Roadmap: mHealth Interventions for at-risk women

Preliminary Version 2014

Health and Development 
Eurasia Foundation 
SSTAR
The Public Health Working Group

The Roadmap

m-Health Interventions
For At-Risk Women

First Version

USA-Russian Federation
2014
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The roadmap was developed by representatives of several US and Russian organizations working in public health:

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## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AA/NA</td>
<td>Alcoholics Anonymous/Narcotics Anonymous</td>
</tr>
<tr>
<td>A-Chess</td>
<td>Addiction Center for Health Enhancement Systems Studies</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<td>App</td>
<td>Application (refers to Mobile Application)</td>
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<td>ART</td>
<td>Antiretroviral therapy</td>
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<tr>
<td>BCC</td>
<td>Behavior change communication</td>
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<td>BHRM</td>
<td>Behavioral Health Recovery Management</td>
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<td>CHW</td>
<td>Community health worker</td>
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<tr>
<td>CSP</td>
<td>Community Support Program</td>
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<td>CSW</td>
<td>Commercial sex worker</td>
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<tr>
<td>EBI</td>
<td>Evidence based information</td>
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<td>EMA</td>
<td>Ecological Momentary Assessment</td>
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<tr>
<td>EMI</td>
<td>Ecological Momentary Interventions</td>
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<tr>
<td>FP</td>
<td>Family planning</td>
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<tr>
<td>GSM</td>
<td>Global System for Mobile Communications</td>
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<td>GSMA</td>
<td>GSM Association</td>
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<tr>
<td>GPRS</td>
<td>General Packet Radio Service</td>
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<tr>
<td>GPS</td>
<td>Global positioning system</td>
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<tr>
<td>HDF</td>
<td>Health and Development Foundation</td>
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<tr>
<td>HCP</td>
<td>Health care provider</td>
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<tr>
<td>HLS</td>
<td>Healthy life style</td>
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<tr>
<td>HMIS</td>
<td>Health management information system</td>
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<tr>
<td>IT</td>
<td>Information technology</td>
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<tr>
<td>IDU</td>
<td>Injecting drug user</td>
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<tr>
<td>IVR</td>
<td>Interactive voice response</td>
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<tr>
<td>JHU/CCP</td>
<td>Johns Hopkins University Center Communication Programs</td>
</tr>
<tr>
<td>KAB</td>
<td>Knowledge Attitudes Behavior</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
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<tr>
<td>MARP</td>
<td>Most at risk population</td>
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<tr>
<td>mHealth</td>
<td>Mobile health</td>
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<tr>
<td>Mob App</td>
<td>Mobile Application</td>
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<tr>
<td>NIATx</td>
<td>Network for the Improvement of Addiction Treatment</td>
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<tr>
<td>MMS</td>
<td>Multimedia messaging service</td>
</tr>
<tr>
<td>MNO</td>
<td>Mobile network operator</td>
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<tr>
<td>MSM</td>
<td>Man who have sex with man</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>PLHA</td>
<td>People living with HIV/AIDS</td>
</tr>
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</table>
P-Process The Process and Principles for Health Communication Projects
RH Reproductive health
SIM Subscriber identity module
SMART Specific, measurable, appropriate, realistic, time-bound
SMI Serious mental illness
SMS Short messaging service
SSTAR Stanley Street Treatment and Recourses
STI Sexually transmitted infections
SUD Substance use disorder
TA Target audience
TB Tuberculosis
UN United Nations
USSD Unstructured supplementary service data
VCT Voluntary counseling and testing
WHO World Health Organization
Background and Executive summary

This Roadmap is intended as a guide for developers and implementers of mHealth interventions for at-risk women. It is our hope that the experience of the authors and the information provided will assist users in creating programs that meet the demands of that target audience and improve the quality of services available.

The roadmap includes best practices in the field, a review of mobile tools as well as a literature review, lessons learned, evidence-based data, and information on the mHealth interventions available and appropriate for this at-risk population.

The manual also contains a comprehensive explanation of methodology and practical recommendations on the strategic planning of behavior change interventions based on mobile devices for different groups of at-risk women – those with a history of substance abuse, commercial sex workers, and women preparing to start or who have recently completed prison terms.

The roadmap focuses primarily on the US and Russian context, but can be implemented in other countries for developing mHealth interventions for at-risk women. Regardless of the level of mHealth program development in a country, this roadmap will assist in helping and supporting underserved and at-risk female populations through the utilization of mobile devices.

The roadmap covers topics on enrollment strategies for outreach and engagement of the target audience in a program, and motivational activities to maximize the benefit of participation for the target audience. Topics covered in this guide also include issues related to legal and ethical questions, like legislation covering mobile and health communication, and privacy and confidentiality concerns for clients.

In terms of content and strategy development, the authors also outline some of the main theories and best practices involved in creating effective behavior change communication initiatives, as well as discussing coalition building, the organizational structure of a development team, and step-by-step strategies for creating and launching a service.

Those interested in learning more about the technical aspects can read about some of the communication options for these audiences. The content encompasses a wide range of technological issues and "how-to's": how to develop or identify a platform for SMS services and aggregator solutions, how to provide data security and protection, how to establish effective subscribing process, etc.
Finally, the authors cover different aspects of effective monitoring and evaluation of existing programs, providing practical frameworks for the step-by-step assessment of program effectiveness for various sub-groups of the target audience.

**US-Russia collaborative effort**
This Roadmap is the result of collaboration between a US-Russian coalition of experts. The authors shared their experience in mHealth interventions in Russia and the US in the field of health promotion to at-risk, underserved, disadvantaged, and vulnerable female populations. All the organizations involved have a long record of implementing behavior change communication campaigns, including those based on mobile technology.

**Our readers**
This Roadmap addresses specialists and project managers applying mobile solutions in the fields of public health, health promotion, and education for various groups, including so-called most at-risk populations, such as women with substance use disorders, commercial sex workers, patients with mental disorders, recent parolees, etc. These groups have specific needs and gaps in knowledge and skills, and require creative and unorthodox approaches.

Please note that this is intended as a living document, and we welcome comments, suggestions, and information from readers to help update and improve it. Our goal was not to present a definitive guide, but to share our experience in the field, and resources that colleagues may find useful. We would be happy to receive any ideas, comments, or suggestions at info@fzr.ru.

This Roadmap will be also available online at www.fzr.ru/eng/.

**Content**
Given the ubiquity of mobile phones and devices, and their increasing role in health promotion, the ultimate goal of this document is to provide specialists in various fields with tools, lessons learned and possible pitfalls, and practical recommendations on how to develop, implement and evaluate their own mHealth interventions for at-risk female populations.

Even though this particular guide focuses on female MARPs, the approaches and solutions provided are not limited to one audience and can be applied to a much broader spectrum of issues and audiences. This Roadmap will also be useful for those who work with a general population and seek to address health issues of pregnant women and newborns, youth, diabetics, HIV/AIDS, TB and hepatitis prevention, tobacco and alcohol prevention, senior health, etc. The solutions
provided in this Roadmap will also be useful for the development of both local and large-scale mHealth interventions.

The Roadmap focuses on the following:

1. mHealth as a tool to address health issues of female MARPs
2. Gender issues in the development and implementation of mobile health interventions
3. Patient monitoring, routing, and referral
4. Behavior change communication from an mHealth perspective
5. Establishing text-message services for female MARPs – learning about the audience, content development and technical solutions
6. mHealth as a component of an integrative model of treatment/education
7. A review of the literature and mobile applications addressing health issues of female MARPs

Behavior Change Communication
Mobile phones and applications for smartphones have proved to be a viable tool in behavior change interventions. However, despite the rapid increase of multiple mHealth initiatives across the world, many of them are neither based on nor include BCC theories.

The recent outburst of enthusiasm for mHealth has resulted in a tremendous amount of diverse mHealth initiatives for various audiences across the world. At the same time, many of them are not based on the results of in-depth surveys of clients’ actual needs and gaps in knowledge, information, and skills. Ignorance or the under-utilization of BCC results in a reduction of the effectiveness of mHealth initiatives and discredits the whole approach. It is crucial to apply BCC theories to mHealth interventions targeting MARPs at all stages of implementation.

This Roadmap is focused on behavior change theories as an essential part of mHealth intervention development. For this particular work, the P-Process concept developed by JHU/CCP was used.

Basic tenets
followed by the authors of this document as key principles in the development of mHealth initiatives for female MARPs:

1. Free and client-oriented service
2. Voluntary, anonymous, and confidential
3. Integration with medical services and offline rehabilitation activities
4. Based on scientific and behavior change theories, use verified and evidence-based data/information
5. Multidisciplinary approach
6. Comprehensive content (STDs, substance use disorders, co-morbidities, etc.)
7. Promote access to and utilization of gender-based health services, where available
The problem

Given the ubiquity of mobile phones in modern life, they have become a very effective communication channel for the delivery of health messages to various audiences. These messages include health advice, recommendations, medication and appointment reminders, etc., sent directly to clients’ phones. So-called mHealth initiatives – communication campaigns based on or utilizing mobile devices – are becoming increasingly popular and widespread, targeting various audiences.

The vast majority of current mHealth programs focus on the health issues of the general population and have proven successful in addressing, for example, mother and child health issues, youth and adult health, and HIV. In addition, mobile phones have recently been proven to be an effective tool in targeting the most-at risk populations and hard-to-reach audiences – SUD clients, commercial sex workers, and individuals in the criminal justice system.

However, there is a lack of evidence-based practices and information on how the mHealth approach can be applied to at-risk audiences and help underserved women. Most of the initiatives targeting these audiences are usually small pilot programs or implemented by organizations lacking extensive experience in this field, providing fragmented and non-strategic services for clients.

Programs for at-risk women require specific and unorthodox solutions for key aspects of an intervention – messages should be carefully pre-tested to ensure their comprehensibility and psychological impact; illiteracy among this audience should be resolved in such mHealth programs (given the low level of literacy in the population of some at-risk women, voice messages can be developed along with text messages); the content should carefully focus on women’s actual needs; and such programs should also address issues of child health and care, and many other issues associated with the everyday life of at-risk women.

Another gap in current mHealth initiatives is a lack of intersectoral collaboration between related agencies and health services in addressing issues of at-risk women. This problem is especially prominent in Russia, where the linkage of key services responsible for providing health and social services to at-risk women is traditionally insufficient or absent at all. For example, drug treatment facilities, AIDS centers, rehabilitation centers, social welfare agencies, and others work independently and separately. It is, however, essential for the success of mHealth programs to ensure strong collaboration between all related agencies and centers.

It is our intention that this manual will serve to provide an effective tool for health
organizers, communication campaign developers, and implementers, and will help address such issues as the psychological and social rehabilitation of at-risk women, child abandonment, drug abuse, the high rate of relapse and dropout from rehabilitation programs, HIV prevalence, adherence to substance abuse and HIV treatment, and violence in families of the at-risk population, as well as improving access of at-risk women to the mother and child medical care system.
Why SSTAR and the Health and Development Foundation

Our experience
This document was developed by SSTAR (USA) and the Health and Development Foundation (Russia) as a response to the Millennium Development Goals 8 set by the United Nations and address health issues for at-risk women. SSTAR and HDF have developed this Roadmap as a guide for other organizations intending to use mobile tools in BCC programs where the target audience is at-risk women; specifically, women in risk groups that include IDU, HIV, or CSW. These guidelines are based in part on a successful pilot program developed by HDF and implemented with SSTAR as a partner, aimed at women with a history of substance abuse and HIV or HIV-risk behaviors, as well as on a review of mobile health interventions aimed at MARPs.

Both organizations have a long record of successfully implementing unique interventions for at-risk and underserved women. SSTAR is a US NGO, established in 1977, that provides integrated addiction mental health, primary healthcare, and HIV/AIDS services. It is located one hour’s drive south of Boston.

Although SSTAR provides services to both men and women, the agency is especially known for providing specialized services to women and has also been a leader in introducing technology-based treatment to improve outcomes.

Most of SSTAR’s funding comes from the state and federal government with the largest proportion (65%) through fee-for-service reimbursement by publicly funded health insurance.

SSTAR was introduced to the Addiction-CHESS mobile health intervention through its involvement in the national NIATx (Network for the Improvement of Addiction Treatment), which aimed to identify cost-neutral strategies for improving addiction treatment through rapid cycle process improvement. A-CHESS is a smartphone application tool to support patients with a history of substance abuse in recovery. NIATx was led by researchers at the University of Wisconsin at Madison, and this group was also involved in the development of the mobile app. In 2013, SSTAR became a member of the University of Wisconsin’s A-CHESS research collaborative.
and began introducing this intervention to its addiction treatment patients. Currently there are 42 patients enrolled in the A-CHESS project.

The Health and Development Foundation, formerly known as Healthy Russia, is a non-profit, non-governmental organization acting in the field of development and conducting programs aimed at public health improvement and behavior change. HDF has 10 years of experience in designing and implementing comprehensive educational and outreach programs to improve the health and healthy lifestyle skills of Russians.

HDF has also been an mHealth innovator in Russia, developing and launching the country’s first national mHealth program, SMSmame (Text4baby Russia). This maternal and child health program is based on text4baby in the U.S. SMSmame subscribers receive free text messages with information on caring for their health and the health of their children during pregnancy and the first year of life. The organization is also currently running several other national mHealth programs.

A pilot mHealth program that used text messages and telephone follow-up for patient monitoring, routing, and referral after clients left inpatient substance abuse treatment.

A free service providing pregnant women and new mothers throughout Russia with health information through text messages to their mobile phones.
Support and information for women and families undergoing assisted reproductive technology treatment through a comprehensive offline and mHealth approach.

An interactive mobile application that helps Russians get informed about new smoking legislation, and get involved in promoting smoke free zones in their communities.

*Please see the Chapter “Our experience” for further details about SSTAR and HDF’s joint project.*
The Health and Development Foundation developed an innovative mHealth program to create positive changes in the health behavior and knowledge of an at-risk population: female clients with a history of injecting drug use or HIV.

“A Comprehensive mHealth Approach to Reaching At-Risk Women” is aimed at keeping the at-risk groups of women and new mothers who are HIV+ and/or have injecting drug use in their medical history informed and connected to a multi-sectoral medical and social support network and system of care.

In 2010, the Health and Development Foundation launched a pilot version of this mHealth initiative in St. Petersburg. Clients who came to St. Petersburg Maternity Hospital No. 16, a hospital for high-risk patients, during pregnancy or for delivery were invited to join the program based on the following criteria: injecting drug use in their medical history, experience as a commercial sex worker, or HIV+ status. Female clients were selected for the same criteria at St. Petersburg State Narcological Hospital.

Selected clients received individual counseling, and upon release from the hospital, these women received text messages, developed by relevant health care specialists, with content related to counseling topics: encouraging adherence to substance abuse treatment, the prevention and treatment of HIV and other infectious diseases, reproductive health, information on childcare, and more.

This mHealth pilot program was part of a comprehensive initiative in St. Petersburg intended to create a support system to ensure the most effective care for HIV and substance abuse risk groups through interagency and intersectoral collaboration, training of health care providers, utilization of NGO peer counselors, and HIV/substance abuse counseling for clients.

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The mobile health approach

Mobile phone ownership and usage in the U.S. and internationally
The steady growth in mobile phone ownership and usage has provided the necessary background for the concurrent steady growth in mobile health interventions.

A Pew research report found that 91% of American adults owned a cell phone in 2013, with 81% of those using their phones to send and receive text messages, 52% of them using their phones to check email, and 50% to download apps².

A global research report by Pew found that more than half of the population in each of the nations surveyed (24 total) said they owned a cell phone. Roughly nine-in-ten or more own mobile phones are in Jordan (95%), China (95%), Russia (94%), Chile (91%) and South Africa (91%)³.

That same study found that large majorities in most countries regularly send text messages. Overall, a median of 78% of mobile phone users across the 24 countries send texts, making it the most popular cell phone activity (other than making calls) included on the survey.

Particularly relevant to this guide, the 2012 Pew report found that from 2010-2012, the percentage of mobile phone owners in the U.S. using their phone to look for health or medical information online rose from 17% to 31%, with certain demographic groups, including women, Latinos, and African Americans at the forefront of this trend⁴. Although the percentage of mobile phone owners in the U.S. receiving any health-related text updates or alerts is relatively low at 9%, women were again more likely than other cell phone owners to have signed up for such programs⁵.

In 2013, Pew⁶ also reported that 91% of Americans owned cell phones and that 60% of American adults had a smartphone from which they could access the Internet and download apps. This is up from 29% with smartphones in 2009. Eighty-one percent of people surveyed use their cell phone to text while only 51% use the phone for email. People who are black or Hispanic are more likely to report using their cell phone to access the Internet than people who are white non-Hispanic.

² Pew Research Center, 2013
³ Pew Research Center, 2014
⁴ Pew Research Center, 2012
⁵ Pew Research Center, 2012
⁶ Pew Research Center, 2013
Younger people and people with higher incomes also have higher rates of smartphone ownership than older people and poorer people.

In the United States, Pew reports that among young adults, age 18-34, smartphone usage is less related to income level than it is with older adults. Eighty percent of people 18-34 own a smartphone, with 77% of those aged 18-29 with incomes below $30,000 owning a smartphone. This high level of overall cell phone ownership and smart phone ownership among young adults makes the use of mobile health technology to reach the target population possible.

Pew reports the cost of smartphones as decreasing worldwide by 16% between 2011 and 2013 as phone companies realize that first world markets are nearly saturated and third world markets require lower prices. As prices lower, using interactive communication technologies for healthcare purposes will become easier to do regardless of population. In terms of gender disparities in cell phone ownership, PEW reported a very slight one for America in 2014, with 93% of men owning one, and 88% of women.

