

Texting for Health: An Evaluation of a Population Approach to Type 2 Diabetes Risk Reduction With a Personalized Message

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■ ABSTRACT

txt4health is an innovative, 14-week, interactive, population-based mobile health program for individuals at risk of type 2 diabetes, developed under the Beacon Community Program in the Greater New Orleans, La., area. A comprehensive social marketing campaign sought to enroll hard-to-reach, at-risk populations using a combination of mass media and face-to-face engagement in faith-based and retail environments. Little is known about the effectiveness of social marketing for mobile technology application in the general population. A systematic evaluation of the campaign identified successes and barriers to implementing a population-based mobile health program. Face-to-face engagement helped increase program enrollment after the initial launch; otherwise, enrollment leveled off over time. Results show positive trends in reaching target populations and in the use of mobile phones to record personal health information and set goals for reducing the risk of type 2 diabetes. The lessons from the txt4health campaign can help inform the development and programmatic strategies to provide a person-level intervention using a population-level approach for individuals at risk for diabetes as well as aid in chronic disease management.

New strategies in self-management of health are required to stem the increasing burden of chronic diseases such as type 2 diabetes. Mobile technology has promise as an innovative tool to build awareness of risk factors for these conditions and to promote early screening and prevention in the general public. Testing mobile health (mHealth) programs at the population level is therefore imperative. This article assesses the effectiveness of a social marketing campaign in raising awareness of the txt4health program in the Greater New Orleans (GNO), La., area.

mHealth refers to the practice of medicine and population health management that is supported by mobile devices (1,2). mHealth applications provide an important mechanism

for sharing information among patients, health care providers, and public health program managers (3). Customized messages, which have been found to be more effective than nonpersonalized messages for health behavior change, are easily delivered via mobile phones (4). mHealth has been used effectively for disease prevention (e.g., HIV and AIDS and maternal health) as well as for chronic disease management for patients in clinical care (5–9). The GNO txt4health program is innovative in its focus on the general population at risk for type 2 diabetes.

As in many other communities across the country, type 2 diabetes is a growing public health problem in the GNO area, which comprises four parishes (counties): Orleans, Jefferson,

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St. Bernard, and Palaquemines. One out of every 10 adults in Louisiana has been diagnosed with type 2 diabetes, and Louisiana has the highest diabetes mortality rate in the United States. In the GNO area, the numbers are even more staggering. It is estimated that up to 60% of the population has at least one risk factor for type 2 diabetes, including overweight or obesity (59.9%), little or no exercise (58.3%), smoking (18.8%), high blood pressure (36.4%), high cholesterol (33.2%), and inadequate fruit and vegetable consumption, defined as fewer than five servings per day (80%) (10). Thus, the primary target population for this intervention was low-income adults between the ages of 18 and 44 years, with a particular emphasis on African Americans because they are disproportionately at risk for type 2 diabetes (11).

txt4health, an mHealth program developed for those at risk for type 2 diabetes, was implemented as part of the Crescent City Beacon Community (CCBC) initiative and aimed to test innovative strategies to engage patients in their care as well as the general public on health promotion and appropriate health care-seeking behavior. CCBC is one of 17 Beacon Communities funded by the U.S. Department of Health and Human Services' Office of the National Coordinator for Health Information Technology (ONC) in 2010 to demonstrate the impact of health information technology on improving care and population health outcomes. In the GNO area, the focus is on improving diabetes and cardiovascular disease outcomes. By communicating with at-risk adult GNO residents via text messages over a 14-week period and providing them with timely, relevant health information, the program sought to improve patient understanding of their risk for type 2 diabetes and encouraged them to take action. The four main objectives of the program were to facilitate individuals' assessment of their own risk for type 2 diabetes,

raise awareness of type 2 diabetes and the importance of obtaining care and reducing risk, share information about sources of care and other health resources in the community, and provide a path for prevention (e.g., diet and exercise tips, health reminders, and assistance in setting personal weight loss and exercise goals).

