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PUBLIC HEALTH PRACTICE

Quality Metrics in Digital Health Equity: A Systematic Evaluation of Cleveland Clinic's Ongoing Virtual Care Initiative

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ABSTRACT

Background: As digital health technologies become increasingly integrated into health care delivery, there is a pressing need to ensure that vulnerable and underserved populations are receiving the appropriate resources. The adoption of this patient-centered approach empowers patients to manage their own health through the promotion of digital equity.

Methods: A literature review and quality improvement evaluation were conducted to understand gaps in current digital equity programming at the Cleveland Clinic and identify avenues for public health collaboration within the Cuyahoga County, Ohio, community. Patients in the department of internal medicine were screened for digital needs and evaluated via confidential phone interviews. Descriptive statistics and qualitative analysis were used to evaluate the interview data.

Results: Of 2993 patients screened, 554 reported digital needs, and 395 successfully received referrals to community resources. Despite these efforts, only 27.64% of contacted patients reported receiving assistance, highlighting persistent barriers such as transportation, documentation requirements, and limited follow-up protocols.

Conclusion: Recommendations to improve digital equity include expanding transportation services, implementing digital navigator roles, and integrating community organizations into health care facilities. While the limitations of this study restrict generalizability, the findings highlight the value of adopting a comprehensive approach to achieving digital health equity and calls attention to maintaining a commitment to equitable health care access to achieve broader public health objectives.

Keywords: Digital equity; Cleveland; Telehealth; Quality improvement; Public health

INTRODUCTION

Digital equity has gained increasing recognition in recent years for its transformative value in addressing disparities in health care access and outcomes. The digital health landscape is continuously expanding, making access to such technologies crucial for advancing public health objectives. Digital health refers to the use of communication technologies to manage illnesses by reducing inefficiencies, improving the quality of care, and lowering the cost of health care.[1] This includes, but is not limited to, telehealth offerings, health analytics, and remote patient monitoring. Very few studies have systematically analyzed the contributions of digital health technology across the spectrum of disadvantaged populations due to the complexity of interactions with various social determinants of health. In this context, digital equity is focused on ensuring that all individuals have comparable accessibility to these health tools.

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The value of digital health equity goes beyond addressing immediate health disparities, though. The key stakeholders in the development of this technology include the individual end users (patients and providers) and technology proprietors that report to a larger health care system.[2] As technology becomes increasingly integrated into health care delivery, there is a pressing need to ensure that vulnerable and underserved populations are receiving the appropriate support and resources. In fact, in their global strategy for 2020-2025 the World Health Organization identified digital health as a priority.[2] The adoption of this patient-centered approach empowers individuals to manage their own health and enhances health literacy. These digital determinants of health must be addressed through a multilevel approach that targets concerns at the individual, interpersonal, community, and societal levels.[3]

The Cleveland Clinic has recognized a gap at the individual level in the accessibility of their services for many residents, identifying a key opportunity for positive change. The following objectives were proposed to identify areas for improvement within the current model of care:

1. Develop and execute surveys targeting patients facing digital inequities to collect data that reflect current patient engagement difficulties and access to digital health care resources.
2. Evaluate survey results to identify and understand gaps in digital access among impoverished populations in Cuyahoga County, Ohio.
3. Propose well informed policies that address the identified barriers to digital access and prioritize equitable health care access.

It is evident that these impoverished communities experience countless digital determinants of health that interfere with their ability to seek care and guidance in the health care space. By providing a more personalized health care experience for patients, the Cleveland Clinic is committing to fostering increased occurrences of positive health outcomes within their community. This commitment is rooted in the understanding that better patient engagement and resource distribution aligns with broader goals of health equity across various socioeconomic populations.

LITERATURE REVIEW

With the rise of the COVID-19 pandemic, limitations posed by many of the already present social determinants of health were brought to the forefront of public health efforts.[4] However, with the decline in COVID-19 rates, the concern to prioritize the digital connectivity for patients has begun to decline (R. Ranallo, MLIS, Cuyahoga County Library, oral communication, April 2024). These apprehensions are supported by a new study by the University of Cincinnati which found that disparities in digital technologies have the potential to widen the gap in health care access, especially for those living in socially vulnerable communities.[5]

The Cuyahoga County Public Library has made plans to implement technology trainers and digital navigators to help assist their patrons with technological needs (R. Ranallo, MLIS, Cuyahoga County Public Library, oral communication, April 2024). Many individuals who have reached out regarding these resources have been referred to the library to discuss telehealth and MyChart competencies. The library offers secluded computer spaces to be used to attend appointments and job opportunities, but they have seen a rise in demand for Wi-Fi connectivity over devices. There is increasing concern about the sustainability of such programs with the drop in funding post-pandemic, and the Cuyahoga County Public Library urges health care institutions to acknowledge that technology changes are overwhelming for many patients.

