



Challenges with text-based messaging platform to perform social needs assessments of patients presenting with COVID-19-like illness at an urban academic emergency department

Sunil R. Dommaraju^{a,1}, Dante Robinson^{a,1}, Shaveta Khosla^a, Ruth Pobee^a, Marina Del Rios^{b,*}

^a Department of Emergency Medicine, College of Medicine, University of Illinois at Chicago, Chicago, IL, USA

^b Department of Emergency Medicine, University of Iowa, Carver College of Medicine, Iowa City, IA, USA

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ABSTRACT

Objectives: To evaluate the challenges encountered when using technology-based recruitment and electronic consenting to conduct social needs assessment of patients presenting with COVID-19-like illness at an urban academic emergency department.

Methods: COVID-19 Testing Registry (CTR) was established in the emergency department of UI Health in Chicago, Illinois. An online survey platform REDCap (Research Electronic Data Capture) was used, through which a standardized text message was sent to the mobile devices of eligible patients who tested positive for COVID-19. Patients were first provided with information on social services (e.g., health, food, transportation, housing). After e-consent, they were then asked to complete a social and health needs assessment on the first day and 14th day after COVID-19 testing.

Results: Out of 153 patients invited to participate in the survey, 32 (21%) opened the link and accessed the survey, 13 (8%) accessed the information on resources, 22 (14%) replied to the question on interest in research participation, while 17 (11%) expressed interest in learning about CTR. Ultimately, only 6 (4%) consented and only 1 (0.6%) eventually completed both surveys. The mean age for the total invited pool was 39 (± 16), while mean age for those who consented was 37 (± 11).

Conclusions: In our urban, mostly minority population, technology-based recruitment and electronic consent proved to be significantly low yield. In the future, CTR aims to further analyze predictors of lower patient engagement and widening disparity when using digital tools. Further data collection will be conducted using phone-call based procedures in patients who contracted COVID-19 in the first 6 months of the pandemic.

In March 2020, the coronavirus disease 2019 (COVID-19) pandemic underscored and exacerbated existing social and health inequities across the United States. Black and Hispanic populations have experienced disproportionately higher rates of COVID-19-related infections, hospitalizations, and mortality compared with non-Hispanic White populations [1]. The COVID-19 pandemic has worsened inequities in social determinants of health (SDOH) through high rates of job loss, increased need for child care services, and underfunding of social support programs in marginalized communities [2]. These inequities have created numerous calls to action to build a fair and just post-COVID world through social protection and solidarity [3].

The rapid proliferation of health informatics and digital health innovations has revolutionized clinical and research practices. Digitally mediated research methods such as synchronous online interviews, text messages, and interactive voice response systems have been suggested as better outreach for vulnerable populations and are increasingly implemented due to convenience, reduction of costs, and enhanced patient privacy [4]. However, there are legitimate concerns about how digital advances can lead to unintended consequences and perpetuate health care disparities for low-income and minoritized populations. Therefore, a crucial consideration in building technology platforms as an alternative to in-person health communication is ensuring equitable reach.

* Corresponding author. University of Iowa, Roy J. and Lucille A. Carver College of Medicine, Department of Emergency Medicine, 200 Hawkins Drive, 1008 Roy Carver Pavilion, Iowa City, IA, 52242.

E-mail addresses: sdomma4@uiowa.edu (S.R. Dommaraju), dwrobin2@uiowa.edu (D. Robinson), skhosl2@uiowa.edu (S. Khosla), rpobee@uiowa.edu (R. Pobee), marina-delrios@uiowa.edu (M. Del Rios).

¹ Denotes equal contribution, co-first authors.

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The COVID-19 Testing Registry (CTR) was established in June 2020 to assess and address the unique social and health needs of patients with COVID-19-like illness who were discharged from the emergency department (ED) of the University of Illinois Hospital & Health Sciences System (UI Health) in Chicago, IL, which is an urban, academic health center. The UI Health ED is located within a predominantly African-American/Black and Hispanic/Latino(a) neighborhood, and 21 of the 24 communities in UI Health’s primary service area (PSA) have a minority population greater than 75% [5]. Moreover, when compared to the overall city of Chicago, the PSA has lower levels of education (only 36% of individuals are a college graduate or higher) and higher levels of unemployment; 46% of individuals earn less than \$39,999 in income [5]. It is an inner-city urban area with a high density of publicly insured (e.g., Medicaid/State Children’s Health Insurance Program residents, who mostly reside in the west, south, and southwest side of Chicago [5]. The demographics of UI Health ED patient population reflect those of its PSA.

Given the immediate adoption of digital methods of health communication and research due to the COVID-19 pandemic, the CTR focused on building an online infrastructure to conduct operations. Patients who were 18 years or older, had been tested for COVID-19, and were discharged after being tested were eligible for inclusion in the registry. While primary care providers frequently followed-up with COVID-19-positive patients to map cardiopulmonary function or other health metrics [6], the CTR identified and aimed to fill in the gap for social support follow-up. The objective of this work was to implement technology-based enrollment and patient engagement and reflect on the challenges encountered when using this method to conduct social needs assessment of patients presenting with COVID-19-like illness at an urban academic emergency department.