According to the Pew Research Consortium (8), 89% of adults in the United States have cell phones, and 72% of adults with cell phones use text messaging. Further, mHealth technology promises to help close the existing digital divide in the use of technology between whites and African Americans and Latinos (12); 70% of African Americans and English-speaking Latinos use text messaging, which is much higher than the roughly 50% of whites (13). However, little is known about the frequency and patterns of mobile use among low-income residents in the southern region of the United States who are at high risk for type 2 diabetes—the target population for the txt4health program. Therefore, the goals of the campaign evaluation were to 1) understand the patterns of mobile technology use among the target population and 2) assess the effectiveness of the campaign in reaching the population.

Campaign Design

The development and promotion of txt4health involved a number of public- and private-sector partners at the national level, including the CCBC; two other Beacon Community partners from Detroit, Mich., and Cincinnati, Ohio; the ONC; the Centers for Disease Control and Prevention (CDC); the American Diabetes Association; Voxiva; the Louisiana Public Health Institute (LPHI); and partner community organizations.

txt4health is modeled after the text4baby program, a national mobile information service designed to promote maternal and early child health by targeting expectant moth-

ers. However, as we designed the campaign for txt4health simultaneously in three Beacon Communities (GNO, Detroit, and Cincinnati), it became clear that each location needed to customize the campaign to the culture and demographics unique to its community.

To ensure that the program would meet community needs, txt4health program staff engaged a diverse group of community partners and established a consumer advisory group early in the planning process; this collaboration helped to support product design, message and creative concept development, and the development and implementation of a robust social marketing campaign to reach priority audiences where they live, work, play, pray, and socialize. Advisory group members represented or served the racial and ethnic groups and vulnerable communities residing in GNO, including but not limited to a large health plan (BlueCross BlueShield of Louisiana), a network of churches (MacFarland Institute), a large retailer (Walmart), a coalition of community primary care clinics (504HealthNet), a large pharmaceutical company (Novo Nordisk), and several community-based organizations.

The social marketing strategy was designed to engage the target population at multiple levels using generalized messages through mass media, as well as focused community outreach and mobilization activities. Mass-media channels included television, radio, print, and outdoor advertisements. Table 1 summarizes the scope of the paid media campaign for txt4health. Program staff worked with community advisory group members to directly engage consumers in a variety of settings in the GNO area, including large retail stores, churches, colleges, and health clinics. LPHI also leveraged social media to engage in a two-way dialogue with consumers and providers via Facebook and Twitter; this allowed for the sharing of cam-

TABLE 1. Summary of the 2012 txt4health Paid Media Campaign

Media Type	Size	Number of Units	Campaign Length
Outdoor (billboards)	10.5 by 22.8 feet	39	30 January to 6 May 2012
Television (WVUE channel 8 Fox; DUVE channel Bounce; WWL channel 4 CBS; WDSU channel 6 NBC; WUPL channel 54 MyNetwork; Cox Media)	30 seconds	1,109	30 January to 6 May 2012
Radio (WQUE-FM, WYLD-FM, WYLD-AM)	30 seconds	1,947	30 January to 24 June 2012
Print (<i>Data News, Louisiana Weekly, New Orleans Tribune, Greater New Orleans Living</i>)	8.2 by 7.75 inches	25	4 February to 23 April 2012

paigned messaging and promotion of local health and wellness activities. Free outreach messaging through local publications and over the radio provided the opportunity to further promote the campaign’s call to action (“Text HEALTH to 300400”).

The public campaign launch event took place on 31 January 2012 and was followed by widespread community outreach activities and a formal media campaign. The majority of the media campaign was completed by the end of June 2012.

Evaluation Methodology

Formative and summative evaluation strategies were conducted to inform the design of the social marketing campaign and its effectiveness, respectively. Focus groups and in-depth interviews with providers, diabetes patients, and community partners informed the campaign strategy and materials, as well as the messaging content and frequency of messaging. To gain an understanding of mobile technology use, a series of questions was included as part of the pre-campaign awareness survey (discussed below).

We applied a pre- and post-campaign population-based evaluation design to assess the effectiveness of the social marketing in raising awareness of the txt4health program in the community. Given that this is a full-coverage program in the GNO area, it was not feasible to include a comparison group.

In this article, we present the results of the pre- and post-campaign surveys, as well as the enrollment information from the program data that were collected via interactive text messaging in the first 6 months of the program.

Research Design

Two cross-sectional surveys (pre- and post-campaign, *n* = 701 each, for a total sample size of *n* = 1,402) were conducted to assess patterns of mobile technology use (pre-campaign) and to assess the effectiveness of the social marketing campaign to raise awareness of and support for the txt4health program among at-risk residents of the GNO area (post-campaign).