A 2010 report by the GSMA Development Fund reported a different situation for low- and middle-income countries, at least at that time. The report cited data showing that, overall, women in these countries are 21% less likely to own a mobile phone than men.

Mobile tools for public health
The introduction of new technology has always triggered innovation and adaptation in the medical and public health fields, and the introduction of mobile and Internet-based tools in this area over the last ten years has dramatically changed the landscape of program planning and implementation. The eHealth strategy toolkit by the WHO points out the inevitability of these changes: “Whether to deliver care, deploy personnel, conduct research or support humanitarian action, at every level and in every country the business of health relies on information and communication and, increasingly, on the technologies that enable it.”

mHealth is the use of mobile technologies as a medium to provide or assist in access to and utilization as well as the provision of healthcare and public health campaigns, in addition to utilization as a tool of health research. The benefits to this type of tool, especially for public health campaigns, include:

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7 http://www.pewresearch.org/fact-tank/2013/09/10/the-average-selling-price-of-a-smartphone/
8 Pew Research Center, 2014
9 GSMA Development Fund
10 http://www.who.int/ehealth/brochure.pdf
● Cost effectiveness – fewer materials, locations, and personnel are required;
● Expanded project scope – the target audience can be increased exponentially, unlimited by geographical restrictions;
● Expanded monitoring capabilities – health care providers can gather data and health information more frequently than with in-person visits;
● Faster feedback – clients can participate in a real-time dialogue with program administrators, leading to quicker, continuous program improvement (this also means provision of immediate feedback to patients, keeping them involved);
● Monitoring, referral and routing of patients – mobile tools can be used to stay in touch with patients from at-risk populations that traditional tools might fail to reach;
● More effective at tailoring an intervention to individual clients – messages can be easily and economically adapted to meet the needs of different groups within the target audience;
● Less intrusive, more confidentiality;
● Less time-consuming for staff;
● Occurring in real-time, in real-life situations, changing and increasing the effectiveness of real-time patient monitoring and intervention.
● The possibility of a real-time dialogue with program administrators, health care providers, and peer advocates.

For awareness and behavior change programs in particular, mHealth tools can greatly expand the size and scope of the target audience, enabling health care providers and administrators to provide more information to a greater number of people over a potentially exponentially larger geographic area. In addition to expanding the size and scope of a target audience for the communication of information and raising awareness, mHealth programs can also re-create or improve types of in-person interactions in a virtual or mobile space, such as one-on-one communication and peer interaction.

Such programs include both those that use mHealth tools to augment an existing program, as well as interventions implemented solely through mobile and Internet channels.

Some examples of the type of technologies and strategies currently being utilized

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11 Many reviews of these types of interventions cite the cost-saving effects of using mobile technologies: “The third [aspect of mHealth that renders it such a potentially robust healthcare tool is its capacity to operate at scale in a cost-effective, financially sustainable way.”

are social media pages for research and peer and administrator interaction, program websites that provide information and support, and mobile applications and text messaging programs for mobile devices for the provision of information, interaction, and behavior change. The main focus of this guide is text messaging and mobile applications.

mHealth strategies are ideally suited, as well, for reaching and maintaining contact with vulnerable populations that often create significant challenges for programs using traditional approaches and technologies. At-risk populations that traditional interventions might struggle to contact, because of location (such as poor and rural communities), or lifestyle (such as homeless clients or injecting drug users), are potentially successful target audiences for mobile health interventions.

With mobile interventions, the communication tool has also become more than simply a medium that increases the convenience or cost-effectiveness of reaching a particular audience. As the makers of a smartphone application aimed at clients with a serious mental illness put it: “[Our program] does not merely serve as a delivery system for existing interventions. Rather, it introduces a novel approach to clinical care for schizophrenia (i.e. real-time, real-place, on-demand, self-navigated), i.e. only made possible through recent advancements in mobile hardware, software, and telecommunication infrastructure.”

In recent years, mobile and Internet tools have increasingly been used as central or peripheral components of public health behavior change communication programs. They have been used successfully to address a variety of health issues, from maternal health, HIV prevention, the management of other chronic diseases, and exercise and diet.

Research that demonstrates the usefulness of text messaging and cell phone check-ins has been available for a number of years. Text messaging has been demonstrated to be effective in reducing the time to treatment in sexual health clinics and increasing quit rates in tobacco cessation programs. Continuing care via telephone also reduces alcohol use in people who have completed treatment.

12 Ben-Zeev, 2014
Examples of mHealth programs aimed at a “general” audience include programs targeting smoking cessation, physical fitness, and the management of chronic illness. The 2012 Pew Report on mobile health found that the most popular downloaded mobile applications addressed exercise, diet, and weight issues.16

Of those Americans surveyed, 38% used health apps to track their exercise, 31% monitored their diet, and 12% used an app to manage their weight. The report cited other applications dealing with chronic conditions like diabetes and high blood pressure.

Mobile interventions as a way to fill in gaps in traditional health care

In a review of the literature on interventions for MARPs carried out for this guide, a number of study authors noted that mHealth interventions could be used as a tool to fill in gaps in traditional health care delivery. One reason these gaps exist is an issue of funding for specific types of health care. In their study on patients with alcohol use disorders and comorbid depression, Agyapong et al note that, historically, addiction treatment systems have addressed a chronic condition as if it were an acute condition, which thereby limited public funding for more effective ongoing treatment and monitoring:

Accordingly, policymakers allocate limited public health funds for addiction treatment; insurers restrict the number of patient days and visits covered; treatment centers make no infrastructure allowance for on-going monitoring; and families and the public become impatient when patients relapse.19

The authors note the potential of SMS interventions to provide a cost-effective way to supplement episodes of specialized in-person treatment.

Mobile interventions may also reach those audiences not accessed at all by traditional health care. Cohn et al reported findings that 85% of problem drinkers “never come into contact with professional help”, and call mobile technology a potential “new frontier” for reaching the untreated.20

As mentioned above, economics plays a role from the point of view of public funding, but it can also play a more direct role in the lives of people attempting to

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16 Pew Research Center, 2012
17 Scott, Johnson, & Dennis, 2013
18 Existing systems cannot afford to offer continuous formal and informal recovery support systems for women as they re-enter the community (Scott, 2013)
19 Agyapong, Milnes, McLoughlin, & Farren, 2013
20 Cohn, Hunter-Reel, Hagman, & Mitchell, 2011
access services. In a study targeting low-income smokers, Vidrine et al noted that while economically disadvantaged individuals had lower quitting success rates and were more aggressively marketed to by tobacco companies, there were “few interventions targeting individuals who lacked access to transportation, had limited or no medical insurance, and typically do not utilize traditional health care facilities”\textsuperscript{21}.

Economics and lifestyle also play a role in clients’ losing contact with health care facilities and ongoing care: authors of studies on homeless adults and migrant workers found that these populations had high rates of chronic illness, but often accessed emergency care as a result of losing connectivity through lack of a fixed address\textsuperscript{22} \textsuperscript{23}. Rates of mobile phone ownership and use in these populations suggested mobile communication as an effective means of maintaining connectivity (see the section on specific characteristics of at-risk women).

\textsuperscript{21} Vidrine, Arduino, Lazev, & Gritz, 2006
\textsuperscript{22} Eysenbach, Walker, Baloch, & Post, 2013
\textsuperscript{23} Price, et al, 2013
Key characteristics and specific aspects of mHealth interventions for at-risk women

The definition of MARPs varies widely, depending on context; for the purposes of this Roadmap, we define MARPs as those groups who are a) at increased risk for illness/harm, either through risky behavior, environment, or pre-existing condition and b) less likely to access or be reachable through traditional health communication. These groups include clients with minority status, a history of substance abuse, serious mental illness (SMI), homelessness, poverty, and/or incarceration, as well as people living with HIV/AIDS (PLWHA).

This Roadmap focuses specifically on at-risk women, who may also fall into many of the groups listed above. Creating mobile health programs for these populations requires an additional set of considerations than those addressing a more mainstream audience.

Screening and assessment

At-risk women may have practical and psychological difficulties when seeking treatment or health and assistance. For example, women generally experience greater societal stigma, guilt, and shame associated with their abuse of substances. This, along with risk of loss of their children to child protective services, can be a barrier to entering treatment. Other categories of at-risk women such as recent parolees, CSW, or women suffering from a serious mental illness (SMI) may find it initially difficult to seek help or subscribe to a new service.

It is important that any screening and assessment process, or introduction to your program, begin to build a trusting relationship between the woman and the treatment system. Interviews and interactions should be conducted in the woman’s preferred language.

When asking sensitive questions related to substance misuse and other high-risk behaviors, self-administered tools have been shown to elicit more honest answers (Lessler and O'Reilly 1997; Russell et al. 1996; Tourangeau and Smith 1996). Because of the increased stigmatization and guilt experienced by many at-risk women, self-administered tools can be an important component of the screening and assessment.

A high proportion of women with substance use disorders are significantly impacted by trauma history. Estimates of prevalence of trauma among this
population exceed 70% (Covington & Kohen, 1984). Assessment process should include questions about history of sexual, physical, and emotional abuse.

Because women are frequently in caregiver roles, the assessment process should identify strengths and barriers to treatment associated with any caregiver roles. Assessment instruments should be used that have been adapted and tested on women in specific cultural groups and special populations.

**Pretreatment and post-treatment recovery support** should be part of an overall Behavioral Health Recovery Management (BHRM) approach. This approach emphasizes motivational enhancement, and supports the woman in identifying her own treatment goals and preferred treatment modalities.

Pretreatment focuses on increasing motivation for treatment as well as overcoming barriers to treatment. Relationships are especially important to women and key to successful recovery. Family Intervention is one type of pretreatment that involves engaging the woman’s family and social network to increase the family’s understanding of addiction and to improve their capacity to support their loved one and help motivate them to begin treatment and recovery. The availability of peer-recovery support /case management services in the pretreatment phase and continuing post treatment can be key to helping women overcome barriers to entering treatment, reducing relapse and sustaining recovery.

**Availability of easy-to-access primary care**
Women with substance use disorders are more likely to experience other chronic health conditions due to their addiction. Other vulnerable populations of women may also lack long-term access to primary care, increasing the risk for chronic disorders. Caregiver responsibilities often prevent women from seeking medical treatment for themselves so having integrated primary care, specialized treatment, and mental health services in one location with babysitting services on site improves access to appropriate care.

**Treatment**
Women respond better to treatment that is supportive rather than confrontational. A strength-based model should be fundamental to all services. The woman should be able to choose from a range of treatment options that meet her needs and recovery goals.

Staff in all treatment services should have training in trauma and organizational leadership, and should strive for “trauma-informed” care in all settings. Strength-based trauma treatment should be available in all behavioral health services.
Because so many at-risk women have experienced abuse from males, single-gender treatment settings are preferred.

Since relationships, including care-giver roles, are integral to the course of addiction, initiation of treatment, and recovery, services should be “family-friendly”, engaging family and social network in the processes. Childcare needs should be addressed, and services should be available on flexible schedules. Use of technology – web-based interactive treatment, and mobile health applications that support recovery, can be especially useful to women who have difficulty scheduling and traveling to treatment appointments.

**Additional challenges in the development and implementation of communication programs for MARPs**

Another consideration during the development of mHealth programs for at-risk women is one of access – is there a digital divide between the general population and those groups affected by economic and social disadvantages? If cell phone ownership was significantly different in these groups, it would indicate that mHealth initiatives would not be the most effective health communication tool.

However, several studies in a review of the literature on mobile interventions conducted for this guide found that mobile phone ownership and usage among MARPs was equivalent to the general population, but that access to certain types of technology might be more limited.

A number of studies found that even the most disadvantaged and disenfranchised groups had similar access to mobile phones as the general population. A recent study, for example, found no significant difference in the mobile phone ownership of homeless and housed adults\(^24\). However, authors in the articles surveyed did find a difference in usage in several cases. So while mobile phone access is less of a barrier than might be supposed, there is still a digital divide in terms of access to all available technologies.

Another potential challenge in targeting MARPs is the acceptability of mobile interventions for the targeted populations: will high-risk, disadvantaged populations trust and be interested in this type of communication? The responses in the literature review were generally positive.

\(^{24}\) Eysenbach, Walker, Baloch, & Post, 2013
Feasibility of mobile interventions for high-risk groups: Is there a digital divide?

Are mobile interventions a practical solution to communicating with high-risk populations? Is there a “digital divide”, i.e., lower than average mobile phone ownership or access for MARPs, negatively impacting the efficacy of such programs?

A number of studies in a review of the literature reported that even the most disadvantaged and disenfranchised groups had similar access to mobile phones as the general population. A recent study, for example, found no significant difference between mobile phone ownership of homeless and housed adults\(^\text{25}\). Another group surveyed who might be viewed as particularly difficult to keep in contact with was Hispanic migrant farm workers; but Price et al found that they had 81% mobile phone ownership, similar to the national average\(^\text{26}\). The same statistical similarity in mobile phone ownership held true for those with substance use disorders; recently incarcerated women with a history of substance abuse, homelessness, and poverty; and low-income Latinos\(^\text{27}\).

So even where we might reasonably expect economic and social factors to create a significant difference in mobile phone ownership, they did not seem to create a barrier. However, authors in the articles surveyed did find a difference in usage in several cases.

In the feasibility studies on mHealth interventions for clients with substance use disorders and recently incarcerated women with a history of substance abuse, authors found that participants had a high level of access to mobile phones, but did find that SMS-only programs would be more effective than those including Internet and email access. In McClure’s study on an SUD target audience, 60% had simple pay-as-you-go phones, and Internet and email use was low\(^\text{28}\). In Scott’s study on recently incarcerated women, only 30% of participants had smartphones with Internet capabilities, again indicating that text message-only programs might be more effective for certain disadvantaged populations\(^\text{29}\). Given the increasing role of the Internet in commercial sex work, it seems likely that CSW might have higher access to smartphones than some other groups, and could thus be successfully addressed through mobile Internet and/or smartphone application interventions in addition to SMS, but we are not aware of any studies devoted to smartphone use and ownership for this population.

\(^{25}\) Eysenbach, Walker, Baloch, & Post, 2013  
\(^{26}\) Price, et al, 2013  
\(^{28}\) McClure, Acquavita, Harding, & Stitzer, 2013  
\(^{29}\) Scott, Johnson, & Dennis, 2013
Acceptability: Will MARPs accept and use mobile interventions?
Another question relevant to developers of mobile interventions for MARP women is whether high-risk, disadvantaged populations would trust and be interested in this type of communication.

Again, the responses in literature review studies were generally positive. A majority of participants from groups such as substance abusers, recently incarcerated women, clients with a history of alcohol abuse and depression, MSMs at risk for HIV, Hispanic farm workers, and low-income Latinos with diabetes all either expressed a willingness to use mobile interventions or their approval of ongoing interventions they were a part of.

Tailoring technology to the population
Given the results on mobile phone ownership and attitudes towards mHealth programs, we can say that mobile phone interventions in general are feasible for MARPs as well as general audiences. However, within that broad framework, there are additional considerations regarding the tailoring of technology used to the population being targeted.

For example, in the populations mentioned above with low smartphone ownership, it would be effective to create text message-only programs, (or programs whose mobile component consisted only of text messaging), rather than including Internet, video, or email components intended for access through mobile devices. This would also be a consideration in developing countries or resource-poor areas, where Internet and smartphone access may be limited, as Blyn et al note.

Two studies also raise the issue of design when working with cognitively impaired clients suffering from a serious mental illness (SMI). A 2011 pilot study tested a smartphone application aimed at reducing and managing symptoms for schizophrenic clients. While a majority of participants expressed their approval of the application, and self-reported improvement in target areas, some had difficulty navigating the system. Taking such issues into account, a later trial study of the FOCUS application reported that the application was designed according to design principles for electronic resources for people with SMI and cognitive impairment.

Summary of relevant points:

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31 Blynn, 2009
32 Granholm, Ben-Zeev, Link, Bradshaw, & Holden, 2012
33 Ben-Zeev et al, 2014
● There is no significant difference in mobile phone ownership between at-risk groups and the general population.

● There are some differences in mobile phone usage between the general and at-risk populations that must be taken into account during program design.

● At-risk groups from a review of the literature had positive attitudes regarding current and potential mHealth programs.

● Program designers must also take into account specific abilities and characteristics of users (such as cognitive impairment).
The Health and Development Foundation developed an innovative mHealth program to create positive changes in the health behavior and knowledge of an at-risk population: female clients with a history of injecting drug use or HIV.

“A Comprehensive mHealth Approach to Reaching At-Risk Women” is aimed at keeping the at-risk groups of women and new mothers who are HIV+ and/or have injecting drug use in their medical history informed and connected to a multi-sectoral medical and social support network and system of care.

In 2010, the Health and Development Foundation launched a pilot version of this mHealth initiative in St. Petersburg. Clients who came to St. Petersburg Maternity Hospital No. 16, a hospital for high-risk patients, during pregnancy or for delivery were invited to join the program based on the following criteria: injecting drug use in their medical history, experience as a commercial sex worker, or HIV+ status. Female clients were selected for the same criteria at St. Petersburg State Narcological Hospital.

Selected clients received individual counseling, and upon release from the hospital, these women received text messages, developed by relevant health care specialists, with content related to counseling topics: encouraging adherence to substance abuse treatment, the prevention and treatment of HIV and other infectious diseases, reproductive health, information on childcare, and more.

