The National Campaign
to Prevent Teen and Unplanned Pregnancy

# Public Health Digital Brief

## Introduction

Information and communication technologies (ICT) provide tremendous opportunities to support and improve public health. Public health practitioners have long been using not-so-new digital media, primarily websites and email, as vehicles to deliver health information and messages to their audiences. With the recent rise in interactive social media, including blogs, podcasts, mashups, and social networking sites, however, there are new ways to have health conversations. Individuals can be more than just passive receptacles of health messages; it is now possible for them to be part of an information exchange with public health experts. These technological tools, along with other well-established digital media such as instant messaging, chat rooms, text messaging (also known as short message service, or SMS), and video, are all important agents that we can integrate into our health promotion and disease prevention efforts.

As The National Campaign expands its use of digital media in the prevention of teen and unplanned pregnancy, it is a worthwhile exercise to look at examples of public health projects around the world that are using digital media in innovative ways. While not an exhaustive list, this paper provides a brief overview of recent online and mobile ICT applications across a number of health domains, including health care, health emergencies, diabetes, physical activity, substance use, and sexual and reproductive health. The focus here is on health projects that target the public, setting aside those applications that provide new digital options for health care providers (e.g., electronic records or mobile devices for collecting patient data in the field). The examples range from randomized control trials (RCTs) to social marketing campaigns to social networking applications. Where possible, outcome data are included, but other than the RCTs, there are few projects that have any evaluation or outcome data indicating a program's effectiveness. Hopefully as applications have enough time to be analyzed and as evaluation methods for digital media are developed and standardized, more impact data will become available.

## Appointment Reminders

SMS have been used successfully in a variety of clinical settings to provide patients with reminders for appointments. For example, a cohort study among hospital attendees in Australia found that failure to attend (FTA) rates were significantly lower for those who received SMS appointments reminders than the control group, which received no such reminders (14.2% v 23.4%; $p<0.0001$).[1] Further, a randomized control trial in Malaysia compared attendance rates and intervention costs for three groups of patients: those who received appointment reminders by cell phone, those received reminders by SMS, and those who received none at all. SMS and phone reminders were both more likely to result in clinic attendance (with the SMS group significantly more likely to attend than those with no reminder at 59.6% and 48.1%, respectively). At almost half the price, SMS was more cost efficient than the phone reminder.[2] A Spanish study found slight improvement in follow-up doses of Hepatitis A and B vaccines for those sent text messages, but the results were not significant.[3]

# Health Emergencies

Just as mobile devices are used to remind patients of appointments, they are also used to send alerts for emergency health situations. Two domestic programs established by the Centers for Disease Control and Prevention (CDC) provide alerts for different varieties of flu. By signing up on the website, anyone can receive the ***Seasonal Flu Activity Report*** by email or SMS.[4] The CDC also partnered with the Center for the Advancement of Distance Education (CADE) at University of Illinois at Chicago to create an interactive cell phone application designed to prepare the public for the pandemic flu.[5] As of publication, this service is only available through Cingular, Sprint, and T-Mobile, limiting access for those with other phone service providers.

In London, an environmental organization is using new media to help its citizens cope with air pollution. By signing up for the service, participants receive twice daily messages with pollution levels for their specific neighborhood. On days when pollution reaches emergency levels, the group also sends alerts through SMS, email, or voicemail. An 11-month evaluation of the system began in June 2008.[6]

# Diabetes

***Sweet Talk***, a 12-month RCT in Scotland for 8- to 18-year-olds with Type I diabetes, examined whether a personalized SMS system increased self-efficacy, uptake of intensive insulin therapy (IIT), and improved glycemic control. Participants were given cell phones for the study and randomized into three groups: those who continued with traditional insulin therapy alone; those who received traditional therapy with ***Sweet Talk***; and those who received IIT with ***Sweet Talk.*** The tailored SMS system was associated with a significant increase in self-efficacy and adherence. Further, 82% of participants felt ***Sweet Talk*** had improved their diabetes self-management and 90% wanted to continue receiving the messages.[7]

A study of 25 newly diagnosed diabetics in New Jersey, called ***Mobile Access to Health Information*** (***MAHI***), provided the participants with bluetooth-enabled glucometers. The diabetics uploaded their glucose information to a database through their cell phone and providers responded to the data that were posted. The intention of the program was to help the diabetics develop reflective thinking skills through social interaction with diabetes educators. The study found that ***MAHI*** significantly contributed to the participants' goal of changing their diets and also helped them adopt an internal locus of control, a construct associated with self-care and positive health outcomes.[8]