Patients were identified via a convenience sample based on research staff availability. Staff members remotely monitored electronic health records for patients who received a COVID-19 test while in the UIH Emergency Department. Following discharge, eligible patients were sent a text message to their mobile devices that provided an online link to a web-based application, REDCap (Research Electronic Data Capture). This directed patients to social service resources as well as a research survey to assess patients’ social and health needs in both English and Spanish languages. Patients were given the opportunity to select from 5 categories of resources: COVID-19 symptoms and diagnosis, access to healthy foods, access to transportation, access to childcare, and access to housing. REDCap was used to generate an automated text message that was sent to mobile devices for enrollment of eligible patients. This design allowed for CTR to operate with no face-to-face contact.

After patients completed their selection and had an opportunity to review online resources, they were invited to participate in the COVID-19 Testing Registry survey. Patients watched a standardized video on their mobile device with both English and Spanish options describing the study purpose, risks, and benefits, and were then directed to an e-consent form. Patients who provided e-consent were asked to complete two brief surveys (one at the time of enrollment and the other on the 14th day) from home. The surveys consisted of questions about their understanding on how COVID-19 is spread, symptoms, and medical history. Each survey required around 20 min of participants’ time. In December 2020 (after 75 survey invites had been sent out), the CTR invite was updated to include information on an incentive of \$10 available to participants upon completion of the surveys. This was done to increase enrollment and compensate the participants for their time.

CTR enrollment took place from mid-June 2020 to mid-April 2021. Of the 153 patients who were invited via text messages to participate in

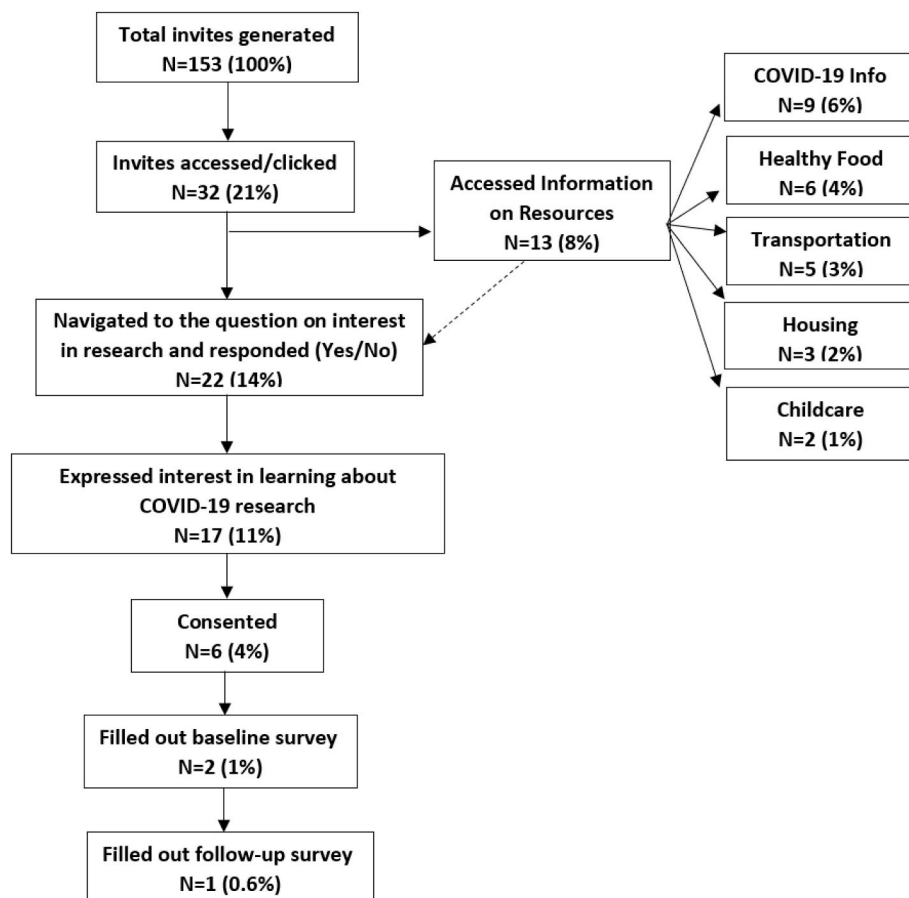


Fig. 1. A flowchart representing the CTR enrollment cascade.

the CTR, 32 (21%) accessed the REDCap platform. Thirteen (8%) patients accessed the information on social/economic resources. COVID-19 symptoms/diagnosis was accessed most ($n = 9$; 6%) followed by information on healthy food resources ($n = 6$; 4%). Fig. 1 shows a detailed flowchart of the enrollment cascade.