This mHealth pilot program was part of a comprehensive initiative in St. Petersburg intended to create a support system to ensure the most effective care for HIV and substance abuse risk groups through interagency and intersectoral collaboration, training of health care providers, utilization of NGO peer counselors, and HIV/substance abuse counseling for clients.

Both the initiative as a whole and the mHealth component showed positive results, with a high percentage of clients willing to participate, and M&E data show positive outcomes in terms of behavior change (more HIV tests and treatment received, a higher willingness to continue substance abuse treatment) and attitude of clients towards the text message service (the amount of clients who actively used text message information or saved them as reference material).
Mobile interventions as a way to fill in gaps in traditional health care

Does your intervention maximize existing resources and address existing gaps?
mHealth interventions can be an ideal tool to fill in gaps in traditional health care delivery. One reason these gaps exist is an issue of funding for specific types of health care\textsuperscript{34, 35}. For example, in their study on patients with alcohol use disorders and comorbid depression, Agyapong et al note that, historically, addiction treatment systems have treated a chronic condition as if it were an acute condition, which thereby limited public funding for more effective ongoing treatment and monitoring:

Accordingly, policymakers allocate limited public health funds for addiction treatment; insurers restrict the number of patient days and visits covered; treatment centers make no infrastructure allowance for on-going monitoring; and families and the public become impatient when patients relapse\textsuperscript{36}.

In a situation where funding is limited, SMS interventions can provide a cost-effective way to supplement episodes of specialized in-person treatment.

In countries with national health insurance programs, mobile initiatives can still be an effective tool. For example, while there is a national health insurance program in Russia, services for a disadvantaged population are often fragmented and disconnected\textsuperscript{37}. In that situation, mHealth initiatives can assist in patient monitoring, routing, and referral, filling in gaps in connectivity.

Mobile interventions may also reach those audiences not accessed at all by traditional health care. Cohn et al reported findings that 85% of problem drinkers “never come into contact with professional help”, and call mobile technology a

\textsuperscript{34} Scott et al, 2013
\textsuperscript{35} Existing systems cannot afford to offer continuous formal and informal recovery support systems for women as they re-enter the community (Scott et al, 2013)
\textsuperscript{36} Agyapong et al, 2012
potential “new frontier” for reaching the untreated\textsuperscript{38}.

As mentioned above, economics plays a role from the point of view of public funding, but it can also play a more direct role in the lives of people attempting to access services. In a study targeting low-income smokers, Vidrine et al noted that while economically disadvantaged individuals had lower quitting success rates and were more aggressively marketed to by tobacco companies, there were “few interventions targeting individuals who lacked access to transportation, had limited or no medical insurance, and typically do not utilize traditional health care facilities”\textsuperscript{39}.

Economics and lifestyle also play a role in clients’ losing contact with health care facilities and ongoing care: authors of studies on homeless adults and migrant workers found that these populations had high rates of chronic illness, but often accessed emergency care as a result of losing connectivity through lack of a fixed address\textsuperscript{40 41}. Rates of mobile phone ownership and use in these populations suggested mobile communication as an effective means of maintaining connectivity (see the section above on feasibility).

\textsuperscript{38} Cohn et al, 2011
\textsuperscript{39} Vidrine et al, 2006
\textsuperscript{40} Eysenbach et al, 2013
\textsuperscript{41} Price et al, 2013
The healthcare system for female MARPs (US and Russia)

US

The American healthcare system is fractured, with public health, primary care, hospitalization and behavioral health, including substance abuse treatment and mental health, all operating separately with different funding streams and unconnected care delivery. This presents barriers to care for people with a set of needs that include multiple health and social issues, but it also offers multiple entry points for the patient herself and for the presentation of mHealth solutions.

A discussion of the healthcare system in the United States must begin with funding, because in many ways funding drives the structure of the delivery system. Primary care and hospital care are both primarily funded with insurance. The health insurance system in the U.S. was initially devised as an employer-sponsored benefit for working people and their families. Currently about 48% of people receive their primary and hospital care via employer-sponsored insurance42.

Publicly funded insurance for people over age 65 became available in 1965. All people over 65 in the U.S. have access to Medicare, the publicly funded insurance program for the elderly.

Publically funded insurance for the poor also became available in 1965 and was initially designed to pay for care for pregnant women and children. Medicaid was designed to have costs shared by the states and the federal government with the cost split between state and government. The types of preventative care available vary by state and specialty services such as substance abuse treatment are not offered in every state. In 2014, there was a significant change in funding for health care services when the Patient Protection and Affordable Care Act became fully implemented, which aims to increase the population covered under state insurance and lower costs for others.

Funding for substance abuse treatment, for example, has historically been via grants developed by both the federal and state governments. The grants generally have gone to programs that use the money to fund operations. Only about 64% of substance abuse treatment providers accept insurance payments, and 56% accept Medicaid43. Funding for HIV treatment originally followed a similar model to

42 http://kff.org/other/state-indicator/total-population/
substance abuse treatment, but as medication became the primary treatment, it was incorporated into the mainstream medical system with treatment paid for by insurance.

Preventative services and other aspects of public health such as needle exchange and health outreach are funded under a grant funding system much like substance abuse services. However, these grants are made from a different federal agency than the substance abuse grants, and different state and local departments are not usually coordinated with either substance abuse services or the rest of health care.

The separate funding arrangements explain the lack of coordination within the delivery system for the population of interest. Healthcare services may be available via Medicaid funding but not always. Public health clinics that are funded by private donations and public grant dollars may be available or not. Substance abuse treatment services may be available for free, low cost, a substantial fee or not at all. Outreach may be available or not. Health care services in general are more available in larger cities than they are in rural areas. Race and ethnicity matters in terms of coverage, with 30% of Hispanics not covered, 20% of black people and about 10% of white people not covered by either public or private insurance.

The healthcare delivery system mirrors the funding structure. Hospitals are mandated by law (EMTALA, 198645) to provide necessary care. Hospital emergency rooms are the place where the population of interest gets much of its medical care. Emergency departments stabilize people and treat acute symptoms of disease but do not provide ongoing care for chronic conditions such as addiction, and HIV. However, they must treat the acute symptoms of chronic disease, and people without insurance often use emergency rooms in the same way that people with insurance use a primary care doctor or clinic. In terms of the formal care delivery system, hospitals may be the organizations with the most contact with a broad population of women at risk.

Across the country, there are 1,128 federally qualified health centers (FQHC) that are designed to provide health care services in areas where there is a critical unmet need as of 201146. They tend to operate in rural and low-income urban areas. These may also be a good mechanism to reach the population of interest.

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46 http://kff.org/other/state-indicator/total-fqhcs/
There are also privately funded family planning clinics in many urban communities where women may get their reproductive health and other primary care needs met. These clinics generally operate on a sliding scale fee-for-service basis with the payment based on income and many women receiving free care. These clinics accept insurance reimbursement and obtain grants and donations to support their free care. They generally do no attempt to address behavioral health issues except via referral.

Physician practices and other private health clinics may serve more of the population of interest as more women access insurance via Medicaid expansion. Outreach services and needle exchange programs operate under a public health and prevention infrastructure in most states, though in some states they are linked to addiction treatment programs. Some outreach programs are broad and aimed at reaching people who are homeless with a variety of possible services including preventative health services, housing, behavioral health, food assistance and other income assistance. Needle exchange programs may also be willing/able to provide access to information about mHealth opportunities.

The substance abuse treatment specialty system provides a variety of services with counseling being the single universal service available in multiple settings including hospital-based and free-standing detoxification, residential, intensive outpatient, day treatment, and outpatient settings. Because the nature of treatment in the US is based upon developing a trusting supportive relationship, it may be an ideal system through which to introduce mHealth services to the target population, particularly those that are more complex than instant messaging.

**Russia**

In Russia, a system of government structures implements preventive and medical/social services for the prevention, treatment, and rehabilitation of mental illness, HIV, and substance abuse.

The system of care for patients with HIV, SUD, and mental illness consists of independent structures covering the entire territory of the Russian Federation, with administrative divisions by republic, city, regional, and inter-regional areas. Their work is overseen and monitored by federal ministries and agencies: the Ministry of Health, the Consumer Protection and Welfare Agency, the Federal Service for the Oversight of Public Health and Social Development, and the Federal Drug Control Service.
Psychiatric and substance abuse rehabilitation services operate through clinics, hospital departments, and outpatient centers that provide preventive care and treatment.

The system of HIV prevention and treatment is based on a government system of medical institutions established in all cities of Russian Federation. The most common facility in the field of HIV prevention and treatment are so-called AIDS Centers – governmental establishments with a wide range of medical specialists and caregivers. All types of medical care (including psycho-social support and outpatient monitoring) of HIV patients in municipal and federal institutions is free and voluntary.

The modern system of medical and social care for patients with mental illness, HIV, and substance abuse issues provides an appropriate level of treatment. However, there is much room for improvement in terms of prevention and patient monitoring, routing, and referral. This is particularly true for female MARPs.

Specialized treatment addressing at-risk groups of women is carried out by individual non-commercial organizations, public organizations, and voluntary societies. There is no systematic state effort in this sphere.

Research and program implementation experience with these groups shows the necessity of developing preventive programs and patient monitoring, routing, and referral programs that take into account specific aspects of treatment for female MARPs and consider such issues as: family planning; the development of parenting skills and responsible motherhood; domestic violence prevention; psychological support and personal development; the prevention of risky behavior, etc.

Studies conducted in St. Petersburg (Russia)\(^{47}\), showed that women using intravenous drugs are heavily affected by issues related to pregnancy, abortion, and childbirth, exposed to greater HIV risks, and associated with sex work.

Only 7.6% of the study population reported that they have never been pregnant during their life. 71% of female drug users already have children. 63% had had at least one abortion during their lifetime. 22.4% had discovered their last pregnancy at a late stage of pregnancy when abortions are prohibited by law (over 12 weeks); among them, 84.5% reported having children and an additional 3.9% - do not have children but were pregnant at the moment of interview. Among those who were

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\(^{47}\) Humanitarian Action, Pregnancies, abortions, childbirths and HIV prevalence among female injecting drug users in Saint Petersburg, Russia, www.haf-spb.org
pregnant at the moment of interview, 90.5% already had children. 62.4% of the study population was tested positive for HIV. Sex workers tend to use condoms more often to protect themselves than drug users who exchange sex for drugs, which leads to an increased level of HIV transmission.
mHealth and Behavior Change Communication

Behavior change as process

Mobile phones and devices have proven to be a viable tool of behavior change. The use of mobile phones brings new dimensions to health communication campaigns and plays a crucial role in interventions aimed at at-risk or hard-to-reach populations. While they are the focus of the overall intervention design, mobile technologies should not replace or eliminate the fundamental role of science and theories behind communication programs based on mobile technologies.

Instead, in order to achieve program goals and create behavior change, mHealth interventions need to be planned and developed based on theories of communication impact on behavior change. Such theories provide explanations, indicators, and examples of what influences behavior, in what way, and under what conditions, and offer foundations for planning, executing, and evaluating communication projects. For example, JHU/CCP recommends the following theories particularly relevant to health communication.

Behavior Change Communication theories

Stage/Step Theories

Diffusion of innovations theory, by B. Ryan and N. Gross, 1943, traces the process by which a new idea or practice is communicated through certain channels over time among members of a social system. The model describes the factors that influence people’s thoughts and actions and the process of adopting a new technology or idea (Rogers, 1962 & 1983; Ryan & Gross, 1943 & 1950; Valente, 1995).

Health communication: lessons from family planning and reproductive health. Phyllis Tilson Piotrov, et al. 1997, Johns Hopkins School of Public Health, Center for Communication Programs

Ibid
The input/output persuasion model, by W. J. McGuire, 1969, emphasizes the hierarchy of communication effects and considers how various aspects of communication, such as message design, source, and channel, as well as audience characteristics, influence the behavioral outcome of communication (McGuire, 1969 & 1989).

Stages of change theory, by psychologists J. O. Prochaska, C. C. DiClemente, and J. C. Norcross, 1992, identifies psychological processes that people undergo and stages they reach as they adopt new behavior. Changes in behavior result when the psyche moves through several iterations of a spiral process: from precontemplation through contemplation, preparation, and action, to maintenance of the new behavior (Prochaska et al., 1992).

Cognitive Theories

Theory of reasoned action, by M. Fishbein and I. Ajzen, specifies that adoption of a behavior is a function of intent, which is determined by a person’s attitude (beliefs and expected values) toward performing the behavior and by perceived social norms (importance and perception that others expect the behavior) (Fishbein & Ajzen, 1975).

Social cognitive (learning) theory, by A. Bandura, specifies that audience members identify with attractive characters in the mass media who demonstrate behavior, engage emotions, and facilitate mental rehearsal and modeling of new behavior. The behavior of models in the mass media also offers vicarious reinforcement to motivate audience members’ adoption of the behavior (Bandura, 1977 & 1986).

Social Process Theories

Social influence, social comparison, and convergence theories specify that one’s perception and behavior are influenced by the perceptions and behavior of members of groups to which one belongs and by members of one’s personal networks. People rely on the opinions of others, especially when a situation is highly uncertain or ambiguous and no objective evidence is readily available. Social influence can have vicarious effects on audiences by depicting in television and radio programs the process of change and eventual conversion of behavior (Festinger, 1954; Kincaid, 1987 & 1988; Latane, 1981; Moscovici, 1976; Rogers & Kincaid, 1981; Suls, 1977).

Emotional Response Theories
Theories of emotional response propose that emotional response precedes and conditions cognitive and altitudinal effects. This implies that highly emotional messages in entertainment (see Chapter 4) would be more likely to influence behavior than messages low in emotional content (Clark, 1992; Zajonc, 1984; Zajonc, Murphy, & Inglehart, 1989).

Mass Media Theories

Cultivation theory of mass media, proposed by George Gerbner specifies that repeated, intense exposure to deviant definitions of “reality” in the mass media leads to perception of that “reality” as normal. The result is a social legitimization of the “reality” depicted in the mass media, which can influence behavior (Gerbner, 1973 & 1977; Gerbner et al., 1980).

Five Steps to Behavior Change Framework

As a part of strategic communication programs, mHealth interventions are also based on the theoretical framework known as the Steps to Behavior Change (SBC). This theoretical framework emphasizes that behavior change is a process and delineates five major steps - knowledge, approval, intention, practice, and advocacy; the target audience progresses from one stage to the next. This framework is an adaptation of a CCP/JHU review of the theory on the diffusion of innovations and the input/output persuasion model, enriched by social marketing experience and flexible enough to use other theories within each of the steps, or stages, as appropriate

Knowledge
1. Recalls key health messages and services info.
2. Understands purpose and benefits of the service.
3. Can name key messages and information.

Approval
4. Responds favorably to key messages.
5. Saves messages.
6. Discusses and share key messages with personal networks (family, friends).
7. Client, family, friends, and community approve key messages.

Intention
8. Recognizes that key messages can meet a personal need.
9. Intends to visit services and consult a provider.

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50 Health communication: lessons from family planning and reproductive health. Phyllis Tilson Piotrov, et al. 1997, Johns Hopkins School of Public Health, Center for Communication Programs
10. Intends to practice promoting lifestyle at some time and extent.

**Practice**
11. Goes to a provider of information/supplies/services.
13. Continues to rehabilitation and/or treatment.

**Advocacy**
14. Experiences and acknowledges personal benefits of HLS.
15. Supports program/service in the community.
16. Recommends service/mob application to peers.
P-Process and mHealth

As a framework for the strategic planning of communication programs we follow “The Process and Principles for Health Communication Projects”, known as the P-Process (see, the Figure). As a part of communication campaigns, mHealth interventions can be strategically planned using this framework.

The P-Process51

(in which P stands for Project or Program) is valuable because it is (1) systematic and rational, (2) continually responsive to research findings and data, (3) practical for field applications at all levels and (4) strategic in setting and pursuing long-term objectives. The P-Process consists of six steps that are followed in sequence to develop and implement effective national communication strategies, programs, or, indeed any organized communication activity:

1. Analysis,
2. Strategic design,
3. Development, pretesting and revision, and production
4. Management, implementation, monitoring
5. Impact evaluation
6. Planning for continuity

The P-process was developed in 1983 by the first Population Communication Services project team and developed by JHU/CCP.

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51 Health communication: lessons from family planning and reproductive health. Phyllis Tilson Piotrov, et al. 1997, Johns Hopkins School of Public Health, Center for Communication Programs
Brief description of key activities on each step

1. Analysis

**Situation Analysis.**
Severity and causes of health, social and environmental problems. An in-depth understanding of the problem, the people, existing policies and programs, active organizations, and communication channels is essential to changing health knowledge, attitudes and behavior. Identify social, cultural and economic factors inhibiting/facilitating desired social changes. Statement of the communication problem. Review of existing health and demographic data, survey results, study findings, programs and policies, and any other available data to be sure you understand what the basic health, social, or economic problem is for the people involved.

**Selected mHealth aspects of the Situation Analysis**
- Learning of previous and current mHealth initiatives in the field
- Identification of a potential role of mobiles in the program
- Mobile network capacity, mobile operators and aggregating companies on the market
- Policy and regulatory environment
- Mobile solution trends
- Standards and Systems
- Mobile phones/devices and SIM penetration
- Costs and traffic plan affordable for potential clients, including costs for text messages and Internet on the arie of the intervention;
- Traffic plans available and the costs of the mobile services
- Solutions for text-messages available
- Feasibility of the mobile phones/devices use
- Identify types of channel that are most effective and appropriate (SMS, voice messages, Internet based applications, social media, webinars, IVR, etc).

