CAN DIGITAL LOCATOR TOOLS IMPROVE ACCESS TO HIGH-QUALITY HEALTH SERVICES AND PRODUCTS IN LOW-RESOURCE SETTINGS?

INTRODUCTION

Barriers to accessing healthcare in low- and middle-income countries (LMICs) are well-documented. Examples include geographical access, high out-of-pocket expenses, limited and under-resourced public and private healthcare facilities, as well as inadequate availability of essential medicines, all of which pose significant challenges for millions of people seeking healthcare services (1,2). However, one less-discussed aspect of healthcare access is the difficulty in locating the right health services and products when and where they are needed. Navigating health systems presents individuals with various challenges. For instance, services may not be available locally, necessitating consumers to identify where specific products or services are offered. Providers might offer specific services only on certain days, and consumers may also need to understand the level of the health system at which they can receive certain services.

In the absence of a trusted and dedicated primary health care (PHC) provider, individuals often spend valuable time and resources navigating through a multitude of health facilities, visiting various providers in search of the right place to address their health concerns. Challenges navigating the health system can result in delays in assessment, diagnosis, and treatment, potentially leading to poor quality of care and adverse health outcomes. This burden of seeking care can erode trust in the health system.

With an expansion in digital access, new technologies may help consumers make decisions about where to seek care. One promising solution is the digital locator, which can enable healthcare consumers to promptly find high quality, affordable health products and services when they need them. Much like Google Maps guides us through unfamiliar streets, digital locators bridge the information gap, offering consumers insights into the specific services available at healthcare facilities near their location, contact information for these facilities, and GPS-enabled directions for easy access. In the context of LMICs, where navigating the healthcare landscape can be complex, this approach has the potential not only to improve access to affordable, high-quality health services and products, but also to empower consumers to make informed decisions about their own health, facilitating more effective planning of their journey through the health system.

While digital locators have great potential, further research and learning are needed to optimize their application and ensure that they reach their full potential to contribute to health system strengthening in LMICs. Existing evidence, largely from the United States, focuses mostly on describing processes for developing digital locators and generally only presents user analytics data. Data providing evidence on the effectiveness of these tools in facilitating access
to services and moving the needle on other health behaviors are scarce. Furthermore, many locator tools appear to be part of larger interventions, or the locator component is merely one feature of an app or website with other features. The evaluation of their effectiveness could therefore be challenging when part of a multicomponent intervention.

In this technical brief, we aim to shed light on the current applications of digital locator tools, opportunities to enhance these tools by incorporating additional features that foster trust, transparency, and quality, and examine the challenges and limitations they face.

To illustrate the practical applications of digital locator services, we share several examples of how PSI and other organizations have designed and piloted digital locator services in Kenya, Nigeria, Uganda, and Vietnam to help people find the right care when they need it. These examples show how digital locators can offer consumers more than just access to high-quality care; they also can also expand consumer’s healthcare options and allow them to make informed choices and access a wider range of care when needed. Digital locators have the potential to enhance access to primary healthcare services and encourage positive health-seeking behaviors, which could ultimately contribute to better health outcomes.

DIGITAL LOCATOR TOOLS: CURRENT APPLICATIONS

The use of digital mapping tools, like Google Maps, has revolutionized the way we navigate the world. These tools bring several advantages, including real-time mapping and directions within a user-friendly and accessible interface, catering to a wide range of users regardless of their familiarity with technology. Furthermore, these platforms can integrate user-generated content, including reviews and ratings, which has the potential to enhance the overall user experience. They offer a generalized approach to finding information and are increasingly used to locate healthcare providers and services.

In high-income countries, various digital locator tools have been developed to locate services related to specific health needs, such as HIV prevention, contraception, and youth-friendly services (3–8). These include, for example, a directory of youth-friendly sexual and reproductive health services with mobile-friendly web-based and paper-based versions for young men in Baltimore (5) and a locator app to help adolescents in New York City locate sexual and reproductive health services, with a focus on no-cost contraceptive services (7).

The development of digital locator tools in LMICs, however, has been more limited but accelerated during the COVID-19 pandemic. Countries like Kenya, Nigeria, Uganda, and Vietnam began harnessing digital locator tools to streamline access to COVID-19 testing, vaccines, and care. Increasingly, these platforms have been expanded to include information about additional health services (see Box 1 for examples of the use of digital locator tools in Kenya and Vietnam).

