare facility accreditation should be tied to the effective development and implementation of patient and provider educational resources associated with health technology.
  iii. Educational resources should be tailored to the diverse needs of the patient population (including formal education, health literacy, digital literacy) to ensure effective comprehension and retention.

b. ***Support programs that promote cultural competency training for healthcare providers*** to promote a healthcare workforce that can provide competent services to their patients.

  i. Healthcare facilities should integrate patient-facing cultural competency assessments to provide ongoing patient satisfaction data and identify areas for improvement.
  ii. Healthcare providers should undergo cultural competency and implicit bias training as a standard module of professional training.

About the Human Factors and Ergonomics Society (HFES)

With over 3,500 members, HFES is the world’s largest nonprofit association for human factors and ergonomics professionals. HFES members include psychologists, engineers and other professionals who have a common interest in working to develop technology, tools, environments, and systems for safe and effective human use, including use in challenging conditions.

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