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Audience and Communication Analysis

Communication capacity
Participation Analysis:
Identification of partners, leading organizations and allies for policy change and strengthening service delivery.
Audience segmentation: primary /secondary/tertiary

Social and Behavioral Analysis:
Individual level: knowledge, attitudes, skills, and behaviors.
Community level: social networks, sociocultural norms, collective efficacy, and community dynamics, including leadership patterns.
Services level: availability of communication materials, capacity for interpersonal communication and counseling.
Environmental level: public opinion, existence of action groups, media engagement

2. Strategic Design
Setting of SMART communication objectives, development of main communication approaches and positioning, behavior change model, media and activities, strategy design statement, implementation plan, determination of budget and key strategies: channel and media selection, development of an implementation plan for key activities, include roles and responsibilities of partners and allies, development of monitoring and evaluation plan.

Selected mHealth aspects of Audience and Communication Analysis
What type of telephones your TA uses: Basic phones, or Feature phones, or Smartphones, or Tablets.
Literacy level – ability to read messages/use mobile phones and application
Ownership – who has an access to/or controls mobile devices in family

Selected mHealth aspects of Strategic Design
Negotiations with mobile providers and aggregating companies
Development of the conceptualization of the mHealth intervention
Development of the strategic design of the mobile application or a text-message program
3. Development and Testing
Develop message concepts, key words, theme lines, visual images, etc.
Health professionals – collaborative work with health professionals to ensure that technical information is accurate and to win their ongoing support.
Producing of educational, visual, multimedia materials and products for the program.
Pretest concepts, processes, messages, stories, materials
Revise for audiences and gatekeepers.
Revise and pilot test final versions and adjust, as needed.

4. Implementation and Monitoring
Results orientation and capacity-building; dissemination plan, produce and disseminate final materials; conduct training of trainers and of fieldworkers/change agents; mobilize key partners, allies, and communities to implement plan; monitor outputs and activities, manage and monitor program participation and outputs.
Respond to feedback, adjust program materials, activities, procedures, as needed.

Selected mHealth aspects of Development and Testing
Content development and testing
Testing of the platform operation, mobile application, other technical components;
Development of participant Enrollment Plans
Soft-launch - the service operation testing for limited number of clients;
Development of supporting channels – web-site, webinars, social media
Development of the strategy to encourage users to try the service
Develop of a strategy to mitigate possible resistance from potential clients to try mobile health service

Selected mHealth aspects of Implementation and Monitoring
The service operation and supporting components deployment
Conducting of the early adopters surveys
SMS and on-line express surveys of early adopters KAB
Implementation of activities to encourage users to adopt and use the service
Conducting of activities to ramp up the number of adopters and users of the service
5. Evaluation and Re-planning

Early planning; assess outcomes and impact on knowledge, attitudes, skills, behavior; behavior change model; different evaluation methodologies; cost-effectiveness; evaluation dissemination, disseminate results to partners, counterparts, stakeholders; determine future needs for follow-up and/or extension; revise/redesign program processes, materials and activities; evaluation findings; changing conditions; scaling up; resources and sustainability; service integration; coalitions and advocacy

Selected mHealth aspects of Evaluation and Re-planning

Total number of the program clients, registered accounts, SMS sent/Mob App downloads, dynamics and trends, Impact on knowledge, attitudes, behavior/skills, clients’ remained in treatment
Survey of clients unsubscribed or refused to participate in the program.
Clients’ involvement and participatory in the program components: webinars, social media, off-line activities, etc.
Considering new technologies and solutions available for a next phase of the program evaluation

A theory behind mobile (particularly SMS) interventions

The increasing use of mobile devices in treatment for physical, social, and mental problems has led to the rise of new theories of behavior evaluation and change. Collecting data in real time to assess the condition of study/program participants started with the use of pagers to prompt participants to record their subjective experiences, and has now evolved to the use of mobile devices. This process is known as Ecological Momentary Assessment (EMA). Researchers point out several benefits of the real-time capture of data. These include fewer issues with memory problems, as when summarizing experiences at a later date; and the lack of pressure or influence of the clinical setting.

Heron and Smyth conclude in their review of Ecological Momentary Interventions (EMI) that “psychosocial and health behavior treatments and therapies can be extended beyond traditional research or clinical settings by using mobile technology to deliver interventions to individuals as they go about their daily lives”53. These interventions occur in a natural, not clinical setting, and during the course of participants’ ordinary life.

In this review, Heron and Smyth point out that health professionals find it useful for patients to work on new skills and behaviors in between treatment, and that mobile

53 Heron & Smyth, 2010
devices make it possible for them to do so on their own time. These interventions can range from recommendations (such as providing relaxation techniques to a cardiac patient), to more formal, specialized recommendations (such as a participant in a smoking cessation program receiving a text message on his mobile phone on how to deal with cravings at a time of day when he usually smokes). Research shows that these interventions can supplement existing programs, or be effective as an independent tool.

These interventions can be particularly successful, as treatment is provided in real time, in a real-world context, and mobile devices are the perfect vehicle for EMI.
Main stages and activities in the implementation of mHealth initiatives

The general framework of mHealth initiatives for MARPs encompasses several stages and activities that outline key milestones of the envisioned work plan. Each component at each stage of the list below requires detailed management and a financial plan.

1. Preparation stage:
   - Develop the strategy and implementation plan.
   - Identify the gaps in KAB to address with the mHealth initiative.
   - Develop, set, and adjust all the technical components for the mHealth initiative.

2. Mapping and trainings:
   - Identify points of entry (clinics, rehab centers, health facilities, etc).
   - Identify outreach workers and counselor staff (HCP, peers, volunteers, etc).
   - Training for staff on communication and counseling regarding the mHealth service.

3. Enrollment:
   - Hold motivational sessions and interviews with clients on sites.
   - Provide clear explanations and comprehensive information on the operation of the service, with an emphasis on issues of confidentiality, the voluntary nature of the service, and benefits for client.

4. Subscribing:
   - Platform processing.
   - Sending messages to clients.
   - Monitoring of the quality of text message/other mHealth technology delivery process.
   - Creating simple unsubscribe and canceling options

5. Follow-up and support:
   - Provide clients contacts for feedback (website, telephone number for emergency, email, Skype ID, social media, etc).
   - Telephone monitoring of clients.
   - Webinars and social media.
6. Monitoring and Evaluation:
- Identify independent research agencies (University, MoH experts, etc).
- Develop robust MNE tools and methodology.
- Develop a dissemination plan (events, materials, data).

7. Advocacy
- Identify the most prominent and reputable experts in the field (reps of MoH, chief specialists, opinion leaders, leading professional societies, etc.)
- Professional Internet resources and media support and coverage.
- Communities and target audience associations.
Multi-tiered approach

In 2010, the Health and Development Foundation (Russia) developed and implemented a multi-tiered approach for reaching target audiences combining both “traditional” and mobile-based strategies and tools. This approach might mean, for example, a program that includes offline seminars/trainings/counseling, a text-messaging service, a phone component or mobile application, and Internet resources such as a program website, webinars for clients, and/or social media pages.

Assessments conducted for the purposes of evaluating the initial program this approach was applied to (the HDF program for female MARPs54), as well as later evaluations, proved that a combined approach based on several communication channels is much more effective than those that are based on a single channel. The most prominent difference was shown in the audiences of at-risk populations, particularly injecting drug users.

Fig.1 Integrative model of service components

All the components of the multi-tiered approach play the role of entry points for clients, reinforcing each other to help clients stay committed to the program. Participants are offered all the options of the service components to participate in – text messages, mobile app, webinars, social media, etc. However, it should always be up to the client to choose which they will participate in. The more options they are offered, the higher the probability that they will stay in the program. A client may subscribe to

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only one element initially, for example, text messaging, but later be routed to other components, increasing her level of participation and adherence.

The diagrams above show the interaction of key components in this approach. The number of components may vary depending upon program goals, purpose, and limitations.
Partners and the team for an mHealth intervention

The coalition of partners for the development of a comprehensive mHealth intervention for at-risk female populations may include the following counterparts and representatives. This list, can, of course, be expanded or contracted depending on the particular requirements related to the mHealth intervention design, scale, goals, etc. The role of each partner group is crucial in terms of the development, operation, promotion, sustainability, and cost effectiveness of the mHealth initiative. The extent of partner involvement may also vary depending on the particular mHealth initiative, however, any input or contribution could be beneficial: consultation, technical support, or co-funding. It is important to disseminate information about your initiative and engage partners during the preparation stage, and keep the lines of communication open during implementation.

**GOV agencies (MoH, related agencies)**

**Role:**
- Overall support
- Advocacy
- Steering and recommendations
- Approval and sustainability
- Health information systems, patient data, health monitoring systems

**Health Facilities, clinics, rehab and crisis centers**

**Role:**
- Professional expertise
- Enrollment
- Trainings, counseling, offline sessions for clients
- Support and follow-up of clients
- Informational support
### IT team

**Role:**
- Development of the platform, website, mobile app, other components of the program
- Platform connection to aggregating company or adjustment of the platform for program operation
- Platform processing
- Monitoring and support of the platform, mobile app, website operation

### Aggregating company

**Role:**
- Connecting the platform with mobile operators
- Processing text messages from clients' mobile phones to a short code
- Routing SMS from the platform to clients' mobile phones
- Security and data protection
- Quality control

### Mobile operators

**Role:**
- Technical support and consultation
- Expertise in best solutions for program technical purposes
- Quality control of message delivery to clients' mobile phones
- Discounts for text message costs

### Platform operator

**Role:**
- Overall platform processing
- Quality control of sending SMS and platform interaction with aggregating company
- Data and statistics monitoring and analysis
- Process quality improvement
### Local NGOs

**Role:**
- Enrollment, outreach work with potential clients
- Interaction with MoH, Health centers and clinics
- Training for healthcare providers
- Trainings and counseling sessions with clients on sites (clinics, centers)
- Telephone monitoring and counseling of clients
- Case management

### Special experts

- Strategic designers
- Mobile app designers
- MNE
- Experts in collecting and analyzing data
- Legal experts
- Specialists on legislative issues of soft use, subscription, and sending SMS to clients
- Media director
- Dissemination specialist: promotion of the service and dissemination of the results

### Potential partners to consider:

- Donor agencies and organizations
- Pharmaceutical companies
- Professional associations of HCP
- Patients’ associations and organizations
- Media: digital, TV, radio, press
- Religious organizations
- International organizations
Organizational structure of the mHealth program team

The organizational structure of your program team is subject to the specific parameters of your initiative. The overall organizational structure and the number of team members may vary according to such factors as: program goals and needs, length and complexity of the intervention, budget limitations, the level of team member qualification, number of coalition partners, etc.

However, some of the components of an mHealth initiative aimed at female MARPs, and the relevant experts, are always necessary. These include:

1. A technical solutions team whose primary focus is the development and operation of the service. This includes development of the mobile application and/or text-messaging platform; communication and negotiations with mobile operators (regarding technical expertise and support, special tariffs and text message price, etc); and communication with the aggregating company (quality control, cost reduction, statistics, etc), customer support, etc.

2. A client support and outreach team whose focus is identifying entry points for your prospective clients; communication and negotiations with clinics, health agencies and crisis centers; development of onsite face-to-face sessions with clients; enrollment and subscription support; and the development and maintenance of social media, websites, and live webinars for your clients.

3. A team responsible for content development and strategic design for the text-messaging service and/or mobile application for female MARPs. This includes communication with HCP and peer counselors for drafting the content, as well as pre-testing and updating it, and the development of informational materials for the target audience.

4. An advocacy team whose focus is on communication with GOV officials, professional societies and health organizers and getting their buy-in and support for the program; identifying prospective coalition partner and communication with acting partners; building and maintaining relationships
with the media; and preparing articles and reports for specialists, the media, and the general public.

5. A monitoring and evaluation team to develop an M&E plan, conduct assessment activities, behavior change surveys, and program impact evaluations, as well as to prepare reports and articles for the professional community and the media.

6. An administrative team to conduct financial procedures, salaries, tax, procurement, legal expertise and support, report preparation, etc.
Apps for addressing health issues of MARPS

A mobile application is a computer program designed to run on a user’s mobile device (mobile phone or tablet). There are a wide variety of applications available today that address any number of everyday needs such as food, transportation, and health, some free for users, and some available for download at a price.

Examples of mHealth programs aimed at a “general” audience include programs targeting smoking cessation, physical fitness, and the management of chronic illness. The 2012 Pew Report on mobile health found that the most popular downloaded mobile applications addressed exercise, diet, and weight issues55.

Of those Americans surveyed, 38% used health apps to track their exercise, 31% monitored their diet, and 12% used an app to manage their weight. The report cited other applications dealing with chronic conditions like diabetes and high blood pressure.

In general, the rationale for mobile health applications is that users have access to information and support at any time, on their schedule and according to their immediate needs. For example, a healthy diet mobile application might allow users to calculate the caloric content of several different meal options, to support healthy eating in real time.

An example of a mobile application aimed at a MARP target audience is the A-CHESS program mentioned above. A-CHESS was developed to address the gap in services for patients leaving addiction treatment, or moving to outpatient treatment. Unlike other chronic conditions, there is a scarcity of aftercare services for clients with a history of drug and alcohol addiction.

A-CHESS has multiple features providing information and support, including a GPS locator warning users of high-risk locations (a favorite bar, for example), all intended to keep users abstinent and connected to the cycle of health care.

Pros and Cons of Using Smartphone Apps for At-Risk Populations

55 Pew Research Center, 2012
The advantages of using mobile applications for MARP populations, including marginalized and at-risk women, are the same as those for the general population: continual access to information and support on a user's own schedule, and the improved capability for real-time analysis and intervention.

However, as discussed above in the section on the feasibility of using mobile interventions for high-risk groups, due to issues of access and design, a mobile application may not be the optimal choice for a particular population. An economically disadvantaged target audience may be more likely to have older-model phones that do not support applications or Internet access, making an SMS message service the more appropriate choice. In terms of design, if the target population may have cognitive functioning issues (as in the case of serious mental illness), complex applications or any smartphone applications may decrease the effectiveness of the intervention.

Of course, given the dynamic growth of technology, and the increasing affordability and accessibility of that technology, leading to its adoption by a wide audience, the field may look very different in five years, let alone 10 years from now. Projects and audiences that may currently seem best addressed through SMS and offline components only may benefit from the use of mobile applications a few years into the future.

For more information on choosing between applications and text-messaging services, as well as mobile applications currently addressing at-risk populations, please see the attached literature review.
Text messages (SMS), USSD and Push Notifications

Many mHealth programs use text messages to reach their users, but there are several different types of messages to consider. We recommend SMS for most programs, given the absence of technical specifications and requirements.

1. **Short Message Service (SMS) messages** – short messages or SMS are the most common type of text messages. They are supported by almost any mobile phone and are usually sent between two or more mobile phones. By using an SMS gateway or working with an aggregator, SMS can be sent from a short code to a user's phone.

2. **Push Notifications** are messages sent via applications that are installed on a smartphone and are often used to send messages about updates, special offers, etc. These notifications appear on the screen even when the app is not being actively used.

3. **USSD** messages were created specifically for standard GSM devices and are transferred directly over network signaling channels. USSD is free for the user and allows for interactive, real-time message exchanges between the user and the system. However, messages cannot be saved or forwarded, and starting a USSD interaction requires remembering special codes (eg. *105*10#). They are also not always reliable due to session-based timeouts.

**Push Notification vs. Text Message**

SMS is sometimes referred to as an outdated format. This is mainly because all the features of SMS programs can usually be transferred to various applications where they can be enhanced with media content, and the text reminders themselves can be replaced with push messages. However, there are certain differences between SMS and push messages to consider when designing your program.

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Universal format

SMS do not require any software installation on the mobile device and are supported by all operating systems. Push messages require the installation of an application on the phone (different operating systems would require developing different applications) and will not work on older phone models.

1. Easy registration.
Users can join an SMS-based program by filling out an online form or texting in a keyword to a short code. With push messages, users are required to not only install an application supported by their particular phones, but also to allow the app to send push notifications.

2. Interaction with the user
SMS allows users to text back an answer. This could be a text, numeric, or keyword response, but it can be sent immediately. While push messages may encourage users to respond, the actions will be somewhat more complex, and in the application itself (e.g. fill out a form), meaning the user will need to open the application to do so, and it will not be an immediate and interactive response.

In summary: while push messages and applications provide more flexibility with multimedia content (increasing the price of the project accordingly), text messages provide flexibility in terms of access to a wider target audience and easy access to your service.

USSD vs. SMS
Unlike Short Message Service (SMS) messages, USSD messages create a real-time connection during a USSD session. The connection remains open, allowing a two-way exchange of a sequence of data. This makes USSD more responsive than services that use SMS. This interaction can be created with an SMS program, but messages and responses will not be considered one session and will be processed and priced individually.

USSD messages are up to 182 alphanumeric characters in length and are free for the user. However, they can be unreliable due to session timeouts if the user remains idle for a certain period of time.
USSD is often used along with SMS. The user dials a numeric request (e.g. *105#) and a USSD session is created where she receives the response that her request is being processed and that she will receive an answer via SMS. Shortly after, the requested information is provided in a “regular” text message.

**Price comparison**

The investment and cost-effectiveness of SMS, USSD, and push messages is also a factor in program design and development. Both text messages and USSD require the development of an interactive response system, while push messages require a mobile application.

Message prices usually differ based on the number of messages you plan to send/receive in a month. Push notifications are free if included in a mobile plan with Internet, or will be priced according to Internet traffic used.