Due to their relatively recent introduction in LMICs, most digital locator tools currently offer only basic functionality. However, there is significant potential for further advancement and for integrating additional features to increase their utility to consumers.

The following section explores ways to enhance the utilization of digital locator tools in LMICs, along with key factors that should be taken into account when deploying such tools.

ENHANCING DIGITAL LOCATOR TOOLS FOR A RICHER USER EXPERIENCE

1. INTEGRATING ADDITIONAL LAYERS OF INFORMATION

In their most basic form, digital locators hold the potential to increase the visibility of healthcare facilities and improve accessibility and convenience for users. Additional layers of information could be added to further enhance the user experience, helping consumers make better informed decisions and easing their journeys through the health system.
EXPLORING USER PREFERENCES

Further research is needed to explore how digital locators can expand beyond basic geolocation of health facilities to become more useful to users in LMICs. Understanding the value to consumers of providing information on factors such as waiting times, real-time product availability, accreditation status, out-of-pocket costs, provider names, licensing, specialties, accepted health insurance plans, professional associations, years in business, and others is crucial for enhancing the effectiveness of digital locators.

Although different types of users prefer different extended features of digital locators, this additional information will likely be important to many users’ decisions about where to seek care. For example, in a study conducted in the United States, participants cited provider’s medical license, certification, and their acceptance of the patient’s health insurance as important factors when deciding to visit a health provider (9). Consumer reviews are also a valuable source of information that may inform decisions about where to seek health services (10) and could be incorporated into a digital locator.

It will be important to understand consumers’ needs and preferences when designing and improving healthcare locator services in LMICs to make them a more effective tool and enable consumers to make informed decisions about where to seek health care services.

INTEGRATING INFORMATION ON MULTIPLE DIMENSIONS OF QUALITY FOR INFORMED DECISIONS

Quality of healthcare is often categorized into different dimensions. Commonly, these include the (i) perceived dimension of care, which revolves around individuals’ experiences, their satisfaction with service delivery, and their overall perceptions of the care received. Another aspect is the (ii) technical dimension, which involves structured processes, defined practices, and care protocols. (11, p.2) Additionally, governments in LMICs often use accreditation as a means to ensure that providers, especially in the case of private providers, meet predefined criteria. Typically, these accreditation criteria primarily focus on (iii) the structural aspects of quality, emphasizing the characteristics of care settings, such as staff expertise and available equipment.

Information about each dimension of quality can provide consumers with a more comprehensive understanding of the care they might receive at a facility. Consumers’ decisions to seek care from a particular provider tends to be largely influenced by the way they or their peers perceive that provider’s quality of care. However, solely guiding users on perceived quality doesn’t guarantee that they will choose a provider that can effectively address their specific needs. Likewise, information on technical or structural aspects of quality will not always reflect high-quality health services. Integrating information on technical, perceived, and structural quality, or other dimensions of quality of care as additional layers of digital locator tools has the potential to guide individuals to health professionals who may provide higher quality care.

Making information available on multiple dimensions of quality has the potential to significantly influence consumers’ health-seeking decisions. Furthermore, it could create a feedback loop that motivates providers to consistently meet and exceed quality standards, as they strive to attract more clients. This bottom-up approach to accountability, driven by consumer preferences, holds the potential to become a powerful driver for quality improvement, if complemented by effective behavior change communication strategies ensuring alignment between consumer expectations and providers practices based on established care protocols and guidelines. Collaborative efforts across stakeholders to develop and test these innovations within digital locator tools have the potential to generate evidence that could contribute to enhancing both the quality of health services and the overall healthcare experience for consumers.
**USER EXPERIENCE: FINDING COVID-19 VACCINES IN KENYA**

During the COVID-19 pandemic, the MoH in Kenya supported by PSI developed a locator tool to geolocate health facilities providing COVID-19 vaccines. To better understand the use of the digital locator tool, PSI conducted a study among 403 participants across three Kenyan counties to describe users’ approach for accessing information on vaccine availability and health services, assess usability and perceived functionality of the tool, and understand key stakeholder perspectives of the tool’s utility and potential to scale-up. Findings showed that many users found the tool very or somewhat useful to find vaccine information. Although many were confident in using it, some users needed additional information and encountered usability challenges. The overall usability score, a metric used to assess opportunities for improving usability for digital tools, indicated room for improvement, with users finding the tool cumbersome to navigate. However, 95% of users would recommend the tool to others, especially friends, parents, and siblings. Users expressed interest in features such as vaccine types (74%), eligibility details (62%), and other vaccines offered (52%). The study’s insights can inform user experience enhancements and future functionalities for the tool.