Additionally, MetroHealth has partnered with Dollar Bank to create a subsidy program through which they have received $600000 of funding over a 5-year period (M. Santiago-Rodriguez, MSW, MPH, MetroHealth, oral communication, April 2024). They will be collaborating with DigitalC to provide oversight and work to incorporate a digital navigator position that will help improve virtual health within the already existing MetroHealth infrastructure. There are also plans to implement a social determinant of health screening tool and provide computer classes at the Buckeye location to help with MyChart education. However, MetroHealth's focus remains primarily on administration and funding services for such efforts.

Looking outside of the Greater Cleveland area, it is valuable to recognize the efforts of the Digital Health Equity Collaborative.[6] Operational leaders, academic researchers, and patient advocates meet every 3 to 4 months to discuss ongoing and relevant topics within the digital health care space. During the most recent meeting in May, Dr. Craig, Digital Health Equity Clinical Champion at CHOP, highlighted the importance of awareness and support for digital health equity, presenting a framework involving access and sustained engagement. Dr. Briggs-Maloson, co-chair of the Health Information Technology Advisory Committee at UCLA Health, and Dr. Richardson, Director of Digital Health Equity at NYU Langone Health, both went on to stress the value of viewing digital equity as a foundational justice that requires collaboration to see a true minimization of harm.

COMMUNITY PROGRAMS

The Cleveland Clinic partners with PCsforPeople, DigitalC, ASC3, and the East Cleveland Public Library to pick up referrals for patients that are sent through the UniteUs platform. Many of these programs receive funding through the Affordable Connectivity Program (ACP) that was funded by the COVID-19 relief package under the Biden administration. The ACP Program is no longer providing funding but was submitted as a bill to Congress on January 10, 2024, as the Affordable Connectivity Program Extension Act of 2024, cosponsored by former Ohio state senators serving on the United States Senate, among other state senators.[7]

PCsforPeople offers high speed internet services for users at a reduced cost of $15 per month and access to desktops or laptop computers with prices ranging from $0 to $50. They require photo identification and documentation of current enrollment in a

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government assistance program to determine user eligibility for their services.

Similarly, DigitalC's mission is to soften the digital divide caused by the historical practices of redlining in Cleveland. They exclusively offer internet services in the Fairfax (zip codes 44103, 44104, 44106), Hough (zip codes 44106 and 44113), and Kinsman (zip code 44104) regions for a reduced cost of $18 per month with plans of expanding access throughout Cleveland in June of 2025 (L. Norris, DigitalC, oral communication, April 2024). DigitalC does not require documentation to determine user eligibility for their services. The digital equity team at Cleveland Clinic has donated $10000 to DigitalC for laptops and chargers through a 5-week program where participants can take home the device with free Wi-Fi connectivity for a year.

ASC3 (Ashbury Senior Computer Community Center) is part of the Cleveland Digital Ambassadors Group and receives funding through the Cleveland Foundation. They provide several services:

1. Digital Aviator Program (DAP) offers free computer classes that are delivered in-person and virtually. Program participants are provided with laptops and hot spots for the duration of the 6-week course.
2. Structured technology classes targeted toward different age groups and access to an open computer lab.

ASC3 also provides resources to senior individuals about other affordable internet service options:

1. New Mobile Citizen Hotspot via Sprint to provide wireless internet at $227.16 per year.
2. Internet Assist via Spectrum offers internet services at $50 to $80 per month upon completion of an online application and proof of eligibility documentation.
3. Lifeline Discount Program via Verizon offers internet services at $50 to $80 per month upon completion of an online application and proof of eligibility documentation.
4. Connected Learning Centers via AT&T helps users sign up for internet services, learn how to use computers, and improve their digital skills under the assistance of community based digital navigators.

The East Cleveland Public Library offers free computer classes to the public, in addition to their on-site computer lab. They have digital navigators to assist patrons with computer skills and loan out wireless hotspot devices for 2 weeks to library members who are above the age of 18 years with a valid ID in an East Cleveland address (zip codes 44108, 44112, 44118, 44128).