A mixed mode survey of random digit dialing (RDD) landline telephone interviews and an online panel were used to broaden the representation of the target population (adults aged 18–44 years who own cell phones with text-messaging capability). Typically, household surveys using landlines tend to over-represent older, female populations, which are less likely both to have cell phones and to use text-messaging capability (14). Adding an online panel component helped to expand the reach of the survey to the target population, particularly younger people. However, there are likely some cell-phone-only users who would have been missed. Residence in the GNO area was verified in two ways: first, the initial sampling frame was based on area codes for the four-parish area

of GNO, and, second, one of the first screening questions in the survey verified the parish of residence.

Landline and online modes were selected instead of a cell-phone sample to gain an understanding of local patterns of mobile technology use and non-use. In addition, we were able to ask questions about the potential for future use of mobile technology. Finally, this approach provided important information on levels of risk factors among the target population at large.

The pre-campaign survey was conducted from 11 to 25 January 2012 before the public campaign launch event on 31 January 2012. The post-campaign survey was conducted from 20 to 30 June 2012. Survey data collection and preliminary reporting were subcontracted to a locally owned, private market research company.

The historical program data represent information that emerged out of the interaction of participants’ responses to questions posed to them via text message in the course of program implementation. Programmatic data on enrollment includes every text message sent from participants upon initial enrollment in the program. Participants initially sent the message “HEALTH” to the number 300400, after which they were prompted to enter their zip code. By responding to this confirmation text message with an appropriate zip code from the GNO area, participants were consid-

ered “enrolled” and thus captured on the txt4health electronic platform. Any text message from an enrolled participant was captured in the txt4health server, including weight, height, and various behaviors with a time stamp. The participant data for those enrolled in the txt4health program represent the 1,093 participants enrolled in the txt4health program between its launch on 31 January 2012 and 30 April 2013, when the data were analyzed.

Sample

The total sample ($n = 1,402$) of the pre- and post-campaign surveys was randomly selected; it included 1,002 respondents to the RDD telephone survey and 400 respondents to the online panel.

The samples for the pre- and post-campaign landline telephone survey were drawn from a random list of households with landlines in GNO. The online panel was recruited by e-mail and online marketing from >300 diverse lists of online affiliate partners and targeted Web advertising. The dual approach facilitated access to hard-to-reach business professionals and low-incidence consumers, who are typically less likely to join panels.

All respondents were screened to ensure that they were ≥ 18 years of age, had resided in GNO for the past 6 months, and were not employed in the fields of advertising, marketing, market research, or public health.

Measures

To understand cell-phone usage in the GNO area and assess the txt4health social marketing campaign, we used data from two sources: pre- and post-campaign cross-sectional surveys and a retrospective records analysis from the interactive program data, which included recruitment and enrollment information.

The pre- and post-campaign surveys collected information about demographic characteristics, mobile device use for text messaging, and awareness of the txt4health pro-

gram. The measures selected for the surveys were adapted from those used in surveys such as the CDC’s Behavioral Risk Factor Surveillance System Survey (15). Where standard items or instruments were not available, the research team developed measures appropriate to the effort. Described below are the measures used to understand cell-phone use and the effectiveness of the social marketing campaign from the pre- and post-campaign surveys.

Demographics. Respondents were asked about their age (“How old were you on your last birthday?”), race, ethnicity, highest level of education obtained, and total household income before taxes.

Text-messaging capabilities and usage. Because there is so little known about cell-phone usage and capabilities (e.g., text messaging) in GNO and Louisiana in general, questions regarding cell phones and mobile phones were included in the surveys. Questions assessed whether respondents had a cell phone or mobile device on which they can send and receive text messages, how many times in an average week text messages were sent and received on their cell phone or mobile device, and whether anyone else in the house had a cell phone or mobile device for sending text messages.

Assessment of social marketing campaign. The pre- and post-campaign surveys included items to measure respondent awareness of and participation in the txt4health program through questions such as, “Over the past 6 months, have you seen or heard the slogan or phrase, ‘Text HEALTH to 300400?’” and “Did you enroll in txt4health by texting ‘HEALTH’ to 300400?” Participants were asked where they had heard about or seen information about txt4health (e.g., TV, radio, signs at clinics, from providers, received an e-mail, and so forth). This question was only asked in the post-campaign survey.