**FINDING THE RIGHT CARE IN VIETNAM THROUGH DIGITAL SYMPTOM CHECKING AND SIGNPOSTING**

From January 2022 to June 2023, PSI and Babylon Health collaborated on an AI-powered digital healthcare project in Vietnam to meet consumer demand for reliable health information and access to high quality services. Supported by the Patrick J. McGovern Foundation, the project aimed to deliver a proof of concept focused on expanding access to digital self-care tools for underserved lower-income consumers. The digital platform combined Babylon’s AI Symptom Checker and PSI’s provider locator tool to facilitate users’ health journey through mobile phones. By integrating triage with linkage to suitable health providers, the project aimed to promote digital inclusion, reduce misinformation, and enhance service coverage while broadening the range of health-seeking options. Within 6 months from the platform launch in late 2022, both online and offline promotional campaigns drove 151,308 people to the platform. A total of 2,406 users signed up with the home page. These users started 5,100 Symptom Checker flows. Overall, 48.4% of users completed the Symptom Checker flow, of whom 94.1% were signposted to nearby health facilities. The data showed that users followed the intended design flow, consulting the symptom checker first before signposting to nearby health facilities.

In implementing this proof of concept, our shared goal with Babylon Health was to support consumers in Vietnam, equipping them with the tools to make informed choices about their healthcare. The collaboration aimed to leverage AI to create a seamless and accessible digital healthcare experience. The insights gained throughout this initiative emphasize the potential of AI in healthcare. As we reflect on our project’s achievements and challenges, we recognize that AI tools, and the technology industry itself, are dynamic. There is much more to learn. AI health applications continue to grow stronger and more precise, and further research is needed to assess their impact on improving healthcare access and achieving health outcomes.
2. IMPROVING HEALTH FACILITY MAPPING

ENHANCING ACCURACY AND COMPLETENESS OF MASTER FACILITY LISTS

The effectiveness of digital locator tools relies on the accuracy and completeness of Master Facility Lists (MFLs). Thus, improving the accuracy and completeness of MFLs is crucial for optimizing the functionality of digital locator tools. Ministries of Health in LMICs have made significant strides in developing MFLs, which include essential information such as geographical locations, administrative details, facility types, and available services. Additionally, various online directories, such as MedPages, have emerged, boasting extensive listings of healthcare providers across Africa.

However, the dynamic nature of the healthcare landscape, marked by new facility openings, closures, and service changes, requires regular maintenance and a unified, coordinated approach among stakeholders for effective management to maintain MFLs that are accurate and relevant. This approach can facilitate communication, linking, and merging of facility data across systems, reducing fragmentation caused by program-specific lists with limited interoperability (12).

Despite advancements, there is great variation in the availability and quality of MFLs in LMICs. Data on public facilities are often incomplete or outdated. For example, only 48% of these directories offer GPS coordinates to identify the exact location of health facilities (13). Furthermore, accessing GPS data for the listed facilities is not straightforward and can be challenging due to the lack of a standardized method for geolocating health facilities. Additionally, these directories are frequently amalgamated from numerous data sources, adding a layer of complexity in maintaining these extensive integrated databases.

ENHANCING COLLABORATION AND INTEROPERABILITY

Keeping digital health directories up-to-date and relevant while ensuring that external organizations and stakeholders can easily access and use the information is a significant and ongoing challenge. Data maintenance requires continuous effort, as a lapse in updates can lead to outdated or incomplete information, undermining the reliability of digital locator tools. Moreover, as previously noted, harmonizing data from various sources to create a comprehensive directory can be complex, requiring standardized procedures and consistent collaboration among stakeholders.