METHODS

Prior to conducting this quality improvement evaluation, the PIDAR (Partner, Identify, Demonstrate, Access, Report) framework for digital health research was identified to guide a systematic, data-driven approach in reporting the impact of digital health intervention.[8] In efforts to include diverse target stakeholders, Cleveland Clinic identified 5 main zip codes to focus on for analytical purposes: 44103, 44104, 44106, 44112 and 44113. The population of individuals in these zip codes who live at or below the federal poverty level are respectively 42.4%, 46.8%, 33%, 34.8%, and 23.2% (all of which are significantly higher than the statewide level).[9] The percentage of the population of Ohio that live at or below the federal poverty level is 13.4% compared to the national average of 11.5%.[10] The patients in these targeted areas were screened for good broadband internet, access to devices, and good literacy skills. Referrals were completed via the UniteUs platform. Patients aged 18 through 80 years were included in this initiative, with most individuals being above the age of 40 years. The quality outcome measure and primary purpose of this quality improvement evaluation project is to determine if patients successfully received assistance from a community partner and if they required additional assistance moving forward. The following screening questions were asked to understand the extent of digital inequities present:

1. Are you able to use the internet from your home to do whatever you need to do?
    a. Yes
    b. No
2. I currently have access to … (Choose all that apply)
    a. An affordable internet plan
    b. A working device that connects to the internet
    c. Knowledge and skills to access the internet using connected devices

Throughout this census, Cleveland Clinic was able to screen 2993 patients within the internal medicine department from which 554 patients reported a need. These individuals were connected with the appropriate resources to learn more about how to use the internet and gain access to the digital tools available to them. These resources were obtained in collaboration with the community-based organizations outlined above. A 40% gap closure for providing patients with resources through this intervention was reported by Cleveland Clinic.

The next aim was to report the impact of this programming to determine effectiveness and areas for improvement. To conduct this quality improvement evaluation, a questionnaire was distributed via phone to 395 patients who received a screening and referral after indicating a need. This questionnaire was delivered via phone to collect information about patient experiences. The following questions were included in the survey:

1. You were previously screened for:
    a. Device
    b. Connectivity
    c. Understanding of how to use device/internet
2. Did you successfully get connected to a resource?
    a. Yes
    b. No
3. Are you on MyChart?
    a. Yes
    b. No

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4. Would you like to learn more about how to use MyChart?
    a. Yes
    b. No

For analysis purposes, the data collected from the questionnaire above were used to create a percent success rate based on the number of patients who successfully received an intervention. The patient's name, identification number, and date of birth were entered into an Excel spreadsheet. The data were further broken down by zip code, intervention required (device, internet, training classes), race, gender, and age.

This information helped in understanding if there has been an increase in patients' digital behavior. Cleveland Clinic was evaluating if the resources that patients received contributed to their digital health. Information from the social determinants of health screenings were also included in the data collection process to identify potential trends present within the patient dataset. All phone call attempts and communication with patients through community partners are recorded within the UniteUs platform. The referrals for patients who still reported a need were checked in UniteUs to gain a full understanding of the referral process and investigate why they were not connected with a resource.

This project was conducted under the scope of a quality improvement project with a focus on evaluating and enhancing current health care processes. Institutional policies were followed to guarantee that all ethical considerations were maintained. Patient data was securely stored with restricted access, and referral records were managed in the HIPAA-compliant UniteUs platform. All findings have been reported in an aggregate format to ensure that data cannot be traced back to any individual patients, prioritizing patient anonymity and data integrity.

RESULTS

Of the 395 patients included in the patient screening, 389 patients identified as Black (98.48%), 5 patients identified as White (1.27%), and 1 patient identified as Asian (0.25%). Of the 395 patients included in the patient screening, 260 patients were 18 to 64 years of age (65.82%) and 135 patients were over the age of 65 years (34.18%). The majority of patients (35.70%) were located in the 44112 zip code region.

Of the 395 patients that were included in the primary digital health screening, 123 were successfully contacted with over half of the primary patient set being unable to contact. Of these 123 patients, 34 reported that they had received assistance by one of Cleveland Clinic's community programs. This demonstrates a 27.64% success rate since success was defined as receiving assistance, regardless of whether that patient still required additional assistance. Of the 123 patients contacted, 104 required an additional referral for their needs to be appropriately met. From those who required an additional referral, 12 patients did not receive assistance primarily as they were unable to come into the office or were unable to provide the appropriate documentation to determine eligibility, and 15 patients had received assistance from a community program but the resource was no longer working for them.

RECOMMENDATIONS

Before looking for ways to improve the number of patients attending these appointments and meetings, it is important to recognize contributing factors to such behaviors. A study conducted by the University of Nebraska Medical Center showed that as many as 45% of patients fail to keep their scheduled appointments.[11] The primary reasons for no-shows were that (1) some patients are anxious, (2) some patients feel disrespected by the health care system, and (3) some patients simply do not understand the scheduling system.[11] Keeping this information in mind, it is evident that addressing these underlying issues is crucial for an improved intervention strategy.