Our experience shows that SMS messages seem to be the optimal choice for many vulnerable groups. However, your research and program goals may point towards the benefits of either push notifications or USSD.
SMS Program design: Implementation and Use

In this section we provide a brief overview of the key parts of any SMS program. For the end user, the program starts with her subscription to the message service. Creating the maximum possible channels for registration to an SMS program is the best way to increase enrollment and access.

**Fig 1. Registration**

The simplest ways to register for an SMS program are through:
- **Mobile phones** (clients send a keyword to the program number)
- **Program website** (clients fill out a registration form on the site, and are automatically signed up after providing their personal data)

**Registration via mobile phone**

Registration to an SMS service via mobile phone provides for **two-way communication** (see Fig. 2): to register, a client sends a text message from her mobile phone with a code word to a short number, and receives a message back that registration was successful. (For example, to sign up for SMSmame (Text4baby Russia), participants send the word MAMA from their phones to the number 5253.)
Fig. 2 How clients access an SMS service through their mobile phones

The following elements are necessary to support the functioning of the service, as shown in Fig. 2:

**SMS Platform**

An SMS platform is software that enables you to accept, send, process, route, and deliver SMS messages between clients of mobile operators and external service applications.

Depending on its capabilities and goals, a project can:

- develop its own platform for specific tasks;
- use already developed options (SMS transmission services using free or paid platforms)

**Developing your own platform** requires financial investment and time to create and adapt. However, having your own platform gives you the ability to create a varied, and flexible, set of functions, enabling the service to:

- send personalized messages according to a schedule at specifically defined times, taking into account different time zones by region;
- set up different message programs depending on the needs of different groups within the target audience, select by gender, and also use different filters, including geographical;
- plan message delivery for specific dates at planned intervals;
- automatically add to the client database;
- send out a special message if necessary related to a particular event, as well as automatic reminders;
- carry out SMS survey (the multifunctionality of the service lets you carry out client satisfaction surveys);
- review online statistics, reports, and details of processed messages;
- as well as many other functions.

One particularly noteworthy advantage of developing your own platform is the constant opportunity to expand its unique set of functions at any time, depending on changing conditions and goals at different stages of the project.

Nonetheless, as mentioned above, there are off-the-shelf options available on the IT market: either free or paid platforms. As a rule, these platforms all have the same, highly restricted set of functions, depending on the cost.

Most off-the-shelf options do not support a number of key tasks, which can be carried out using your own platform, such as: sending messages at strictly defined times taking into account different time zones by region; setting up different message programs depending on the needs of different groups within the target audience; automatically rerouting a certain group of subscribers from one set of messages to another; doing surveys; using different filters when sending out messages, etc. (see below in this chapter).

The benefit of using an off-the-shelf platform is the predictable monthly cost, while developing your own platform will require a significant initial financial outlay. The resources and goals of the project in question, as well as an evaluation of the advantages, disadvantages, and effectiveness of different platforms, will help you determine whether designing a unique platform or using an off-the-shelf option is the best solution for your program.

**SMS Aggregator**
An SMS aggregator/service provider ensures access to your SMS service in all the areas a program covers (an aggregator primarily provides message traffic throughput to multiple wireless operators or other aggregators, and often rents virtual numbers and short codes to content providers). This means that clients of different mobile operators in different regions of a country can register for the same service.

One issue to consider when selecting an aggregator is a company’s experience implementing similar projects, and whether it cooperates with every mobile operator in the country. Sometimes a better choice will be an international operator that can work in multiple countries, but this can have downsides as well; see the table below. (Also note that for small-scale projects or pilots you may not need an aggregator at all, but can set up an SMS gateway on a mobile phone or a GSM modem connected to a computer with installed gateway software.)
Legal issues. Privacy and Security

Neither the FDA in the U.S. nor Rospotrebnadzor (Russia's Consumer Protection Agency) have introduced legislation that would regulate the introduction or use of new mobile health applications, devices, or communication services. The FDA has released guidelines for the development and use of mobile medical devices, but these apply to those providing specific medical services, rather than the applications and services intended for information and support that this guide focuses on. Program designers should consult the relevant legislation in their country of operation, and be aware that given the dynamic growth of this field, such legislation is liable to change and adapt quickly to meet new conditions.

In terms of privacy and security, health information is generally considered to be one of the most sensitive types of information about an individual. For any mHealth outreach program to be successful, and programs aimed at at-risk clients in particular, target audiences need to have full confidence that the information they share with program implementers will remain secure and confidential. In this section, we discuss some of the resources and tasks useful in ensuring that security.

Protecting mHealth data is more challenging than the protection of non-mobile data for a number of reasons:

- **mHealth** initiatives may be integrated into larger databases of electronic medical and health records, meaning that security concerns must also include entire networks.
- **mHealth** is not limited by national or geographical boundaries.

**Recommendations**

- Develop guidelines for the protection of health information;
- Develop guidelines and examples of test plans for testing PHI. This should include software and hardware systems and devices, as well as a defined schedule for such testing.

More specifically:

- Secure control access to patients’ personal health information (PHI)
- Protect network and PHI
- Secure data storage (for more details, see the Chapter “SMS Programs: Implementation and Use”).
Protection and Encryption of Data

The secure functioning of an SMS service requires the protection of information and data used in the messages. Security can be ensured to a certain degree through the use of cutting-edge modern technology, and security measures enforced in contracts, on the technical level, and on the level of personnel. Legislation in the country of program operation may address this issue. In Russia, for example, Federal Law №152 “On Personal Data” outlines requirements for the storage and transmission of personal data.

One of these requirements is that the participant personal data must be stored by a hosting company located within the Russian Federation. This company must also have a license for work involving the technical protection of confidential information from Russia’s Federal Service for Technical and Export Control.

Ensuring the security of personal data systems includes not only safe storage, but also protected transmission using SSL certification and other technical tools that protect confidentiality. Requirements like these will impact program development and implementation, so consulting with legal experts during the initial stages will inform how your project proceeds.

Confidentiality and security of mobile communication from the client’s point of view

In the literature review, some study participants viewed mobile communication as an acceptably secure method of receiving or exchanging confidential information, and even valued it above other means\(^\text{57}\). Others suggested or approved of the use of coded messages to receive information on HIV and substance abuse\(^\text{58, 59}\). An application aimed at preventing sexual assault on college campuses, for example, allowed users to send a discreet, pre-coded message if they were in an unsafe situation\(^\text{60}\).

However, safety and confidentiality concerns were raised by several authors and participant groups. The Hispanic migrant workers in Price et al’s study had concerns about the exchange of health information revealing their status as undocumented immigrants, thereby exposing them to the danger of deportation\(^\text{61}\). Similar concerns, even if unfounded, could negatively affect participation in mobile interventions.

\(^{57}\) Menacho et al, 2013, Muench et al, 2013
\(^{58}\) Dowshen, Kuhns, Johnson, Holoyda, & Garofalo, 2012
\(^{59}\) Menacho et al, 2013
\(^{60}\) Circle of 6 U
\(^{61}\) Price et al, 2013
The most serious safety concerns were raised by authors of a review of applications aimed at victims of domestic violence. Westmarland et al also interviewed practitioners in the field for their views on these applications\textsuperscript{62}. While practitioners acknowledged that the information provided (such as the location of crisis centers, emergency numbers, etc.) was useful, they questioned the safety of users who had these applications on their phones and were still in contact with their abusers\textsuperscript{63}.

Such interventions might better be targeted at women no longer in a violent situation, and who are seeking support and information, the authors found. The U.S. Department of Defense has created and launched such an application aimed at servicemen and women who have been victims of sexual assault, as part of a multi-channel program that also includes Internet and hotline resources.

**Project Code/Number**
A program must rent a single mobile number that all potential clients can use to register by sending in a code word. The main criteria when selecting a number are that it be easy to remember and preferably less than 5 digits, which decreases the likelihood of the number being faked by someone else.

**Complying with other legislation**
You may have to familiarize yourself with other legislation relevant to your program. For example, in Russia, a BCC mHealth program must comply with legislation on:
- the advertisement of medical services and medication;
- the advertisement of methods of prevention, diagnostics, treatment, etc.;
- SMS spam.

**Registration via project website**
Registration through a program/organization website requires that website be connected to the SMS platform, that in turn interacts with aggregator, in compliance with data protection and securing legislation. The overall scheme is displayed on the Fig. 3.

\textsuperscript{62} Westmarland, et al.
\textsuperscript{63} While some practitioners could see benefits of apps such as these, they expressed concerns about the safety of women using them when they were still in a relationship with the perpetrator. Perpetrators often check their partner's mobile phone and social media sites as a form of 'controlling surveillance'. As one practitioner who works with domestically violent men put it - 'Phone checking is a big thing for perps'.
Another necessary condition with this option is a program website with a registration form for potential clients. Subscribers fill out the form and send in their data, thereby automatically registering for the service. The Https protocol for a website will provide for secure communication between visitors and the site. SSL certificates should be used; these guarantee the confidentiality of transmitted data, including the personal data of users and other important information.

When setting up registration via website, it is not necessary when selecting a number to be short one. This is because the number is used exclusively by the SMS sender, and there is no need to make it memorable for participants, as they will only be registering online on the program site.
Text-message platforms: off-the-shelf options

Disclaimer: We do not promote or support any specific product. The information below is provided simply to give readers an idea of some of the well-known companies and projects working in this sphere. The descriptions of these services are summarized from the organizations’ official websites. Please refer to these sites for any additional information.

Below you can find a list of some of the most popular platforms and services that have been used in mHealth projects around the world. Although all free and pay platform solutions have limitations in operation, they can be the best alternative for your intervention, or provide a set of options for establishing your own text-message service.

**CommConnect** software: sms platform, surveys, data collection, IVR.
http://www.dimagi.com/commconnect/

A solution for building SMS applications allowing for two-way messaging, conditional reminders, surveys and broadcast messages.

Features:
- Platform for building messaging applications (SMS and IVR)
- Conditional reminders and two-way surveys to clients
- Broadcast communication or large-scale surveys
- Integrate with information collected using CommCare (data collection tool integrated into the platform)

**FrontlineSMS and FrontlineCloud** software: sms platform, data collection
http://www.frontlinesms.com/

**FrontlineSMS** is free open-source software used by a variety of organizations to distribute and collect information via text messages (SMS). FrontlineSMS turns a laptop and a mobile phone into a central communications hub. Once installed, the program enables users to send and receive text messages with groups of people through mobile phones. This program does not require an Internet connection. Just attach a phone and SIM card via USB cable and pay your local operator per SMS as usual.

**FrontlineCloud** allows you to manage SMS messages and data from your browser.
It has a quick set-up process, many ways to connect to mobile networks, and data management available through the cloud. Other features include: SMS gateway, virtual numbers, and short codes.

**Magpi (formerly EpiSurveyor) - software: sms platform, surveys, data collection.**
https://www.magpi.com/
Magpi enables anyone to quickly and affordably create mass SMS or voice messaging campaigns in any language from an easy-to-use web interface, without having to work through the carriers.
Features include:
- Compatibility with iOS, Android and Symbian systems
- Instant data analysis and publishing of data sets and maps
- Import/export of forms, data and contacts
- Forms in any language in any alphabet
- Customizable form roles and privileges

**RapidSMS - software: sms platform, data collection.**
https://www.rapidsms.org/
RapidSMS is a toolset for rapidly building SMS (text message) services for data collection, streamlining complex workflows, and group coordination using basic mobile phones — and can present information on the internet as soon as it is received. So far RapidSMS has been customized and deployed with diverse functionality: remote health diagnostics, nutrition surveillance, supply chain tracking, registering children in public health campaigns, and community discussion.

**Vumi - software: sms campaigns, surveys, USSD (in some countries)**
http://vumi.org/
Vumi is a highly-scalable messaging engine for the delivery of SMS and instant chat messages. The open-source solution allows for mobile conversations to take place across multiple territories, simultaneously connecting audiences and applications to multiple networks in various countries. Other feature also include creating SMS-surveys, registration campaigns and using USSD
Program content development

Text-message services and mobile apps for populations of at-risk women

In this section, we outline some of the main targets and challenges for mHealth programs aimed at different groups of at-risk women. These are by no means the only issues we envision a mobile intervention successfully addressing with these populations, but potential areas of focus relating to some of the major challenges these target audiences face.

I. Women with substance use disorders (SUD)

Aimed at performing or supporting the following treatment components and activities:

- Overall adherence to treatment and relapse prevention
- Appointment and medication reminders
- Life skills education and support – BCC, psychological support
- Parenting skills education
- Maternal and child health issues, including pregnancy and parents’ rights issues
- Routing to related services: HIV testing and ARVT adherence, AA/NA and self help groups, social services

Items to consider in terms of barriers and possible limitations

- Ability to comprehend information and advice in messages
- Lack of willingness to use the app/service on a regular basis
- Ability and readiness to follow advice in messages
- Access to mobile plan/phone model that can receive text messages and access the Internet
- Confidentiality of personal data and participation
II. Mental disorders

Aimed at performing or supporting the following treatment components and activities:
(varies depending on the type and severity of the disorder):

- Education and informational/psychological support to family members of the client
- Appointment and medication reminders
- Maternal and child health issues, including pregnancy and parents’ rights issues
- Life skills education and psychological support to both client and family members
- Parenting skills education
- Routing to related services: HIV testing and ARVT adherence, AA/NA and self help groups, social services

Items to consider in terms of barriers and possible limitations

- Ability to use gadgets and mobile applications
- Ability to comprehend information and advice in messages
- Lack of willingness to use the service/app or read messages on a regular basis
- Ability and readiness to follow advice in messages
- Access to a mobile plan/phone model that can receive text messages and access the Internet
- Confidentiality of personal data and participation

III. Sex workers

Aimed at performing or supporting the following treatment components and activities:

- Prevention of HIV, STIs, and other communicable and non-communicable diseases
- HIV testing and ARVT adherence
- Prevention of drug/alcohol use and other risky behavior,
- Motivation to start treatment
- Prevention of domestic violence
- Routing and navigation to related medical facilities, self-help communities,
and crisis centers
- Maternal and child health issues, including pregnancy and parents’ rights issues
- Parenting skills education
- Overall life skills education
- General psychological support

**Items to consider in terms of barriers and possible limitations**
- Ownership of the device; it can be controlled by other people who are not interested in such interventions
- Lack of willingness to use the app/service on a regular basis
- Ability and readiness to follow advice in messages
- Access to mobile plan/phone model that can receive text messages and access the Internet
- Confidentiality and security of personal data and participation

**IV. Recently paroled women**

**Aimed at performing or supporting the following treatment components and activities:**
- Life skills education and psychological support to both clients and their family members
- Maternal and child health issues, including pregnancy and parents’ rights issues
- Parenting skills education
- Prevention of HIV, STIs, and other communicable and non-communicable diseases
- HIV testing and ARVT adherence
- Prevention of drug/alcohol use and other risky behavior
- Prevention of domestic violence
- Routing and navigation to related medical facilities, self-help communities, and crisis centers
- Education on legal issues related to the parole status of the client
Items to consider in terms of barriers and possible limitations

- Enrollment strategy and points of entry
- Ownership of the mobile device; it can be controlled by other people who are not interested in such interventions
- Lack of skills and knowledge necessary to use the app/ text message service
- Access to a mobile plan/phone model that can receive text messages and access the Internet
- Confidentiality and security of personal data and participation
Development of text-message content

Tailoring, targeting, and personalization of content

This section of the review looks at the way developers create message content for a certain population, and how that relates to program efficacy. We follow the distinctions described by Head et al in their meta-analysis of health promotions: content may be **targeted**, i.e. designed for a particular audience but not particular individuals; **tailored**, i.e. customized for the particular individual based on demographic (height, age, etc.) or psychosocial (motivation, attitude) information; and/or **personalized**, i.e. including means of communication such as using the individual's name in messages\(^{64}\).

Most mobile interventions are targeted; an example would be a program aimed at patients with diabetes. A tailored intervention for a diabetes intervention might use factors such as patients’ history of medication adherence to differentiate content for clients.

Head et al found that message tailoring and personalization were “significantly associated with greater intervention efficacy”\(^{65}\). In addition, they found that interventions using both message tailoring and targeting were most effective, and that including demographic and psychosocial variables in tailoring lead to more effective tailoring\(^{66}\).

One example of this type of message tailoring in the studies reviewed was Alk-Check, which targeted teen problem drinkers attending vocational schools in

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\(^{64}\) Head, Noar, Iannarino, & Harrington, 2013

\(^{65}\) Head et al, 2013

\(^{66}\) First, interventions that used both targeted and tailored messages exhibited the largest effect size, followed by tailoring only, and finallyby those that used targeting only. Given the wealth of literature indicating the effectiveness of tailored interventions (see Noar & Harrington, 2012), this finding is not terribly surprising. However, the combination of both tailored messages and targeted messages in the same intervention is something that has received scant attention in previous research. For example, a smoking intervention could incorporate targeted messages that appeal to all smokers (e.g., what to do when experiencing cravings) and tailored messages specified to a participant’s unique situation (e.g., messages sent at times when a participant tends to experience cravings). Additionally, we found that interventions tailored on demographics and psychosocial variables, respectively, were significantly more efficacious than those that did not employ these tailoring techniques.
Switzerland. Message content and amount, and online feedback were tailored through an automatic initial online assessment of participants. While the authors acknowledged that further randomized controlled trial studies should be conducted to verify their non-control-group study, they did find significant decreases in problem drinking episodes, number of drinks per week, and alcohol-related problems in their study participants as compared to non-participants.

Many studies emphasized participants’ positive assessment of personalization techniques and their suggested improvement of program efficacy. The meta-analysis done by Head et al found that personalization “may be a key ingredient contributing to the efficacy of tailoring.”