# Physical Activity, Diet, and Weight Loss

A number of projects use mobile devices as aids to diet and exercise. The Patient-Centered Assessment and Counseling for Exercise and Nutrition (PACE) team at the University of California School of Medicine is currently testing a variety of these types of programs. One RCT is evaluating ***Patient-Centered Assessment and Counseling Mobile Energy Balance*** (***PmEB***), an application that allows users to self-monitor in order to track their caloric balance by recording on their mobile phones food intake and physical activity. Formative evaluation with seven health-intervention experts and a week-long user study with six clinically overweight, non-expert participants have shown ***PmEB*** to have strong potential for improving self-efficacy in dietary and exercise behavior.[9,10] The PACE team also conducted an NCI-funded RCT on the ***mDIET*** application, a mobile intervention focusing on dietary improvements through personalized goal-setting and targeted SMS to reduce weight in overweight and moderately obese men and women ages 25-55. After four months, the ***mDIET*** group lost 4.25 pounds more than the control group (p=0.03). An ***mDIET*** program culturally tailored for Latinos is currently underway.[11]

A few commercial ventures are also using mobile devices to address weight and physical activity. ***Sensei*** is an online and mobile phone "Personal Digital Coach" (PDC) designed to support the weight loss of its users through Motivational Interviewing, meal recommendations, and fitness ideas.[12] The ***Nutrition on the Go*** system, provided by Diet Health, Inc., allows users to send an SMS with the name of a restaurant and a menu item to "diet1" and then receive a listing

of the calories, total fat, carbohydrate, and protein in the requested food.[13] ***myFoodPhone***, is a camera-phone food-journaling feedback service, which provides free features, such as creating and updating the journal, talking with community, and monitoring biometric data. ***myFoodPhone*** also offers personal video feedback from an online advisor for a monthly fee of $9.99.[14]

Created by Persuasive Games, a company that designs, builds, and distributes electronic games for persuasion, instruction, and activism, and funded by the Corporation for Public Broadcasting, ***FATWORLD*** is a serious video game that focuses on eating, obesity, and the politics of nutrition in the contemporary US. The game is downloadable online and allows players to choose starting weights and health conditions, including predispositions towards certain ailments. Players then live an accelerated life where they construct menus and recipes, decide what foods to eat and if they will exercise, and run a restaurant business to serve the members of the community.[15] In addition to linking to relevant resources on the ***FATWORLD*** website, the game also includes a Recipe Exchange. This feature allows players to export recipes and meal plans they create in the game and download content other players have created. Video games like ***FATWORLD*** allow the simulation of factors that would not be possible in real life and may well prove successful in getting players to think and act differently when it comes to nutrition. Unfortunately, it is unclear just how many people have downloaded this game and just how much they have benefited from its lessons.

## Substance Use

Digital media have been used in a variety of ways to prevent the abuse of substances like alcohol and tobacco, as well as promote cessation and responsible use. For example, The Century Council, a nonprofit organization dedicated to fighting drunk driving and underage drinking has interactive websites aimed at teen girls[16,17] and their mothers.[18] The girls' site features polls, videos, information, links to the group's pages on social networking sites, and contests for creating user-generated content, each with the goal of getting girls engaged with the site's messages. It is unclear if there are any evaluations of the site's impact.

Another digital project related to alcohol is the State of Pennsylvania's ***Full Apologies*** campaign. The website features video testimonials from individuals who have killed others while drinking and driving. The site also provides two SMS services. First, ***B SAFE TXTRS*** is a service that allows anyone to create personalized SMS to be sent to themselves or their friends at time of their choosing. The hope is that users will have the service send themselves a reminder to get home safely when they are actually out and at risk of driving drunk or recklessly. The site also helps a group of friends choose a designated driver. By going to the ***Responsibility Randomizer*** section of the website, a group of friends can enter their names and phone numbers and the service will send an SMS to everyone in the group indicating who the randomly chosen sober driver will be for the night.[19]

The University of Auckland (New Zealand) conducted an RCT to assess the effectiveness of an SMS-based smoking cessation program, ***STOMP***. The intervention group received personalized SMS with advice, support, or distraction based on their demographic and smoking behavior. Six weeks into the program, those who received this treatment were significantly more likely to have quit smoking than those in the control group, who received no support messages (28% v 13%; $p<0.0001$). These differences held across age, sex, income, and geographic location.[20] A pilot version of the program was recently conducted in the UK under the name ***Txt2Stop***; those researchers are currently recruiting for a larger study.[21]

Smoking cessation programs are also underway in the US. Funded by 2004 state tobacco excise tax money, the Colorado Department of Public Health and Education built two separate interactive Flash sites to address tobacco use among adults[22] and 13- to 18-year-olds.[23] In addition to hearing testimonials, producing user-generated content, and joining forums, users of the sites can also link to ***FixNixer***, a 21-day, tailored smoking cessation program with online and SMS support.[24]

***Chew Free***, an online smokeless tobacco cessation program developed by the Oregon

Research Institute and the National Cancer Institute, consists of forums, resources, information and a "Personalized Quitting Assistant" who walks the user through an assessment.[25] A noteworthy aspect of this program is that they had the foresight to realize that other public health professionals might be interested in seeing how the ***Chew Free*** site works. They created an exact replica of the intervention site so that professional visitors can sign up and experience the site's functionality without contributing inaccurate data or disrupting the registered users on the real site.