Facilitating easy access to health facility data and encouraging the use of API documentation provided by both the government and other relevant sources can increase efficiency and streamline collaboration for individuals and organizations working with MFLs. Additionally, prioritizing interoperability between the multitude of program-specific lists is essential. This effort will require effective communication and the adoption of a common standard such as the Fast Healthcare Interoperability Resources (FHIR) standard. Recently endorsed by WHO in its SMART Guidelines, FHIR addresses fragmented information systems and has the potential to be a game-changer for digital locator tools by increasing the interoperability of multiple data sources to that feed into a locator.

HIGH RESOLUTION MAPPING OF HEALTH FACILITIES

Technological advancements in geolocation hold promise for achieving high-resolution mapping of health facilities. High resolution mapping can enable healthcare consumers to precisely locate and access the services they need, reducing uncertainty and saving time and resources. Moreover, it can support health system actors to plan and respond more effectively by gaining a clearer understanding of healthcare infrastructure distribution. This improved granularity is foundational for robust and accurate
digital signposting tools. In 2021, for example, the Population Health Unit at the Kenya Medical Research Institute created a geocoded list of private health facilities. This initiative was designed to complement the national MFL, which primarily included public sector health facilities. The inclusion of private facilities in high-resolution mapping endeavors contributes to a more comprehensive and detailed healthcare facility dataset to provide consumers with information about all available options for access to high quality, affordable health services or products, including both private and public providers. However, these lists typically still lack data on certain cadres of private sector providers, such as informal providers, who play a significant role in delivering essential health services and products in LMICs (14).

CONSIDERING PROVIDER INCENTIVES

For private providers, there are both benefits, and drawbacks related to participation in digital locator tools. Inclusion in these tools has the potential to attract new clients, particularly if positive consumer reviews or ratings are included in the tool. On the other hand, such features can leave providers vulnerable to negative reviews that may drive business away. Incorporating accreditation statuses into these tools, as previously suggested, can serve as a valuable incentive that can enhance their credibility and trustworthiness. This allows users to identify and choose accredited healthcare facilities, enhancing their confidence in the quality of care offered.

However, this approach also demands careful management and standardization. Other incentives for private providers might involve offering real-time digital profiles to display information on product availability or waiting times. This approach has the potential to improve transparency and attract more clients but comes with associated costs.

Addressing these incentive-related challenges requires further research to find the right balance between encouraging private providers to participate in digital locators and mitigating potential downsides.

Furthermore, the integration of private providers into digital locators should ideally align with broader government efforts to integrate various types of private providers within the health system, enabling government stewardship and oversight of quality standards, reporting, and more. The inclusion of private providers who are not fully integrated into the health system but still play a significant role in delivering health services will likely be an ongoing challenge. Thus, a careful balance must be struck between expanding consumer options for informed choices and ensuring that users are signposted to providers offering high-quality services.

3. FOSTERING A CONDUCIVE ENVIRONMENT AND INTEGRATING DIGITAL SIGNPOSTING INTO A BROADER OFFERING

Digital signposting tools cannot be stand-alone approaches for improving the health-seeking experience for people in LMICs. When introduced, these tools must include a broader consumer engagement strategy that encompasses advocacy, government support and ownership, and awareness campaigns. Only with this level of integration can digital tools further empower users to make better-informed health decisions. Box 2 presents PSI’s experience from the Delivering Innovation in Self-Care (DISC) project, which underscores the importance of integration in the successful implementation of digital locator tools.
BOX 2

FINDING SELF-INJECT CONTRACEPTION

Over the last five years, Uganda, Malawi and Nigeria, among other countries, have adopted and are operationalizing WHO recommendations and guidelines on self-administered injectable contraception (depot medroxyprogesterone acetate in its subcutaneous form – DMPA-SC).

Delivering Innovation in Self-Care (DISC) is a five-year project funded by the Children’s Investment Fund Foundation implemented by PSI and consortium partners in Malawi, Nigeria and Uganda. The DISC project supports women to assume greater power and control over their sexual and reproductive health by using contraceptive self-care methods like self-inject.