The data fields assessed from the program data for this article include demographic information such as race/ethnicity and age, as well as self-reported weight and height to calculate BMI and weight goals.

Analysis

For the pre- and post-campaign surveys, univariate and bivariate analyses were performed, and online panel data were weighted to more accurately reflect the population’s education and race/ethnicity distribution. Standard statistical techniques, such as correlations, t tests, and nonparametric tests were used to compare the means of the continuous variables across the different groups. χ^2 or Fisher’s exact tests and t tests were used to compare variables across stratifications (e.g., ethnicity, setting, and age). SPSS version 21.0 (IBM Corp., Armonk, N.Y.) and Stata (StataCorp, College Station, Tex.) statistical software programs were used for data analysis.

Retrospective analysis of program enrollment data was presented in an XY scatter plot versus time. The enrollment trend was compared to the txt4health programmatic activity log. Participants’ self-reported data were filtered to exclude missing values (e.g., those who reported height but not weight) and then analyzed. The results were displayed in pie charts and graphs.

Results

Survey Data

Profile of Survey Respondents
Most respondents self-identified as white (55 and 53%), as compared to African American (37 and 38%), in the pre- and post-campaign surveys, respectively. This is close to U.S. Census Bureau statistics for GNO (54% white and 37% African American) (15). The median age range selected among all respondents was ≥ 45 years. The survey respondents overall appeared to be better educated relative to Census data, with most respondents indicating college graduation or some college.

The median household income range selected was \$25,000–50,000 for the total survey population and was higher (\$50,000–75,000) for those self-identifying as white relative to those self-identifying as African American (\$25,000–50,000).

Text Messaging Capacity

Pre-campaign survey data indicate that respondents <45 years of age had greater access to and made more use of texting capabilities than those ≥45 years of age (Figure 1). These results support targeting the txt4health program to those 18–44 years of age, who are more likely to own cell phones and mobile devices and are more facile with text messaging.

Social Marketing

As described earlier, the txt4health social marketing effort included a mass media campaign and community outreach mobilization activities. Respondents were asked in the pre- and post-campaign surveys whether they had seen or heard about txt4health. The purpose of asking respondents for this information in the pre-campaign survey was to measure the underlying “noise” related to awareness of any other campaigns addressing risk for diabetes. Awareness is therefore measured as the difference between the post-campaign awareness-level minus the pre-campaign noise level. Overall, 29.5% (*n* = 207) of post-campaign survey respondents reported that they had heard of txt4health, indicating that almost one-third of the respondents recalled being exposed to the social marketing campaign.

Of the respondents (*n* = 99) who answered a follow-up question on the specific source(s) of their information (with multiple responses allowed), 75% stated that they were made aware of the txt4health messaging through television, 36% through interactions with a doctor or other health care provider, and 50% through radio. Females had higher awareness of the campaign than males through all types of media exposure, and those