In addition to strategies such as addressing users by name, several studies personalized message content by working with participants initially to create customized messages in terms of content and timing, which was seen to increase program efficacy.

Program clients also gave positive feedback on personalized messages. In a study looking at the effect of a bi-directional SMS intervention on the behavior of substance abusers who were non-adherent with HIV medication, clients initially worked with staff to create personalized messages addressing each targeted area (SA, adherence, mood), and depending on their initial response via text. Participants spontaneously reported that the personalized messages made them feel “cared for and connected to the clinic” operating the program, despite knowing that the tool was automated.

From the other side, participants in a qualitative study on TExT-MED, a mobile intervention tailored to low-income, urban Latinos with diabetes, participants suggested that more message personalization (in terms of both content and timing) would have increased their feeling of being “cared for” and program efficacy.

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68 The content of the text messages was tailored according to the individual values on the following baseline variables: gender, motivation for reduced alcohol consumption, alcohol-related problems, typical drinking day and time, number of standard drinks in a typical week, and maximum number of drinks on a single occasion during the last 30 days.
69 Head et al, 2013
70 Dowshen et al, 2012
71 Ingersoll, et al., 2014
72 Eysenbach et al, 2014
73 "In the design of TExT-MED, we opted to have all participants receive the same messages and to have automated message delivery. The messages did not include the patient name and the delivery schedule was not specified to anyone’s schedule. We did this to maximize the scalability of the program. However, participants specifically requested personalization of message delivery, including using their names and timing. Participants said they would have felt more cared for if the messages..."
Frequency: tailoring delivery of messages.

As the participants in Eysenbach’s study noted, message timing can directly impact program efficacy. If a message is intended to remind a subscriber to take his medication at a certain time of day, if the message arrives hours later, it will have little positive impact.

Excessive or overly automated message timing might decrease efficacy as well; Head et al found that interventions that texted on variable schedules were more effective than fixed-schedule interventions. This included interventions that tapered off frequency over time, or were personalized to the users’ schedules.

One example of such tailored frequency being built into program design was suggested by participants in a qualitative study on using SMS to motivate HIV testing among MSMs in Lima, Peru: “Participants recommended that some messages should be sent on “special days”, for example messages about condom use should be sent before the weekends when participants are more likely to engage in risky sex. Messages about HIV testing should be sent at the beginning of the week, so participants can schedule their appointment at the clinic.”

It also seems logical that too-frequent messages would disrupt users’ daily schedules and cause negative attitudes towards the intervention. Client attitudes towards what specifically would be “too frequent” could be determined by qualitative studies among the target audience. In the study above, participants said that one or two text messages a week would be the maximum amount they would like to receive, and that more would be “annoying”.

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74 Head et al, 2013
75 Interventions that texted on particular variable schedules (i.e., interventions that allowed participants to set their own schedule and interventions that used decreasing frequency over the course of the study) were most effective. Interventions that were individualized allowed users to customize their messaging schedule, which presumably led to messages being delivered at times that were most relevant to the behavior.
76 Menacho et al, 2013
77 Menacho et al, 2013
Key phases of text-message content development

Consider content development from the perspective of behavior change communication. This requires answering the following questions:

1. What are the gaps in prospective clients' knowledge?
2. What attitudes should be changed?
3. What behavior/skills must be developed?

Your development team can seek answers to these questions through the following steps:

**Phase 1.**
Research activities will help you to create a profile of prospective clients, their gaps in knowledge, attitudes and behavior to change, and skills to develop. In order to obtain such information you can use questionnaires, focus groups, experts, and key informant interviews.

It is also important to conduct a relevant literature review, analyze available data representing the status of the problem in the field of at-risk women's health, and explore current or recent initiatives, with a focus on the mHealth initiatives for the at-risk female population.

**Phase 2.**

These research activities will help to identify key informational components that will become a basis for the development of text-message content and protocols. For example, if your initiative targets female clients with SUD and aims to maintain the rehabilitation process, it will include components on relapse prevention, HIV/STI testing and prevention, psychological support, parental skills, child care, social welfare information, self-help group information, etc. Health professionals and peer counselors should play the leading role in identifying such components. However, the team of content developers must be multi-disciplinary and include diverse specialists – psychologists, sociologists, communication specialists, etc.
Phase 3.

The process of drafting the text messages is focused on the development of key topics that will reflect the key informational components identified in the previous phases. At this stage, you identify the approximate length of the intervention and frequency of message delivery, develop a set of messages, and place them in the sequence that is most appropriate to address clients’ information needs and reach your program goals. At this stage, developers and partners should not be concerned about the length of the message; it is most important to determine key content and points to address. The messages can be edited for length at a later stage.

The formative research may identify that your primary target audience should be broken into several sub-audiences according to status or behavior change stage. For example, if your target audience is female substance users in rehabilitation, you may expect that after a certain point, you will need to determine if they are still in treatment and abstinent or have relapsed. In this case, you will have two sub-audiences that require two different text message protocols.
In order to address the actual needs of each sub-audience, your program should be designed according to possible pivotal points, and as many protocols as sub-audiences you envision should be developed. Each protocol must be pretested as well as messages with “routing” questions at the pivotal points to make sure that your client comprehends the request or testing question correctly and is able to choose the right option to answer.

**Phase 4.**

Once draft messages are developed, you will start working on the length of text messages and deploy a soft launch of the initiative to pre-test the entire service operation. At this phase, the text-message content must be tailored according to the following criteria:

- Appropriate and applicable for mHealth interventions for the female at-risk population – always take into account all the limitations that mobile technology imposes: a relatively small amount of information in messages, comprehensiveness, connectivity, impersonality, and the willingness of clients to use and adhere to new technologies.

- Clear and monosemantic – clients easily comprehend the information in the message and there is only one possible (intended) interpretation of the message.

- Practical and feasible – it is easy for clients to follow the advice in the text messages and do what is suggested.

- Actual and in-demand for prospective client – the messages should address those issues and problems that are actually important for clients and at that time when it is the most appropriate. For example, if your target audience is female clients with SUD, you may want to consider sending information on access to a crisis center for women with children as well as details on location and the procedures for admission.

In order to make sure that the informational components and messages match these conditions, pre-testing research is required. It is crucial to set and conduct a series of focus groups with professionals and clients. The obtained data will help you to improve the content and hone the wording of your messages, rearrange the sequence, update the information and number of messages of each informational component, add more details, optimize the length of messages to make it fit the
SMS/GMS standards, frequency of delivery, etc. Remember that the length of SMS in US GSM standard is 160 characters, and the Russian GSM standard is 80 characters in Cyrillic. Longer messages will increase the cost of service. The finalizing process requires a multi-disciplinary team consisting of health professionals, peer counselors, psychologists, sociologists, and linguists.

**Phases 5-6.**

Once the database of messages and protocols are pretested and finalized, the service is given a full-scale launch; you should conduct an “early adopters survey” which includes exploration of the KAB of clients and their satisfaction with the service. The obtained information will help you upgrade and tailor your messages so that it is appropriate and consistent from the very beginning of your initiative for optimal program management, client promotion, and scale up. For more information on the early adopters survey, see the chapter on monitoring and evaluation.

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**Nota Bene**

Think big – don’t limit advice and information aimed at clients to single topics. Think creatively and learn from your clients’ surveys: what other topics will be helpful for your prospective clients and serve their interests?

Explore what issues apart from primary ones may also be relevant to your audiences’ lifestyle, behavior change, and informational needs. Given that your target audience is female MARPs, it is crucial to address specific issues relevant to women: parental skills, child health and care, domestic violence prevention, psychological support, information on social welfare for women, self-help groups and crisis centers, etc.

It also is important to mix messages containing information and advice with those providing psychological support and serving to create a positive emotional tone for the entire initiative.
Checklist: what to consider while developing a text-messaging service:

- **Mobile phone/smartphone penetration**, traffic costs and ownership. Make sure the devices you are designing your program for are available for your prospective clients. Explore who is the actual owner of the device to ensure the confidentiality of client subscription.

- **Literacy level** of the TA: conduct an assessment of your prospective clients’ literacy level and ability to comprehend the content.

- **Content clarity**, one-way perception. It is also essential to pre-test message content to make sure you clients perceive the information correctly and aren’t confused by the content you are providing them.

- **Client-oriented**, practical, useful – messages should be developed according to the data derived from clients’ needs surveys and fill their gaps in knowledge and behavior change. All information in the text messages should be aligned with activities of her rehabilitation schedule and help fulfill her health plan goals.

- **Supportive, positive tone** – each message should be designed with a positive tone. Additionally, text messages should create a cumulative positive tone through psychological support, content that is relevant and specifically tailored to clients’ needs, and timely adjustment of text messages over the course of program implementation.

- **Program/Senders Name**. It is important to design a name of program/application and the sender that will be displayed on the clients phone and stand for incoming text messages. Avoid explicit associations with the program, as it could be seen by others and create discomfort for clients. Still, it is important to use a name linked with positive and encouraging meanings like health, hope, new life, believe, etc.

- **Timing of text messages** Messages should not be annoying for clients; try to provide clients a way to set up the most convenient time to receive text messages.

- **Frequency** of text messages. The answer to this question is the subject of audience preference research. It is a continuing process, as preferences may change and require adjustment.

- **Medical advice and advertisements**. No advice regarding the use of specific medical treatment. No brand of equipment or names of clinics that are not free. From our experience, one of the cornerstones of program credibility is the absence of any type of advertisement, spam, or promotion.

- **Subscription canceling options** – clients must be provided with a simple and clear procedure to unsubscribe at anytime without any conditions. It is also
important for client enrollment and adherence to introduce this option at the beginning, during face-to-face motivational sessions.

- **Length of messages and the concatenation issue.** The best message design is a balance between the length and information provided in one message. Make sure, if the message exceeds 160 characters in length, it should be properly connected when displayed on clients’ phones and look like a single message. This process is called concatenation.

- **GOV support and localizing the program.** Involve local government and social leaders at the ground level so that they will feel ownership of the program, become stakeholders. One of the crucial ways to gain support of the government is to localize the development of your program. Develop an authentic program with a coalition of local experts, local field practitioners, and members of the professional community, not just copying existing programs implemented in another country, which ensures that your initiative will be specifically targeted culturally and socially appropriate.
Supporting communication channels and tools

Comprehensive mHealth initiatives may embrace various communication channels in addition to text messages and mobile applications. These may include TV, radio, the media, websites, live webinars, and social media. These components may be very effective in addressing the general population but limited in their capacity for outreach to at-risk populations. In most cases, none of these channels should be established and utilized for initiatives aimed at MARPs. For example, TV, radio, and the media are not appropriate channels for promotion of mHealth initiatives aimed at MARPs, firstly because of cost-effectiveness. However, you may consider some of these channels and their capacity for mHealth programs addressing various groups of the female at-risk population.

Various online tools as communication channels for MARPs
## Commercial sex workers

<table>
<thead>
<tr>
<th>Use among Target audience</th>
<th>Websites</th>
<th>Social media</th>
<th>Webinars and other online group meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Internet is widely used by the target audience to find clients for commercial sex. According to various research, up to 50% of commercial sex encounters are from Internet advertisements.</td>
<td>Same as websites, social networks are often used by CSW to find clients. Moreover, social networks are hard to control by law enforcement, unlike websites, which can be banned.</td>
<td>N/A</td>
</tr>
<tr>
<td>Current prevention and advocacy activity</td>
<td>There are online communities of people doing CSW.</td>
<td>At this point social media campaigns cannot provide the necessary reach for MARPs engaged in sex work. Broader campaigns on safe sex and STI prevention are in operation.</td>
<td>Used by professionals to share research information on STIs, prevention, and other educational purposes.</td>
</tr>
<tr>
<td>Our view</td>
<td>Interventions cannot be online only, because there are many closed CSW communities that require outreach work.</td>
<td>Social media can be an effective channel due to high use, but cannot reach closed communities like ethnic groups of CSW. Keeping in mind privacy and stigma you cannot expect high engagement in open groups either.</td>
<td>Webinars can be an effective way to confidentially provide information to the target audience and organize group work. (Due to possible anonymous login to the webinar systems)</td>
</tr>
</tbody>
</table>

### Items to consider:
- Ownership of the computer or other device; it can be controlled by other people who are not interested in such interventions
- Lack of willingness or ability to use online tools on a regular basis
- Ability and readiness to follow advice
Confidentiality and security

Summary: While online tools may be effective in terms of providing information, there are not enough entry points to reach closed and ethnic CSW communities online.

References:
http://www.urban.org/UploadedPDF/413047-Underground-Commercial-Sex-Economy.pdf
https://www.c-changeprogram.org/sites/default/files/Social-Media-Assessment-Jamaica.pdf, pg.2
http://www.ohio.edu/sportsafrica/journal/Volume7/carlson.html
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0024816
http://www.scarletalliance.org.au
Recently paroled women

<table>
<thead>
<tr>
<th>Target audience</th>
<th>Websites</th>
<th>Social media</th>
<th>Webinars and other online group meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>There are reports of use of social media even while individuals are serving a prison sentences. There are debates on banning the use of social networks and chats for people convicted of sexual offences.</td>
<td>N/A</td>
</tr>
<tr>
<td>Use among audience</td>
<td>A large number of sites provide information on life in prison and social adaptation after release. Websites provide legal information, advocacy groups, group therapy, penpals, etc.</td>
<td>Social media is actively used by law enforcement to monitor and investigate criminal activities.</td>
<td>There are webinars for community workers on various aspects of the social adaptation of paroled men and women.</td>
</tr>
<tr>
<td>Current advocacy activity</td>
<td>Websites should contain clear directions on how all social services may be accessed.</td>
<td>Social media is one of the fastest developing markets in the world. Adopting use of social media can be a huge step in overall social adaptation.</td>
<td>Webinars can be an effective way to confidentially provide information to the target audience and organize group work.</td>
</tr>
</tbody>
</table>

**Items to consider:**
- Enrollment strategy and points of entry
- Confidentiality and security

**Summary:**
Motivation in this group can be rather high depending on other conditions of the client.

**References:**
http://www.iacpsocialmedia.org/Resources/Publications/2013SurveyResults.aspx
## Mental disorder

<table>
<thead>
<tr>
<th></th>
<th>Websites</th>
<th>Social media</th>
<th>Webinars and other online group meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use and prevention activity</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Current advocacy activity</td>
<td>Online communities, sites for the patients and the family, a number of advocacy sites.</td>
<td>The impact of social media on the mental health of patients is highly debated. Some reports show a negative impact on patients with depression or anxiety disorders.</td>
<td>Most experts agree that online mental health treatment has not accumulated enough data to prove its effectiveness. However there are cases which show high effectiveness of online interventions.</td>
</tr>
<tr>
<td>Our view</td>
<td>Websites lack the necessary feedback and patient engagement.</td>
<td>Social media can be an effective tool to provide support, however the uncontrollable negative effects can overwhelm the benefit of such interventions.</td>
<td>Webinars and group calls can be used for anonymous group counseling.</td>
</tr>
</tbody>
</table>

**Items to consider:**
- Ability to comprehend information
- Access to Internet
- Confidentiality

**Summary:** Liability of online tools, especially requiring self-monitoring is the major concern of most experts. Social networking may be useful for community work with the families, but may have unstable results on the patients.

**References:**
[http://unh.edu/ccrc/pdf/CV97.pdf](http://unh.edu/ccrc/pdf/CV97.pdf) Online Mental Health Treatment: Concerns and Considerations
Doherty, Gavin; Coyle, David; Matthews, Mark (July 2010). "Design and Evaluation Guidelines for Mental Health Technologies" 

Clients with substance use disorders

<table>
<thead>
<tr>
<th>Use among Target audience</th>
<th>Websites</th>
<th>Social media</th>
<th>Webinars and other online group meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Websites both for people undergoing treatment and their families and other support group are available.</td>
<td>Use of social media is high in some groups, because they are more difficult to monitor by law enforcement than phone calls and websites.</td>
<td>N/A</td>
</tr>
<tr>
<td>Current prevention and advocacy activity</td>
<td>Most of the audience is not motivated to seek treatment on their own. Addressing their relatives is advised.</td>
<td>There are various drug-free communities available on Facebook and other social media.</td>
<td>Webinars are mostly used for professional purposes in the medical community.</td>
</tr>
</tbody>
</table>

Our view

IDUs tend to create local communities for drug use purposes. Outreach of such communities is usually impossible or less effective with online tools. Online group counseling can be effective in groups with high abstinence motivation in the later period of rehab.

Items to consider:
- Lack of motivation to use online rehab tools
- Ability to comprehend information
- Access to Internet
- Confidentiality
Summary:
Using online tools may be useful in later rehabilitation when patients get enough motivation and self-control to use those tools. Social media can be useful for community work, not only with SUD clients but also with their significant others/realtives.

References:
http://uhrn.civicua.org/library/art_en/norms.txt
http://www.psychiatry.ua/books/prevent/paper10.htm

Summary
Use of online tools for MARPs still requires more research to prove the effectiveness of the treatment. While some case studies show the high effectiveness of online interventions aimed at the target group, some methods are still a matter of serious debate by the medical community.
Enrollment strategies, routing of clients and points of entry

Communication channels
Unlike mHealth initiatives targeting the general population that can be promoted through a wide range of conventional communication channels, it is crucial to provide women who can be defined as at-risk with the right conditions to subscribe and stay in a program.

Conventional channels for promotion of such initiatives, such as TV, radio, print media, Internet, etc., are less effective for several reasons. First, such large media campaigns are not a cost-effective way to reach a relatively small, specialized target audience. Second, a highly publicized campaign aimed at, for example, commercial sex workers (CSW) might make potential participants reluctant due to issues of anonymity and confidentiality.