Challenge 1

Patients are being successfully contacted by local organizations upon referral but remain unable to come to in-person meetings to get set up with the appropriate resources. Lack of transportation delayed 5.8 million people in the United States (1.8%) from receiving necessary medical care in 2017.[12] In fact, 28 of the patients from the initial set of 395 had indicated transportation needs in their social determinants of health screenings. Providing transportation services for free or at a reduced cost has the potential to bridge this gap in barriers to health care access.[13]

Table 1. Patient Population Demographics

	White	Black	Asian	Total
Gender				
Male	1	139	0	140
Female	4	250	1	255
Age				
18-64 years	5	254	1	260
65+ years	0	135	0	135
Region (by zip code)				
44103	0	126	0	126
44104	0	36	0	36
44106	4	86	1	91
44112	1	140	0	141
44113	0	1	0	1
Total	5	389	1	395

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Challenge 1, Proposed Solution 1: Stephanie Tubbs Jones and Langston Hughes Shuttle Service Expansion

The current shuttle service is used to help patients attend clinical service appointments. By utilizing and building upon the existing infrastructure of the shuttle service, Cleveland Clinic can foster a sense of community and has the potential to be a cost-effective solution. Expanding the routes and increasing the frequency of shuttle services will allow Cleveland Clinic to serve a broader geographic area. This can be done by adding stops at community centers and other locations where patients may receive supplementary services that contribute to their overall health. However, it is important to consider the required coordination between health care providers and the transportation services to ensure accessibility for patients.

Challenge 1, Proposed Solution 2: Uber Health

Uber Health is a "HIPAA-enabled platform for non-emergency medical transportation services upon health care provider request to monitor patient rides without patients needing the Uber app or a smartphone."[14] This option reduced some of the technological barriers involved with transportation services and exists as a flexible, on demand service. Developing clear guidelines for eligible rides and the approval process will be essential in understanding the logistical components of creating such a system for patients.

Challenge 1, Proposed Solution 3: Integrate Community Partners On-Site

Bringing the community partners into current Cleveland Clinic buildings can provide patients with easier access to available services. For example, the Langston Hughes site already houses community support services and can be enhanced to serve as a holistic care center to improve overall patient outcomes. By co-locating community organizations within medical centers, patients will no longer have to travel to separate locations, further reducing the burden and barriers to access.

Challenge 2

Patients are unable to provide the appropriate tax information and documentation to determine eligibility for subsidized services. During interaction with community programs, many patients were unable to progress past initial screening due to these barriers, thereby limiting their access to the available resources. This information was noted in each patient's individual referral log within the UniteUs platform.

Challenge 2, Proposed Solution 1: Implementation of Digital Navigators

Working alongside the current Community Health Worker Program, the addition of digital navigators creates a formal position for "trusted guides who assist community members with ongoing, individualized support for accessing affordable and appropriate connectivity, devices, and digital skills."[15] It should be noted, though, that this requires the development of a comprehensive training program and providing these navigators with the necessary equipment to appropriately deliver assistance. The Hennepin County Medical Center in Minneapolis, Minnesota, recently launched a digital navigator program that helped more than 800 people access their health records and other digital tools within just one year.[16]

Challenge 2, Proposed Solution 2: Create a Space for Community Health Workers in Clinical Waiting Rooms

By placing community health workers directly in the clinical setting, patients have immediate access to individuals who can help them to navigate the health care space. Many patients, especially those from vulnerable communities, face barriers in health paperwork, anxiety when working with providers, or language barriers, among others. Community health workers can provide in-person support and build rapport with patients who may be overwhelmed. Their presence can create a more welcoming environment and contribute to a more efficient workflow, as well.

Table 2. Summary of Key Challenges and Recommended Solutions

	Challenge 1	Challenge 2	Challenge 3
Solution 1	Pro: Utilizes existing infrastructure for cost-saving purposes Con: Potential for limited coverage and scheduling flexibility	Pro: Provides personalized support for patients Con: Requires investment in training and equipment	Pro: Improves efficiency and rate of successful patients contacted Con: Requires changes to existing workflow and may result in resistance from staff
Solution 2	Pro: On-demand service that reduces technological barriers Con: Potential higher cost per ride that may not be suitable for all patients	Pro: Immediate access to support services can improve patient outcomes Con: May require additional staffing and resource allocation	Pro: Leverages existing relationships to increase engagement Con: Potential to introduce referral biases and requires community training
Solution 3	Pro: Reduced burden for transportation and promotes holistic care Con: May require significant resource allocation	N/A	Pro: Reaches a broader audience through existing infrastructure Con: Requires coordination with external organizations

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Challenge 3

There is no follow-up protocol when we are unable to contact patients via phone for referrals, creating a lack of communication. The current follow-up procedure states that after 3 phone call attempts, the patient will be marked as "unable to contact." Under these rules, only 31.14% of patients were able to be contacted for a follow-up interview, indicating room for improvement.