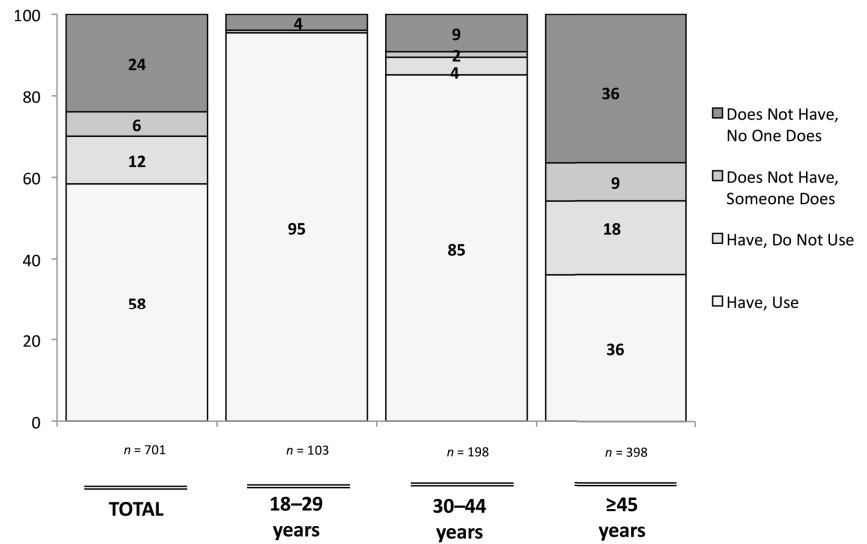


FIGURE 1. Text-messaging capability by age-group. Figure shows the percentages of respondents who 1) had neither a cell phone nor someone else in the household with a cell phone, 2) did not have a cell phone but had someone else in the household with one, 3) had a cell phone but did not use it for text messaging, and 4) had a cell phone and used it for text messaging. Overall, 58% had cell phones and used them for text messaging, and this percentage was greater in younger age-groups and smaller in the older age-group.

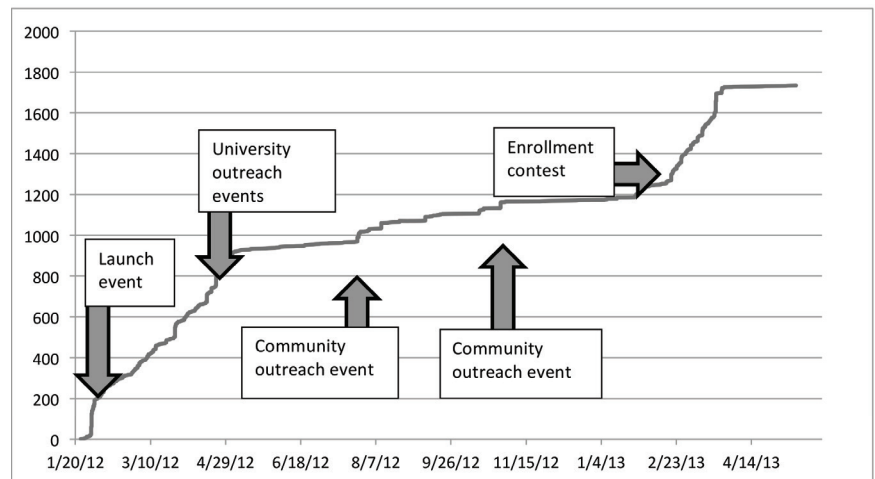


FIGURE 2. Influence of outreach activities on enrollment in the txt4health program.

self-identifying as African Americans outnumbered white respondents in all media exposures, indicating that the campaign did reach the intended target population.

Social Marketing and Enrollment Trends

Participant data for those enrolled in the txt4health program included

the 1,093 participants enrolled in the program between its launch on 31 January 2012 and 30 April 2013. Figure 2 shows the relationship of the social marketing campaign and txt4health enrollment trends from the retrospective analysis. Examination of enrollment trends revealed distinct spikes in enrollment that correlated to specific outreach activities. These

outreach activities varied by target population and method of engagement, which included various types of face-to-face interaction.

txt4health Participant Information

The program has been somewhat successful in enrolling African Americans (63% of enrollees) and people who are 18–44 years of age (68% of enrollees). Seventy-two percent of enrollees are female, which indicates that the program may be particularly appealing to women. However, substantial demographic information is missing from the program data. Only 33% of participants provided their race/ethnicity, 44% their sex, and 62% their age.

More than 82% of participants ($n = 896$) reported both their height and weight. Of these, 27% were overweight (BMI 25–29.9 kg/m²), 47% were obese (BMI ≥ 30 kg/m²), and 26% were in the normal range (BMI 18.5–24.9 kg/m²), indicating the effectiveness of the program in reaching its target population. To keep the number of questions to a minimum, participants were not asked when or where they had last recorded their weight. Importantly, 65% used txt4health to set a weight goal, suggesting that participants considered using the program to help them become healthier. However, few participants consistently tracked their weight through the txt4health system.

Discussion

Population-based mHealth programs have the potential to reach a large proportion of those in need of health information with personalized messages to help them stay healthy outside of health care settings. Evaluating the effectiveness of social marketing campaigns aimed at enrolling participants in such programs is important. The txt4health program in the GNO area sought to reach those at risk for type 2 diabetes through a systematic social marketing campaign implemented in 2012–2013.