## STI, HIV, and Family Planning

Due to the common denominator of sexual behavior, digital projects focused on STI, HIV, general safer sex, family planning, and/or birth control are included here together. This section begins with traditionally in-person services that are now available online or through mobile devices – STI testing, partner notification, and access to birth control – and concludes with those ICTs that have been used to increase information exchange related to sex and reproductive health.

In order to increase chlamydia and gonorrhea testing, Johns Hopkins University developed a project, ***I Want the Kit***,[26] that would allow women 14 years and older to order home-sampling kits for self-collected vaginal swab specimens. The kits can be requested online, through mail or telephone, or at community locations and once submitted, results are obtained by calling the lab and providing a unique identifier and pass code. Those with positive results are referred to clinics for treatment. A seven-month evaluation of the service found that of 400 samples submitted for testing, 350 (85%) were from the online orders,10.25% were positive and 95.1% of those testing positive went on to receive treatment. When asked about the service, 89.5% of study participants said they preferred collecting their own specimen for the testing process and 86.3% would use the Internet again for testing.[27] A similar program at the San Francisco City Clinic increases access to syphilis testing by providing online lab forms that the user can print and take to any one of six city clinics for a blood draw.[28] Between three and seven days later, those who were tested can log on to www.STDtest.org to get their results.

When someone is diagnosed with an STI, Partner Notification (PN) is an important step in preventing further spread of the infection. PN is based on the premise that the sexual partners of people with STIs are likely to be infected, but may be asymptomatic and may not otherwise seek care. That notification process can now be done online. ***InSPOT***,[29] developed by ISIS, Inc.,[30] provides eCards that can be sent anonymously to inform someone that he or she might have been exposed to the STI. Originally developed for gay and bisexual men in San Francisco in 2004, the program has been expanded to nine cities, nine states, and two other countries and card options are being updated so that anyone can use them, regardless of sexual orientation. While the eCards could be sent by and to anyone who accesses an ***InSPOT*** website, it is ideal when the recipient of the message lives in a city served by ***InSPOT*** so that he or she can be connected to local testing and treatment services.

In 2004, Planned Parenthood of the Columbia/Willamette became the first family planning provider in the US to offer hormonal contraception online with a project titled, ***Instant Birth Control***. While anyone with an Internet connection can theoretically find the order page,[31] only qualified women in Oregon and Washington are allowed to use the service, which requires that they go through the same health screening and monitoring as those seen in person, but does not require the pelvic exam. Patients using this service have the option of receiving their prescription at a pharmacy, Planned Parenthood health center, or by mail. The launch of a multimedia marketing campaign late in 2006 brought a significant increase in web traffic, patient visits, and online contraception sales, which increased 20 percent.[32]

The San Francisco City Clinic also used digital means to decrease barriers to contraception access. They made it easier for women in that city to obtain Emergency Contraception (EC) by providing a simple online prescription that can be faxed to a pharmacy or printed and presented in person. Women over the age of 18 do not need a prescription for EC in this country, but some pharmacies charge a $10 consult fee if a woman arrives without one; using the online form guarantees the fee will be waived.[33]

Whether a woman is planning to avoid pregnancy or trying to get pregnant, there are two online sites that could help achieve either of those ends. ***LadyTimer***[34] and ***Mon.thly.Info***[35] both provide online tracking of menstrual cycles. After entering dates for past cycles, both systems send email reminders for ovulation and/or menstruation at an interval of the user's choosing. ***LadyTimer*** will also send SMS reminders and has a Facebook application so that tracking can be done on a subscriber's social networking homepage.