Cross-sectoral approach
It is important to develop a cross-sectoral approach and provide the initiative additional support through collaboration with coalition partners consisting of government agencies, professional societies, health facilities and centers, public organizations, NGOs, faith-based organizations, etc.

In order to promote the service, reach at-risk women, and get them subscribe, coalition partners need to be assigned for promotion, entry points, and overall technical and informational support.

Points of entry
In order to reach your audience, you have to be creative in identifying those facilities/sites that are most likely visited by your prospective clients and/or their relatives. Depending on the specific characteristics of each type of at-risk female population, the entry points can be established at:

- Maternity hospitals (check for special facilities or units)
- Substance abuse rehabilitation clinics and centers
- AIDS centers and clinics
- Crisis centers for women
- AA/AN groups and similar self-help communities
- Mental hospitals and clinics
• Social and psychological counseling centers
• Police departments and jails
• Gathering points for target communities

Possible roles of coalition partners in enrollment strategy

Government agencies, professional societies
- approval of materials promoting the service to the target audience and the dissemination of official information about the service among health facilities, rehab centers, pharmacy chains, and organizers of specialized hotlines.

Health facilities, rehabilitation facilities, pharmacy chains, specialized hotlines for at-risk females and women in difficult life situations
- disseminating informational materials and providing information about the service directly to women of the target audience, establishing off-line groups (where possible), and individual sessions for women to provide detailed information about the service.

NGOs, faith-based organizations, peer communities – outreach to at-risk women, conducting off-line counseling and orientation sessions at health and rehab centers to motivate women to join the program, and technical assistance in enrolling.

Fig. Collaboration between partners for enrollment of clients

The off-line sessions should include trainings and meetings with women to explain how the program works; how to use the mobile application/SMS service; the benefits of participation in the program, its design, goals and purpose, conditions, and terms of participation; discuss client concerns and the confidentiality and
security of personal data; and how to cancel a subscription.

In order to effectively engage all partners in the initiative, it is important to develop special educational curricula and informational materials for GOV representatives, health care providers, physicians, and peer counselors who address health issues of at-risk women, as well as training courses for media specialists on how to cover the health issues of the underserved and at-risk female population.

In many cases, print materials or advertisements will be helpful and can play an important role, but are almost never sufficient motivation for women of the target audience to subscribe to the program; it is likely that interpersonal communication will always be required to motivate women and help them register and use the service. This face-to-face communication is crucial in establishing trust with potential clients and reassuring them that the planned initiative will indeed be beneficial and helpful.

Our recent experience shows that motivational and educational sessions with clients on enrollment in mHealth programs are more effective if they are incorporated in a course of off-line trainings, counseling sessions on women’s and mother and child health, maternal and life skills development, psychological support, social welfare, etc.

Nota Bene
Make sure that you have developed a transparent and comprehensible subscription and enrollment process. It is important that voluntary participation is clear, according to local legislation. This can be done through written consent forms signed by subscribers, or ensuring that the subscription procedure makes it clear that clients are participating voluntarily. (Each country has its own regulations in regarding the necessary proof of clients’ voluntary downloading of a mobile application or enrollment and participation in an SMS service; this is an area that needs to be researched before developing a subscription and enrollment process.

The program also needs to include a clear and comprehensive disclaimer specifying what services are provided with terms, limits, conditions, possible risks, and other important aspects of the service relating to women’s health and well-being.

Fig. Establishing counseling sessions on-site

Monitoring and evaluation

Main principles
Monitoring and evaluation is an important part of every communication campaign (see P-process section for more details). Ideally, every component of your mHealth program needs to a respectful part in the evaluation process to determine what impact on the target audience’s behavior it has. Below we would like to provide you with a concept of stages of monitoring and evaluation to be conducted in mHealth project.

Preparatory stage & Formative research
Formative research is the basis for a strategy of your project. It helps researchers identify the characteristics of target populations that are important for your communication campaign. Formative research is crucial for developing new programs and can be used to improve existing and ongoing initiatives.

Formative research

<table>
<thead>
<tr>
<th>M&amp;E objectives at the preparatory stage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social-demographical parameters of the TA.</td>
</tr>
<tr>
<td>2. Literature review, study of the materials and recent and current interventions in order to improve the design and implementation of your mHealth initiative.</td>
</tr>
<tr>
<td>3. Level of awareness and knowledge of TA about the issues that will be covered in the Text-messages/Mob App.</td>
</tr>
<tr>
<td>4. Level of attendance (number of hits) of TA of clinics, health and rehabilitation centers.</td>
</tr>
<tr>
<td>5. Health care providers’ needs and gaps in knowledge, attitudes, behavior/skills (KAB) and attitudes to the program as a whole and to text-messages/Mob App components.</td>
</tr>
<tr>
<td>6. Clients’ perceptions of text-messages and topics in the Mob App (content verification, linguistic validation, clearness, sufficient, overall emotional tone, usefulness, easy to understand and follow, etc.).</td>
</tr>
<tr>
<td>7. Characteristics of the perception of information and promotional materials by potential participants of the program (banners, advertisements, brochures, flyers, etc.).</td>
</tr>
<tr>
<td>8. Identification of the optimal frequency, timing and amount of the text-messages and topics/information in the Mob App.</td>
</tr>
<tr>
<td>9. Number of materials developed (informational, promotional, etc.)</td>
</tr>
</tbody>
</table>
Methods

1. Quantitative surveys of the prospective audiences.
2. Focus-groups with clients and health specials.
3. In-depth interviews with prospective clients.
4. Expert interviews with health care providers, health organizers, peer counselors.
5. Literature review and program analysis

Pilot stage, Soft-launch & early adopters survey

Pilot stage or pilot study is a small scale preliminary study conducted in order to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project.

A soft launch is the release of a product or service to a limited audience. Soft-launching is a method for gathering data on a product’s usage and acceptance in the marketplace, before making it generally available (hard launch).

At this stage it is important to understand the first impact that your initiative has on the target audience. This data will help you to correct possible mistakes and technical issues and maybe introduce some extra content.

Early adopters survey

M&E objectives at the pilot stage:

1. Total number of the program early adopters
2. Total number of SMS sent/Mob App downloads
3. Social-demographical characteristics of the early adopters.
4. Early adopters’ level of satisfaction with the content (clearness, sufficient, overall emotional tone, usefulness, ability to understand and follow, etc.).
5. Early adopters’ level of satisfaction with the service operation (frequency, timing and amount of the text-messages and topics/information in the Mob App)
6. Early adopters’ needs and gaps that were not addressed in the content
7. Pretesting of piloting of the additional components of the service (website, webinars, social media, etc.)
8. Possible impact on knowledge, attitudes, behavior/skills (used, saved and shared advice and information received from various channels of the initiative, try to implement behavior models promoted by the program, commitment to treatment increase, etc.).
9. Number of clients unsubscribed or refused to participate in the program.
10. Number of materials developed and disseminated (informational, promotional, etc.).
Methods

1. Quantitative surveys of the early adopters.
2. Focus-groups with clients and health specials.
3. In-depth interviews with early adopters and health care providers, health organizers, peer counselors.
4. Telephone and SMS polls

Main stage

Main stage of the project is the stage when all of the features of the program are fully functioning and all enrollment channels are actively working to get new clients. It is a good point to test how effective different marketing strategies and efforts are at attracting new clients.

Main stage

M&E objectives at the main stage:

1. Total number of the program clients.
2. Total number of SMS sent/Mob App downloads
3. Social-demographical characteristics of the program clients.
4. Program clients’ level of satisfaction with the content (clearness, sufficient, overall emotional tone, usefulness, ability to understand and follow, etc.).
5. Program clients’ level of satisfaction with the service operation (frequency, timing and amount of the text-messages and topics/information in the Mob App).
6. Program clients’ needs and gaps that were not or insufficiently addressed in the content.
7. Program clients’ satisfaction with additional components of the service (web-site, webinars, social media, etc.)
8. Impact on knowledge, attitudes, behavior/skills (used, saved and shared advice and information received from various channels of the initiative, try to or already implemented behavior models promoted and skills developed by the program, commitment to treatment increase, knowledge increase, etc.).
9. Number of clients unsubscribed or refused to participate in the program.
10. Clients’ involvement and participatory in services of the program (webinars, social media, off-line activities, etc.).
11. Clients’ and specialists’ perception and satisfactory with materials developed for the initiative.
12. Number of clients remaining in the treatment and committed to rehabilitation health plans goals.
Methods

1. Quantitative surveys of the subscribers.
2. Focus-groups with clients and health specials.
3. In-depth interviews with subscribers and health care providers, health organizers, peer counselors.
4. Internet, telephone and SMS polls

Wrap-up stage
This is the stage to test the effect of your mHealth campaign on your target audience. At this point, your initiative should have a representative number of subscribers on every stage of your message protocols and subscribers who have completed the protocol. In terms of the mobile app this would mean a representative number of users who have different experience of app use (for a week, a month, half a year, etc.)

Summative research

Evaluation objectives at the wrap-up stage:
Same as for main stage. The researcher should look out for the possible patterns in the use of the app/effect of the messaging program on clients who have different experience with the initiative.

Methods

1. Quantitative surveys of the subscribers.
2. Focus-groups with clients and health specials.
3. In-depth interviews with subscribers and health care providers, health organizers, peer counselors.
4. Internet, telephone and SMS polls
5. Trend analysis

Outputs
- Materials developed and disseminated
- Trainings conducted and specialists trained
- Events or activities conducted by each component
- Clients subscribed
- Clients outreached by each and all activities of the intervention
- Messages sent
- Number of services developed for your intervention’s clients
Outcomes

1. Level of awareness and knowledge of TA about the issues that were covered in the program.
2. TA’s Attitudes, behavior and skills (KAB) connected with issues covered in program.
3. Level of attendance (number of hits) of TA of clinics, health and rehabilitation centers.

Indicators for your research

As a case of research of MARPs we would like to provide you some of the information from the following research:

**Using Mobile Phone Technology to Provide Recovery Support for Women Offenders**

*Christy K. Scott, PhD, Kimberly Johnson, MSED, MBA, and Michael L. Dennis, PhD*

Study explores using mobile technology as a recovery management tool for women offenders residing in the community following release from jail.

All women completed the survey between 21 to 36 months post-release from jail, with 275 done face-to-face in the office, 36 face-to-face offsite, and 58 by phone.

Indicators used in the research

**Participant characteristics**: race, age, marital status, employment, wage.

**Risky behavior indicators** (during 90 days before the survey): substance use, unprotected sex, sex with multiple partners, sex in exchange for money/drugs.

**Availability of mobile phone**: phone ownership, phone type, and service plan characteristics.

**Mobile phone utilization with friends and family**: number of phone calls, texts, emails etc, social networking from the phone.

**Potential recovery support**: number of peers they think can provide support

**Comfort level with smartphones**: comfort while texting, making phone calls, social networking and using other functions on the phone, willingness to learn how to use new features of the phone, install new apps, etc.
Useful Internet resources for mHealth initiatives for at-Risk population

Program-specific websites
www.A-Chess.org

Sites with research/tools/courses for developers
www.K4health.org
www.TechChange.com
www.mHealthAliance.org
www.himss.org/ResourceLibrary/mHIMSS.aspx
www.thehealthcompass.org

News and resources
www.fiercemobilehealthcare.com
www.mHealthSolutions.ru
www.mobihealthnews.com
www.mhealthwatch.com
www.healthworkscollective.com
www.telecareaware.com
www.mobileworldlive.com/latest-stories
www.healthcareitnews.com/resource-topics/mobile-wireless
www.mhealthinsight.com
www.imedicalapps.com

To be updated... Please send us your recommendation of useful and reliable Internet resources. We will be glad to post them here and share with others.
Our experience

The Health and Development Foundation

The Health and Development Foundation, formerly known as Healthy Russia, is a non-profit, non-governmental organization acting in the field of development and conducting programs aimed at public health improvement and behavior change. We have 10 years of experience in designing and implementing comprehensive educational and outreach programs to improve the health and healthy lifestyle skills of Russians, including programs targeting health care professionals.

What we do

While many non-profits specialize in a specific area of expertise, we are able to implement programs across a broad range of topics thanks to our experienced staff and strong relationships with expert partners. The foundation focuses on developing programs in the following areas:

• building healthy lifestyle skills and habits among teens
• substance abuse prevention
• anti-tobacco campaigns
• HIV/AIDS prevention, including comprehensive initiatives to improve the care of HIV+ IDUs and HIV+ women
• education of health care providers, including pharmacists, and specialists carrying out medical trials
• reproductive health and maternal and child health

The Health and Development Foundation also creates and carries out PR and advocacy campaigns, writes proposals for grants and consults for other organizations doing the same, carries out sociological research, and provides consulting services for organizations working in Russia, especially regarding the optimization of administrative costs.
mHealth focus

The work of the Health and Development Foundation has a strong mHealth focus. One of our latest programs, Text4baby Russia (SM斯mamе in Russian), provides pregnant women and new mothers with important health information via free text messages to their mobile phones. Text4baby Russia was developed and implemented as part of the U.S. - Russia Bilateral Presidential Commission, and is based on the successful U.S. text4baby program.

We also use mobile technologies in communicating with vulnerable populations, such as HIV+ IDUs, and in the education of health care providers. In addition, mHealth technologies are used to help train medical professionals to carry out and interpret data for clinical trials.

Geographic scope

The Health and Development Foundation works throughout the territory of the Russian Federation, and has implemented programs in all of the country’s major regions. In total, the reach of our educational programs exceeds 10 million people. Wherever the foundation is working, our programs are always rolled out in close cooperation with local partners and authorities.

Curriculums developed by the Health and Development Foundation are widely used by medical academies and institutions, such as our curriculum “Modern approaches to HIV prevention among IDUs”, which has received official approval from the Russian Ministry of Health, and has been recommended for use in all postgraduate medical institutions in the country.

SSTAR

SSTAR a non-profit health care and social service agency dedicated to the holistic treatment of patients struggling with substance abuse since 1977. Patients of the SSTAR clinic, as well as others, have access to the A-CHESS mobile application, which provides support and information to clients struggling with addiction.

Services

SSTAR is a female-led NGO with a range of services that are organized to make it easier for women to access services. Most services – inpatient and outpatient addiction, mental health, primary care, parenting education, family intervention,
domestic violence, etc - are available at a single location where babysitting is available. Services are offered in a supportive, trauma-informed environment.

Behavioral health services are offered through an “Open Access” model. No appointment is needed for treatment services and, in most cases, treatment. The woman can come in to the Access Center any weekday morning between 7:00 am and 11:30 am and be screened and assessed for admission to outpatient addiction, mental health, inpatient detox, inpatient dual diagnosis, outpatient medication assisted treatment, peer-recovery support/case management. Staff of the Access Center are recruited and trained to convey a warm and welcoming attitude towards clients. In most cases, the woman can enter treatment on the same day.

A portion of the screening and assessment process is self-administered. The assessment includes inquiries into history of domestic violence and other trauma, and evidence of psychiatric symptoms such as anxiety and depression.

The treatment plan is developed in accordance with the treatment/recovery goals and treatment modalities preferred by the woman herself. Caregiver responsibilities are considered in identifying possible barriers to treatment. At the same time, caregiver and other relationships are also identified as strengths enhancing motivation to recover.

Pregnant women are given priority admission to all addiction treatment services. SSTAR’s inpatient Detox, Dual Diagnosis, and short-term (10 day) acute residential treatment services all accept pregnant women as does the outpatient methadone clinic.

Pretreatment – Family Intervention services at SSTAR use a non-confrontational, strength-based model called ARISE. The ARISE model engages the women’s family and social network to increase motivation to change and support ongoing recovery. The work with the family/network continues following discharge from treatment and through any periods of relapse, reducing the length of relapse and increasing periods of sobriety.

Outpatient counseling for mental health and addiction, and the inpatient and residential addiction treatment programs offer women-only groups, including groups that employ the research-validated trauma curriculum, Seeking Safety (Najavits, Weiss, et al, 1998).

Domestic violence counseling and court advocacy are available on-site. If a counselor on the inpatient unit or a doctor in the primary care clinic, for example,
has a patient that discloses domestic abuse, they can have the domestic violence counselor come down and provide the woman support, education on legal and shelter options, as well as advocacy if she chooses to seek court protection from the perpetrator.

In addition to a full continuum of primary care, services, women in any of the SSTAR programs can obtain on-site HIV and HCV testing, counseling, and case management services.

Long-term (6-12 month) residential addiction treatment for up to thirteen women and their young children is available at the SSTARbirth program located in neighboring Rhode Island.

A self-administered interactive computer program for parenting education (Parenting Wisely) is available for use on-site by clients. Patients who used this non-judgmental, supportive, program at SSTAR were found to become more willing to join in-person parenting education and support services.

At intake, during acute inpatient treatment, and for about six months following discharge from acute inpatient treatment, most women patients are eligible for Community Support Program (CSP) services. CSP offers case management service, primarily provided by peer recovery specialists who help the woman link with needed health and social services, connect her to community 12-step programs like Alcoholics Anonymous and Narcotics Anonymous, and provide 24-hour phone support for crisis situations. CSP workers offer their patients who have smart phones with data plans use of the ACHESS smart-phone recovery app. The CSP worker helps them set up the app so it will link them to their recovery support network and to other resources that will help them manage relapse risks and support recovery.
Literature Review: Mobile Interventions for At-Risk Populations

This literature review analyzed 42 articles on the use of mobile phones for public health issues related to MARPs, mainly female-focused. The programs addressed a wide range of audiences, such as substance abusers, recent parolees, economically disadvantaged groups, etc. The following table shows that the majority of programs were designed to address clients with a history of drug abuse (12.3%), alcohol abuse (12.3%), and HIV-positive clients (12.3%). The second largest group of programs were aimed at ethnic and sexual minorities (10.8%), and economically disadvantaged audiences.