For the program to be successful, it was first essential to understand the patterns of mobile technology use in the GNO area, particularly among low-income African Americans at high risk for type 2 diabetes. Pre-campaign survey data revealed high cell phone ownership with texting capacity and frequent use of text features among respondents aged 18–44 years. These data not only support the programmatic decision to target a relatively younger age-group for the texting program, but also highlight the potential for using mobile technologies to engage populations who frequently use these technologies in their everyday lives.

The results from the population survey indicate that the social marketing campaign was moderately successful in reaching the target population. The campaign also reached those at low risk of diabetes. One-third of respondents (33%) indicated that the mix of media—television and radio spots and outdoor billboards—used for the social marketing campaign was effective in raising their awareness of the program. The top three sources of information about the txt4health program were television, radio, and communications from individual providers or provider organizations. Respondents with type 2 diabetes in the family, African Americans, and those <34 years of age were significantly more aware of the slogans associated with the program. The paid media components of the social marketing campaign helped to raise awareness about the campaign and call to action (“Text HEALTH to 300400”). Direct consumer engagement components of the social marketing campaign (e.g., community engagement events) helped drive txt4health enrollment numbers. The in-person engagement strategies were particularly effective at increasing enrollment during the first several months of enrollment.

The historical trend in txt4health enrollment data features distinct

spikes in enrollment that correlate to different types of outreach activities. These outreach activities generally involved face-to-face interaction in various settings (e.g., Urban League conference, health fairs, and college campus events). The enrollment gains outside of these activities were minimal. The spikes from different types of face-to-face outreach efforts also varied. Individual-level increases were found to be more successful if paired with incentives such as collaterals and access to services. Although this was generally more successful than standard engagement through other social media, utilizing group-level incentives, especially monetary contributions to churches, was found to be the most effective in terms of the time correlation to enrollment. Our ability to educate consumers about diabetes in general and txt4health in particular via face-to-face interactions provided consumers with the context behind the campaign, which led to the desired action (enrolling). Although the paid media components of the social marketing campaign raised general awareness of the program, they did not provide the context required to persuade individuals to take the desired action.

The combination of the information from the population-based surveys and the enrollment trends provides some encouraging insights into mHealth programs. First, face-to-face engagement appears to increase enrollment after the initial bump following a public launch event and mass media campaign. This finding supports the need for a comprehensive approach that includes mass media supported by in-person events. The robust marketing mix of the txt4health campaign and the exposure to different marketing approaches measured through the population-based survey showed the varying effectiveness of different media without clearly identifying a single successful strategy. Second, enrollment plateaus over time. Third, by engaging their personal devices to

record personal health information and setting goals for themselves, participants who enroll in mHealth programs demonstrate their awareness of risk and their readiness to try to reduce their risk for type 2 diabetes.

Limitations

There are some limitations to the evaluation methodology. First, landline telephone surveys have documented shortcomings with regard to response rates and coverage (16,17). Second, there was a substantial degree of missing data in terms of self-reports of race/ethnicity, age, and income; however, obtaining complete data was secondary to the purpose of the program, which was to motivate and engage participants in lifestyle changes such as regular physical activity. The post-campaign survey respondents had an ~20% higher incidence of diabetes in the family; however, because the sample was randomly selected, we can ascribe this to chance. It is also possible that the program increased general awareness of diabetes in the community. Finally, given that this is a full-coverage program in the GNO area, it was not possible to include a comparison group for the evaluation design.

Additionally, there were some limitations to the understanding of the social marketing program's effectiveness. There is limited information on participants' motivation for enrolling in the txt4health program. Although awareness of the txt4health marketing outlets was evaluated through the population-based survey, the individual-level motivations for enrollment are unclear. By analyzing the trends in enrollment over time, it is clear that in-person engagement improves enrollment, although how that is affected by other social marketing and mass media outlets is unknown.

Future Directions and Recommendations

Although mobile technologies have existed for decades, only recently have these tools been used for pop-

ulation-level health interventions on a significant scale. The Beacon Communities are leading the way in using some of these innovative technologies to improve individual patient and population health. The txt4health program is, therefore, a unique opportunity to understand the practical and strategic aspects of employing mHealth in the general population for improving population health.