To facilitate access to self-inject contraception, a digital omnichannel campaign was implemented as part of the DISC project. The campaign employs a chatbot as a digital companion that serves as a confidential source to aid women in learning more about self-injection and how to use it. It also includes a digital locator tool designed to guide women to nearby facilities offering self-injections. Data from national health management information systems (HMIS) show that visits to providers for self-inject contraception have grown nationally in Nigeria from 7,000 in 2021 to 65,000 in 2023, and in Uganda from 1,000 in 2021 to 27,000 in 2023. The chatbot dashboard also indicates that the geolocator was one of the most popular features. Lessons from this project underscore the importance of integrating technology within a supportive ecosystem that encompasses advocacy, government support, and awareness campaigns, among other factors. Digital signposting thrives in an environment where various components work cohesively to facilitate access to essential healthcare services.

The previous section outlined potential strategies to enhance the effectiveness of digital locator tools. Beyond these considerations, there are additional critical factors that must be taken into account when deploying digital locator tools. For example, the challenge of deploying digital locator tools in areas with limited infrastructure and internet access, as well as the importance of maintaining the quality of information disseminated through these digital tools.

INTERNET CONNECTIVITY AND COVERAGE

The effectiveness of digital locator tools also hinges on internet connectivity, which can be unreliable in regions with poor infrastructure and limited access, where not all individuals have consistent or easy access to the internet. The same applies to the level of granularity consumers can expect in urban versus rural areas. Similar to Google Maps, the utility of digital signposting tools can diminish when navigating off-road locations or regions with limited infrastructure, affecting their usefulness for healthcare consumers in remote or less-developed areas. Addressing these challenges involves considering alternative offline or low-bandwidth solutions to ensure equitable access to locator tools, regardless of geographic location or infrastructure limitations. However, it is important to note that the utility of digital signposting can vary significantly based on the availability of health care options. In instances where the number of health care providers is limited, such as in remote areas, the need for digital locator tools may be reduced.

QUALITY OF INFORMATION

Another important aspect to consider is the quality of information included in digital signposting tools, which must be accurate and reliable. Those developing digital signposting tools can learn from platforms like Google Maps, where user reviews for a broad range of services are integrated to help consumers choose the provider they prefer. Digital signposting tools have the potential to tap into the power of user feedback to enhance the accuracy of information provided, providing users the opportunity to report instances of inaccuracies or outdated content. However, ensuring the quality of information provided on digital
signposting platforms is not without its challenges. For instance, when relying on users, managing, verifying, and appropriately responding to user feedback and reports can be a resource-intensive task. Exploring how best to harness user feedback to improve the accuracy of information in digital signposting tools is an interesting avenue for further exploration.

CONCLUSION

Digital directories of public and private healthcare providers in LMICs are rapidly evolving, thanks to advancements in geo-location techniques and increased investment in digital infrastructure. Digital locator tools show potential for improving health care access, potentially offering significant benefits for consumers and to the broader health system. These locators help consumers to find suitable healthcare services when and where they need them. Beyond individual users, they allow health system administrators to “see” the health system in new dimensions as they become an aggregator of multiple and diverse data sources, offering new insights and perspectives.

Moreover, digital signposting can foster trust in the health system. Transparency is a cornerstone in building trust, as healthcare consumers gain insights into the specifics of available services, provider quality, and even costs. With the right incentives in place, transparency has the potential not only to empower consumers but also to encourage healthcare providers to embrace accountability and improve the quality of care they deliver.

While digitizing provider information and profiles in LMICs presents opportunities to enhance access to health care, challenges remain in making locator services effective and sustainable. Further research is needed to explore the effectiveness of these tools in removing barriers to accessing high quality care.

To fully harness the potential of digital locators, it is also important to involve consumers and providers in the design and implementation of these tools. This engagement can ensure that digital locators respond to their needs and facilitate access to better healthcare. Moreover, a coordinated effort among various stakeholders is essential. Healthcare consumers can actively contribute by demanding greater transparency and rewarding providers who uphold the highest standards of care with increased trust. Simultaneously, governments can bolster public financing schemes that recognize accredited providers and incentivize the provision of high-quality care. This engagement across stakeholders has the potential to improve quality of care and increase the utility of digital signposting tools, contributing to enhanced access to and use of high-quality healthcare.

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Two adolescents check out a digital fertility app on their phones. Ethiopia, 2019. ©Benjamin Schilling
REFERENCES