Of the 32 subjects who accessed the REDCap platform, 22 (69%) eventually navigated to the question on “Would you be interested in learning more about COVID-19 research at UI Health?” and responded to it, with 17 (53%) responding in a “Yes”. Six (19%) proceeded to and signed the informed consent form. Only two patients (6%) filled out the baseline research survey and one (3%) filled out the follow up survey. The mean age of patients who received an invitation to participate was 39 (± 16); the mean age in those who accessed the survey was 40 (± 14) years. The mean age of those who consented was 37 (± 11). There was no significant age difference between those who clicked on the survey compared to those who did not ($p = 0.7$), those who accessed information on resources compared to those who did not ($p = 0.48$), or those who consented compared to those who did not ($p = 0.99$).

The results of the study suggest that our text-based recruitment platform is not a feasible tool to conduct a social needs assessment, in consideration of our specific study population. Most of the eligible participants who received a REDCap link via text message did not open the link and fewer consented to participate. Adding an incentive to the study did not increase enrollment. Several factors may explain the low participation. In previous studies, text messaging has been used in tandem with in-person interaction [7]. The CTR was designed to be conducted without face-to-face interaction to comply with COVID safety guidelines for research studies within our institution. In the absence of in-person interaction, there may have been distrust about the legitimacy of the text message and the research study. This study also coincided in timing with multiple other competing research studies in our emergency department of COVID-19 positive patients that, unlike CTR, were allowed to rely on clinical staff for enrollment.

Electronic recruitment and consenting, while being a useful tool, may exclude socio-economically disadvantaged patients with low income who cannot afford smartphones or data plans, those with limited digital literacy, patients with visual acuity deficits, older patients, and those that are wary of scam messages. We have no specific data on the digital literacy of our specific patient population, but a study of 502 mostly African-American patients on the south side of Chicago showed that a majority of patients owned a mobile device and had used the internet but one in every three patients had low health literacy as measured by a 3-question Brief Health Literacy Screen; they were more likely to report needing help performing online tasks [8]. Poor digital literacy among the patient population of the UI Health ED may explain why there was low interaction with the CTR platform.

Lastly, there may have been limitations in the study protocol itself that could have contributed to the low engagement levels of the study population. Initially, patients were invited to participate in the study via a convenience sample based on research staff availability; therefore, text messages invites may have been sent at inconvenient times or with a delay of hours to days from when the patient was seen in the ED. Next, the recruitment text itself may have been written in terms that were not understandable or relatable in consideration of the social context of the patient population, which may explain why the REDCap platform was not accessed. Lastly, the REDCap platform may have been too convoluted as it first required patients to navigate through multiple sets of resources which may have caused burnout prior to proceeding to the research survey itself.

A 2019 review of published literature found that, in the short term, it is likely that digital technologies will increase health inequities especially in regard to increased age, lower level of educational attainment, and lower socio-economic status [9]. In fact, in a study of patients with hypertension or diabetes, two diseases than when co-morbid with COVID-19 can worsen outcomes, hypertensive or diabetic patients were less likely to use the internet and only 62% of Blacks and 56% of

Hispanics with hypertension and diabetes used the internet compared to 77% of Whites [10]. In New York City, which was an early epicenter of the pandemic, nearly one-third of households lacked broadband internet subscriptions with significant disparities in low-income populations, racial/ethnic minorities, those over the age of 65, and those who have a non-English primary language [11]. Combined, all these findings stress the importance of studying and improving digital access and literacy to ensure equitable platforms in health communication.

While technological advances have made it possible to engage with potential research participants and health care patients remotely, there can be many drawbacks to using technology exclusively. In some cases, such as CTR, use of technology-based recruitment as a direct substitute for face-to-face recruitment may not be dependable. Researchers and clinicians should be mindful in their approach to digital methods of health communication, ensuring that their methods are not further widening the disparities experienced by vulnerable populations. After reevaluating the outreach methods used by CTR, it was concluded that our existing text-based messaging platform is limited in its effectiveness to contact and enroll patients, as supported by evidence from similar studies [10,11]. Still, text-based platforms can be a useful tool for research. Other studies have shown that text messages are useful in the context of reminding patients about a study or interacting with them on a regular basis without calling or meeting in person [7]. Similarly, mobile text-messaging interventions for patients have consistently been shown to improve medication adherence, self-management of chronic health conditions, and follow-through with appointments [12]. Recognizing the limitations of relying exclusively on text-based communication, CTR is modifying its protocol to perform telephone-based outreach in the future, which will also serve to increase the sample size. This may be beneficial since some patients do not have mobile phones or data plans to receive text messages, it will reinstate human onboarding and allow for two-way conversation, and patients may be more adept at answering a phone call.

Ethical approval

Ethical approval was obtained from the Office for the Protection of Research Subject at the University of Illinois at Chicago.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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