Challenge 3, Proposed Solution 1: Streamline Referral Process

By creating clear referral criteria for physicians and other health care professionals, the likelihood of successful contact through targeted referrals can increase. Patients should continuously be evaluated for social determinants of health and this holistic approach can allow for early identification in patients who may need additional support. To ensure effective implementation, it is important that the screening process is integrated into training for health care professionals so that they can recognize how to make referrals when necessary. Some potential challenges include ensuring consistency across different health care providers and resistance to change due to already existing time constraints within the clinical setting.

Challenge #3, Proposed Solution #2: Implement Community Referrals

Implementing a social credit system can allow long-standing community members to refer their friends and family for support services. Not only does this leverage existing community relationships, but it also increases community engagement in health initiatives. Providing training to community members about the various available services can help create a user-friendly referral network that circumvents patients that Cleveland Clinic is unable to contact.

Challenge 3, Proposed Solution 3: Expand Community Networks

Expand the utilization of community networks, especially within the free library system, that already have an established level of trust with community members to educate patients about such services. A study in North Carolina found that "with minimal investment, rural public libraries can support healthy lifestyle activities and improve community awareness."[17] By tapping into existing infrastructure, Cleveland Clinic can reach a broader audience and include those who may not regularly interact with the health care system. Developing health education materials can assist in the distribution of knowledge through these networks.

DISCUSSION

To improve Cleveland Clinic's ongoing Digital Health Equity initiative, integrating community organizations within the Langston Hughes Center is recommended to address Challenge 1. This is a beneficial long-term solution that encourages a more integrated care model while still maintaining the existing responsibilities of Cleveland Clinic as a health care institution. To combat Challenge 2, the implementation of a Digital Navigator Program is recommended as it addresses both documentation and digital literacy issues. Furthermore, a streamlined referral process with expanded community networks is suggested for Challenge 3 due to its ability to improve existing internal processes while leveraging external resources.

Some of the strengths for this study were the comprehensive approach regarding the breadth of data collected. It addresses multiple challenges in patient engagement and access to care, beyond just digital access. The collected data demonstrates clear gaps in implementation, indicating room for positive improvements as seen through the several solution approaches outlined. The findings are limited due to the small sample size and barriers in contacting all the patients for a follow-up questionnaire. Additionally, the geographic specificity of the patient population included in this study limits generalizability to other regions in the state of Ohio. However, the findings remain significant, and I anticipate that the final recommendations will be comprehensive and practical for implementation.

CONCLUSION

Upon analysis, Cleveland Clinic plans to implement a community health worker that is solely dedicated to ensuring that patients have internet access and are knowledgeable in that realm. Additionally, they are in the process of applying for the National Telecommunications and Information Administration's Digital Equity Competitive Grant Program through which they will fund the digital navigator role. In conjunction, Cleveland Clinic wants to make efforts to develop an ongoing and sustainable model for a digital health program that can be implemented across Cleveland Clinic sites.

The anticipated steps that Cleveland Clinic is taking are promising for addressing digital barriers. Their plans to target patient engagement and health literacy will address significant gaps in the current model of care. Some additional considerations are to consider improving coordination between clinical teams and community services, as well as the exploration of alternative engagement strategies for nondigital patients. It should be recognized, though, that these steps demonstrate a commitment to improving patient access to health care while addressing the many social determinants of health that exist as barriers for many in the local community.

PUBLIC HEALTH IMPLICATIONS

The inability to access digital resources continues to exacerbate existing health disparities. Digital health technologies impact health care delivery, disease management, and patient engagement. The findings of this study demonstrate that addressing equitable access at the systematic level has the potential to drastically improve health outcomes. Focusing on transportation and health literacy is pertinent as they continue to impede upon ongoing intervention efforts in the community.

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AUTHOR CONTRIBUTION

All authors contributed to the concept and design of the study. Aashna Rana conducted quantitative data collection, qualitative interviews, and data analysis. All authors assisted with revising the work critically for important intellectual conduct and agreed to the final version to be published.

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ERRATUM
07/16/2025: Corrected percentages in second and third sentences of Results section. Inserted "successfully" into first sentence of second paragraph of Results section. Inserted reference #8 and updated references following the insertion. Corrected and updated citations within the text to reflect the reference insertion.