The next phase of txt4health evaluation will include a study of program users to determine their satisfaction and degree of behavior change and the impact of txt4health on intermediate health outcomes (e.g., healthy weight). Further inquiry is also necessary to better appreciate the impact of mass media approaches for recruitment and enrollment (both individual enrollment and its diffusion within social networks), as well as participant perception regarding the effectiveness of different combinations of marketing approaches. Because the Cincinnati and Southeast Michigan Beacon Communities are also implementing the same program, a comparative analysis of the results in different populations may generate more evidence regarding the impact of mHealth programs (18).

Finally, mHealth applications can potentially move beyond improving awareness, and encouraging prevention and behavior change to actually helping patients and health care providers better manage chronic conditions in real-time. The use of mobile devices as disease management tools is being evaluated for effectiveness and, if deemed useful, will add to the scope of services that can be offered to people with diabetes or prediabetes.

Although these programs continue to be developed and evaluated, mHealth is likely to grow rapidly given the increasing integration of mobile phones into daily life. Focusing on rapid deployment, meaningful evaluation, and broad collaboration will facilitate the development of promising strategies for

using such tools in the fight against type 2 diabetes. We encourage government agencies, including the Centers for Medicare & Medicaid Services, the CDC, the ONC, and philanthropic foundations, to further promote and study such programs, which may be one of our most effective strategies for providing person-level interventions using a population-level approach. We hope to learn more about the effectiveness of our strategies and their impact on the enrollees of the program with a longer-term evaluation in the future.

Duality of Interest

No potential conflicts of interest relevant to this article were reported.

References

1. Istepanian R, Laxminarayan S, Pattichis CS (Eds.). *M-Health: Emerging Mobile Health Systems*. New York, Springer, 2006
2. Cipresso P, Serino S, Villani D, et al. Is your phone so smart to affect your states? An exploratory study based on psychophysiological measures. *Neurocomputing* 2012;84:23–30
3. Vital Wave Consulting. *mHealth for Development: The Opportunity of Mobile Technology for Healthcare in the Developing World*. Washington, D.C., and Berkshire, U.K., UN Foundation-Vodafone Foundation Partnership, 2009
4. Fjeldsoe BS, Marshall AL, Miller YD. Behavior change interventions delivered by mobile telephone short-message service. *Am J Prev Med* 2009;36:165–173
5. Ybarra ML, Bull SS. Current trends in Internet- and cell phone-based HIV prevention and intervention programs. *Curr HIV/AIDS Rep* 2007;4:201–207
6. Whittaker R, Borland R, Bullen C, Lin RB, McRobbie H, Rodgers A. Mobile phone-based interventions for smoking cessation. *Cochrane Database Syst Rev* 2009;4: CD006611
7. Obermayer JL, Riley WT, Asif O, Jean-Mary J. College smoking-cessation using cell phone text messaging. *J Am Coll Health Assoc* 2004;53:71–78
8. Vaughan C. San Diego researchers first to report positive impact of text4baby program. San Marcos, Calif., Office of Communications, California State University, 2011
9. Krishna S, Boren SA. Diabetes self-management care via cell phone: a systematic review. *J Diabetes Sci Technol* 2008;2:509–517

10. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System survey data. Atlanta, Ga., U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2009
11. American Diabetes Association. Standards of medical care in diabetes—2014. *Diabetes Care* 2014;37(Suppl. 1):S14–S80
12. Mossberger K, Tolbert CJ, Gilbert M. Race, place, and information technology (IT). *Urban Aff Rev* 2006;41:583–620
13. Lenhart A. *Cell Phones and American Adults*. Washington, D.C., Pew Research Center, 2010
14. Tucker C, Brick JM, Meekins B. Household telephone service and usage patterns in the United States in 2004: Implications for telephone samples *Public Opin Q* 2007;71:3–22
15. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Ga., U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011
16. Peytchev A, Carley-Baxter LR, Black MC. Multiple sources of nonobservation error in telephone surveys: coverage and nonresponse. *Sociol Methods Res* 2011;40:138–168
17. Keeter S, Kennedy C, Dimock M, Best J, Craighill P. Gauging the impact of growing nonresponse on estimates from a national RDD telephone surveys. *Public Opin Q* 2006;70:759–779
18. Abebe N, Capozza K, Des Jardins, TR, et al. Considerations for community-based mHealth initiatives: insights from three Beacon Communities. *J Med Internet Res* 2013;15:e221



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