An RCT at Columbia Presbyterian Medical Center in New York is currently evaluating the effectiveness of SMS reminders in helping women under 25 years old remember to take their birth control pills.[36] For six months each, intervention subjects will receive daily reminders to take their pill, while control subjects will receive standard care. The primary outcome of interest is continuation of birth control; a secondary outcome measure is change in contraception knowledge. Though the study will not be completed for another year, certain pre-study data are worth noting. Prior to the RCT, the researchers conducted an initial survey of women attending the study clinic to determine whether cell phone ownership among the inner-city client base was high enough to warrant the study. They found that 77% of their female patients under 20 had a cell phone and 90% of those used the SMS service.[37]

ISIS, Inc., the company in San Francisco responsible for ***InSPOT,*** also examined the feasibility of using mobile technology with a particular target audience before proceeding too far with a proposed digital application. In response to rising rates of gonorrhea and chlamydia among African American teen girls in their city, ISIS conducted focus groups in 2004 to see if it made sense to implement an SMS-based project to increase their access to health information. Once they determined high rates of cell phone ownership among the teen girls, the ***SexInfoSF*** project was created. The service, which has now been replicated in other cities, including Washington, DC,[38] allows users to text "sexinfo" to 61827 and immediately they will get a reply SMS with a menu of options, such as "Txt '1' if ur condom broke" or "Txt '5' for STD info." The user would then get follow up information explaining their next step options and the location of a clinic where they could get further help. In an evaluation of the service, ISIS found that after 24 weeks, the service was used 4500 times and 2500 of those received further information or referrals. They also conducted surveys in clinics in San Francisco and found that their efforts to target the campaign at those most at risk for CT and GC paid off. African American girls from the geographic areas they were targeting were the ones most likely to have seen and remembered the marketing materials promoting ***SexInfoSF***.[39]

Industrialized countries such as the US are not the only places where SMS projects can be implemented to further public health goals. In fact, in a number of locations where individuals do not have access to computers, they do have access to mobile phones. In sub-Saharan Africa there are 2.5 million mobile phone users and relatively high literacy rates, making the location ideal for a project such as ***Text to Change***, an SMS-based program in Uganda with the goal of increasing knowledge about HIV/AIDS. An interactive SMS quiz poses general knowledge questions about HIV/AIDS and is linked with a reward system to provide an incentive.[40]

***Learning About Living*** is a project in Nigeria, implemented by Oxfam Novib and the MacArthur Foundation, that aims to educate 10- to 25-year-olds about HIV/AIDS and sexuality. The ***MyQuestion*** portion of the program invites users to get answers to health questions through SMS, email, or telephone. During the first the months of the program, the SMS service option was by far and away the most popular, with over 14,000 SMS responses sent to teens. The ***MyAnswer*** portion of the program invites teens to send an SMS with answers to questions posed on the Learning About Living site. Every month ten entries win a prize; again, an incentive provided to help ensure the system gets used.[41]

## Lessons Learned

As demonstrated by the projects in this brief, there are efforts being made worldwide to harness digital media for the improvement of public health. Despite the fact that they cover a wide variety of health issues, take place in varied settings, employ a range of digital technologies, and are often lacking

in outcome data, each of these projects offer insights that are relevant to our work across a number of common themes, which are summarized below. Our work on digital initiatives should benefit from strategically addressing each of these issues.

- Evaluation. We should think about evaluation from the beginning of any digital project. To know whether our projects are really making an impact on health behavior, we need to have solid measurements of effectiveness. It is best to think about possible evaluation methods as a project is being developed, rather than trying to retrofit measures once a project has been implemented. Further, evaluation can and should occur throughout the life of a project, not just at its conclusion. By getting feedback on features of a program along the way, improvements can be made earlier rather than later.
- Users. We should understand well the digital media habits of our target audience so that we use the correct channels to reach them. We should also involve our users in the development and testing of applications. We might think we know what they will like or what will work, but we should actually see what succeeds with them.
- Usability. We need to create digital applications that are usable and easy to interact with. If an application is confusing or otherwise difficult to use, we will not engage our target audience long enough to make an impact on their health behavior.
- Accessibility. While we cannot expect to create applications that will reach everyone, we should make an effort to remove all barriers to access that we can. When creating mobile applications, for example, we should aim to work with as many carriers as possible.
- Authenticity. Particularly in social media, having an authentic voice is important. If some of the content of a media campaign is to be created by users, for example, it should sound as though it has been created by users.
- Replication. If something has already been done well by someone else, others do not have to reinvent the wheel. Perhaps a program or application will need to be adjusted to meet one's specific needs, but it does not always have to be developed from scratch.
- Partnerships. Thanks in part to the way public health funding occurs, we often operate in very specific silos. We are often trying to reach similar goals, however, as those in HIV and STI prevention – or even those in less similar areas of public health – and should talk to one another about the potential of shared digital applications.
- Personalization. Though digital media can reach people on the other side of the globe, it is often helpful or even necessary to connect a user with local resources. If we suggest that people should see a healthcare provider to get a new type of birth control, for example, it would be helpful if we provide a way for them to find a doctor where they live.
- Sharing successes and failures. As we join others in public health in the world of digital media, all of our work will be enhanced if we share what has worked and what has not. We can fuel each other's innovation and creativity, save one another time and money, and ultimately make a much bigger public health impact.

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