Table 1. Target Audiences

<table>
<thead>
<tr>
<th>Audience</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeless</td>
<td>1.5%</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>1.5%</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>1.5%</td>
</tr>
<tr>
<td>Inhabitants of economically depressed regions</td>
<td>4.5%</td>
</tr>
<tr>
<td>Smokers</td>
<td>3.1%</td>
</tr>
<tr>
<td>CSW</td>
<td>3.1%</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>12.3%</td>
</tr>
<tr>
<td>Victims of sexual abuse</td>
<td>6.2%</td>
</tr>
<tr>
<td>Undergoing ART</td>
<td>4.6%</td>
</tr>
<tr>
<td>Depressed</td>
<td>1.5%</td>
</tr>
<tr>
<td>Obese</td>
<td>1.5%</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>3.1%</td>
</tr>
<tr>
<td>Economically disadvantaged</td>
<td>9.2%</td>
</tr>
<tr>
<td>Migrants</td>
<td>1.5%</td>
</tr>
<tr>
<td>Youth</td>
<td></td>
</tr>
<tr>
<td>Substance abuse</td>
<td>6.2%</td>
</tr>
<tr>
<td>Recent parolees</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ethnic/sexual minorities</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

The most common means of communication was text messages sent to mobile phones (70%), with the next most common being smartphone applications (17.5%) and telephone counseling (12.5%) (Table 2). One reason that text message programs are preferred for these types of target audiences is that certain groups, such as lower income audiences or migrants might not have easy access to smartphones.

Table 2. Communication channels
Research was carried out for nearly all of the programs, either at the preliminary stage, or after a launch, in the form of monitoring and evaluation. The most common type of research was randomized controlled trials (25.6%) and program effectiveness evaluations (17.9%) (Table 3).

Table 3. Type of research

<table>
<thead>
<tr>
<th>Type of Research</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative research</td>
<td>5.1%</td>
</tr>
<tr>
<td>Literature review</td>
<td>7.7%</td>
</tr>
<tr>
<td>Meta-analysis</td>
<td>2.6%</td>
</tr>
<tr>
<td>No research</td>
<td>2.6%</td>
</tr>
<tr>
<td>Review of mobile applications</td>
<td>10.3%</td>
</tr>
<tr>
<td>Policy review</td>
<td>2.6%</td>
</tr>
<tr>
<td>Needs assessment</td>
<td>2.6%</td>
</tr>
<tr>
<td>Qualitative research</td>
<td>17.9%</td>
</tr>
<tr>
<td>Pilot study</td>
<td>10.3%</td>
</tr>
<tr>
<td>Exploratory research</td>
<td>2.6%</td>
</tr>
<tr>
<td>Development of tools</td>
<td>5.1%</td>
</tr>
<tr>
<td>Randomized controlled trial (RCT)</td>
<td>25.6%</td>
</tr>
<tr>
<td>Technical/financial research</td>
<td>5.1%</td>
</tr>
</tbody>
</table>
A. Literature review tables

Table 1 shows the articles reviewed grouped by subject matter. For the first category, studies/programs addressing health care system connectivity, it should be noted that most of the articles in the review could be included, as most mobile interventions by their very nature increase the connectivity of the user to health care systems. Therefore, we focused only on those articles/programs that specifically addressed this issue.

<table>
<thead>
<tr>
<th>Table 1.1 Articles organized by subject matter</th>
<th>Studies/programs addressing health care system connectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Year</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>Vidrine</td>
<td>2012</td>
</tr>
<tr>
<td>Scott</td>
<td>2013</td>
</tr>
<tr>
<td>Cohn</td>
<td>2011</td>
</tr>
<tr>
<td>Eysenbach</td>
<td>2013</td>
</tr>
<tr>
<td>Price</td>
<td>2013</td>
</tr>
<tr>
<td>Granholm</td>
<td>2011</td>
</tr>
<tr>
<td>Ben-Zeev</td>
<td>2014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 1.2 Articles organized by subject matter</th>
<th>Studies/programs addressing the use of text messages to communicate health information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Year</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>Boyer</td>
<td>2010</td>
</tr>
<tr>
<td>Ingersoll</td>
<td>2014</td>
</tr>
<tr>
<td>Kurth</td>
<td>July 2013</td>
</tr>
<tr>
<td>Hardy</td>
<td>Mar 2011</td>
</tr>
<tr>
<td>Dowshen</td>
<td>Mar 2012</td>
</tr>
<tr>
<td>Simoni</td>
<td>Dec 2010</td>
</tr>
<tr>
<td>Mbuagbaw</td>
<td>2013</td>
</tr>
</tbody>
</table>
### Table 1.2 Articles organized by subject matter

Studies/programs addressing the use of text messages to communicate health information

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalani</td>
<td>2013</td>
<td>Lit review</td>
<td></td>
<td>SMS+, various subgroups (no IDUs)</td>
<td></td>
</tr>
<tr>
<td>Blyn</td>
<td>2009</td>
<td>Evaluate SMS potential</td>
<td>SMS</td>
<td>SMS, resource-poor areas</td>
<td></td>
</tr>
<tr>
<td>Vidrine</td>
<td>2006</td>
<td>Evaluate SMS potential</td>
<td>Mobile phone counseling sessions</td>
<td>SMS/AIDS, smokers, low-income</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1.3 Articles organized by subject matter

Studies of mHealth initiatives addressing substance abuse

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haug</td>
<td>2013</td>
<td>M&amp;E, no control</td>
<td>Individually tailored SMS</td>
<td>At-risk teens, problem drinkers</td>
<td>Alk-Check</td>
</tr>
<tr>
<td>Suffoletto</td>
<td>Apr 2013</td>
<td>RCT</td>
<td>SMS dialog</td>
<td>At-risk youth, binge drinking</td>
<td></td>
</tr>
<tr>
<td>Stoner</td>
<td>Jun 2012</td>
<td>RCT (ongoing)</td>
<td>Tailored SMS</td>
<td>Adult alcoholics, medication adherence</td>
<td></td>
</tr>
<tr>
<td>McClure</td>
<td>2012</td>
<td>Feasibility study</td>
<td>SMS for substance abuse treatment</td>
<td>Substance abuse, Digital divide</td>
<td></td>
</tr>
<tr>
<td>Chih</td>
<td>2013</td>
<td>RCT</td>
<td>Mobile app, SMS</td>
<td>Substance abusers (alcohol) (relapse prediction and intervention)</td>
<td>A-CHESS</td>
</tr>
<tr>
<td>Muench</td>
<td>Mar 2013</td>
<td>Exploratory study</td>
<td>SMS</td>
<td>Substance abuse, continuing care</td>
<td></td>
</tr>
<tr>
<td>Scott</td>
<td>2013</td>
<td>Feasibility study</td>
<td>Mobile phones (SMS and/or other functions)</td>
<td>Minority women, recent inmates, substance abuse</td>
<td></td>
</tr>
<tr>
<td>Agyapong</td>
<td>2012</td>
<td>RT - perception of usefulness</td>
<td>Supportive text messages</td>
<td>Alcohol abuse, depression</td>
<td></td>
</tr>
<tr>
<td>Cohn</td>
<td>2011</td>
<td>Needs assessment</td>
<td>Review of smartphone apps (SA)</td>
<td>Alcohol abuse</td>
<td></td>
</tr>
<tr>
<td>Boyer</td>
<td>2010</td>
<td>Position paper</td>
<td>Wireless sensors, SMS</td>
<td>Drug users, SMS+ drug users (adherence)</td>
<td></td>
</tr>
<tr>
<td>Boyer</td>
<td>2012</td>
<td>Development of tool</td>
<td>iHealth: smartphones, wireless tech</td>
<td>Substance abuse</td>
<td>iHeal</td>
</tr>
<tr>
<td>Ingersoll</td>
<td>2014</td>
<td>Development of tool</td>
<td>2-way SMS</td>
<td>ART adherence + drug use</td>
<td>TxTEXT</td>
</tr>
</tbody>
</table>
### Table 1.3 Articles organized by subject matter
**Studies of mHealth initiatives addressing substance abuse**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurth</td>
<td>July 2013</td>
<td>Description of RCT</td>
<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
</tr>
<tr>
<td>Dmitrieva</td>
<td>2012</td>
<td>Program description</td>
<td>SMS</td>
<td>IDUs, SMS, CSW</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1.4 Articles organized by subject matter
**Studies of mHealth initiatives addressing commercial sex workers**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dmitrieva</td>
<td>2012</td>
<td>Program description</td>
<td>SMS</td>
<td>IDUs, SMS, CSW</td>
<td>St-Pete Pilot</td>
</tr>
<tr>
<td>Gow</td>
<td></td>
<td>Case Study</td>
<td>SMS</td>
<td>CSW</td>
<td>CEASE</td>
</tr>
</tbody>
</table>

### Table 1.4 Articles organized by subject matter
**Studies of mHealth initiatives addressing domestic violence/sexual assault**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westmarland</td>
<td>2014</td>
<td>Smartphone app review</td>
<td>Smartphone apps</td>
<td>Domestic, sexual violence</td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>2012</td>
<td>App description</td>
<td>Smartphone app, hotline, online</td>
<td>Sexual assault in the military</td>
<td>Safe Helpline</td>
</tr>
<tr>
<td>Circle of 6</td>
<td></td>
<td>App description</td>
<td>Mobile app</td>
<td>Sexual/partner violence</td>
<td>Circle of 6</td>
</tr>
<tr>
<td>Aurora</td>
<td></td>
<td>App description</td>
<td>Mobile app</td>
<td>Domestic violence</td>
<td>Aurora</td>
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</tbody>
</table>

### Table 1.5 Articles organized by subject matter
**Studies of mHealth initiatives addressing tobacco use**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vidrine</td>
<td>2012</td>
<td>(ongoing) RCT</td>
<td>SMS, cell phone counseling calls</td>
<td>Low-income smokers</td>
<td>Project ACTION</td>
</tr>
<tr>
<td>Vidrine</td>
<td>2006</td>
<td>Evaluate mHealth potential</td>
<td>Mobile phone counseling sessions</td>
<td>HIV/AIDS, smokers, low-income</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1.6 Articles organized by subject matter
**Studies of mHealth initiatives addressing SMI/depression**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agyapong</td>
<td>2012</td>
<td>RT perception of usefulness</td>
<td>Supportive text messages</td>
<td>Alcohol abuse, depression</td>
<td></td>
</tr>
<tr>
<td>Granholm</td>
<td>2011</td>
<td>Pilot study</td>
<td>SMS</td>
<td>Schizophrenic patients</td>
<td>MATS</td>
</tr>
<tr>
<td>Ben-Zeev</td>
<td>2014</td>
<td>Trial study</td>
<td>Smartphone app</td>
<td>Schizophrenic patients</td>
<td>FOCUS</td>
</tr>
</tbody>
</table>
### Table 2.1 Articles organized by the target audience of the study or intervention.

**Target audience: Commercial sex workers**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
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<tr>
<td>Dmitrieva</td>
<td>2012</td>
<td>Program description</td>
<td>SMS</td>
<td>IDUs, HIV, CSW</td>
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</tr>
<tr>
<td>Gow</td>
<td></td>
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<td>SMS</td>
<td>CSW</td>
<td>CEASE</td>
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</table>

### Table 2.2 Articles organized by the target audience of the study or intervention

**Target audience: Clients with a history of substance abuse**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haug</td>
<td>2013</td>
<td>M&amp;E, no control</td>
<td>Individually tailored SMS</td>
<td>At-risk teens, problem drinkers</td>
<td>Alk-Check</td>
</tr>
<tr>
<td>Suffoletto</td>
<td>Apr 2013</td>
<td>RCT</td>
<td>SMS dialog</td>
<td>At-risk youth, binge drinking</td>
<td></td>
</tr>
<tr>
<td>Stoner</td>
<td>Jun 2012</td>
<td>RCT (ongoing)</td>
<td>Tailored SMS</td>
<td>Adult alcoholics, medication adherence</td>
<td></td>
</tr>
<tr>
<td>McClure</td>
<td>2012</td>
<td>Feasibility study</td>
<td>mHealth for substance abuse treatment</td>
<td>Substance abuse, Digital divide</td>
<td></td>
</tr>
<tr>
<td>Chih</td>
<td>2013</td>
<td>RCT</td>
<td>Mobile app, SMS</td>
<td>Substance abusers (alcohol) (relapse prediction and intervention)</td>
<td>A-CHESS</td>
</tr>
<tr>
<td>Muench</td>
<td>Mar 2013</td>
<td>Exploratory study</td>
<td>SMS</td>
<td>Substance abuse, continuing care</td>
<td></td>
</tr>
<tr>
<td>Scott</td>
<td>2013</td>
<td>Feasibility study</td>
<td>Mobile phones (sms and/or other functions)</td>
<td>Minority women, recent inmates, substance abuse</td>
<td></td>
</tr>
<tr>
<td>Agyapong</td>
<td>2012</td>
<td>RT – perception of usefulness</td>
<td>Supportive text messages</td>
<td>Alcohol abuse, depression</td>
<td></td>
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<tr>
<td>Cohn</td>
<td>2011</td>
<td>Needs assessment</td>
<td>Review of smartphone apps (SA)</td>
<td>Alcohol abuse</td>
<td></td>
</tr>
<tr>
<td>Boyer</td>
<td>2010</td>
<td>Position paper</td>
<td>Wireless sensors, SMS</td>
<td>Drug users, HIV+ drug users (adherence)</td>
<td></td>
</tr>
<tr>
<td>Boyer</td>
<td>2012</td>
<td>Development of tool</td>
<td>iHealth: smartphones, wireless tech</td>
<td>Substance abuse</td>
<td>iHeal</td>
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<tr>
<td>Ingersoll</td>
<td>2014</td>
<td>Development of tool</td>
<td>2-way SMS</td>
<td>ART adherence + drug use</td>
<td>TxTEXT</td>
</tr>
<tr>
<td>Kurth</td>
<td>July 2013</td>
<td>Description of RCT</td>
<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
<td>Study type</td>
<td>Intervention type</td>
<td>MARP group(s)</td>
<td>Program name</td>
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<td>RCT</td>
<td>SMS reminder</td>
<td>Low-income, urban, minority, pediatric vaccine reminders</td>
<td></td>
</tr>
<tr>
<td>Ahsan</td>
<td>2013</td>
<td>Survey results</td>
<td>SMS/call – info, reminders</td>
<td>Pregnant women, underdeveloped country</td>
<td>MAMA Bangladesh (Aponjon)</td>
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<td>Hoff</td>
<td>2012</td>
<td>M&amp;E report</td>
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<td>Vidrine</td>
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<td>SMS, cell phone counseling calls</td>
<td>Low-income smokers</td>
<td>Project ACTION</td>
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<td>Feasibility study</td>
<td>mHealth for substance abuse treatment</td>
<td>Substance abuse, Digital divide</td>
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<tr>
<td>Scott</td>
<td>2013</td>
<td>Feasibility study</td>
<td>Mobile phones (sms and/or other functions)</td>
<td>Minority women, recent inmates, substance abuse</td>
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<tr>
<td>Kurth</td>
<td>July 2013</td>
<td>Description of RCT</td>
<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
</tr>
<tr>
<td>Eysenbach</td>
<td>2014</td>
<td>Qualitative study</td>
<td>SMS, automated counseling</td>
<td>Low-income, urban Lations with diabetes</td>
<td>TexT-MED</td>
</tr>
<tr>
<td>Tirado</td>
<td>2011</td>
<td>Policy review</td>
<td>SMS/mobile phone calls</td>
<td>Minorities, low-income</td>
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<tr>
<td>Eysenbach</td>
<td>2013</td>
<td>(Non-program study)</td>
<td>SMS/mobile phone calls</td>
<td>Homeless adults</td>
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<td>Evaluate mHealth potential</td>
<td>SMS</td>
<td>Resource-poor areas</td>
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<tr>
<td>Price</td>
<td>2013</td>
<td>Evaluate mHealth potential</td>
<td>(SMS)</td>
<td>Hispanic migrant farm workers</td>
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<tr>
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<td>SMS</td>
<td>HIV, resource-poor areas</td>
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</tr>
<tr>
<td>Vidrine</td>
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<td>Evaluate mHealth potential</td>
<td>Mobile phone counseling sessions</td>
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**Table 2.4 Articles organized by the target audience of the study or intervention**

**Target audience: Victims/at-risk for domestic violence or sexual assault**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
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<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
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</thead>
<tbody>
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<td>Smartphone app review</td>
<td>Smartphone apps</td>
<td>Domestic, sexual violence</td>
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</tr>
<tr>
<td>Author</td>
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<td>Study type</td>
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<td>MARP group(s)</td>
<td>Program name</td>
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<td>Lit review</td>
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<td>Tuberculosis patients</td>
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<td>Boyer</td>
<td>2010</td>
<td>Position paper</td>
<td>Wireless sensors, SMS</td>
<td>Drug users, HIV+ drug users (adherence)</td>
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</tr>
<tr>
<td>Ingersoll</td>
<td>2014</td>
<td>Development of tool</td>
<td>2-way SMS</td>
<td>ART adherence + drug use</td>
<td>TxTEXT</td>
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<tr>
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<td>July 2013</td>
<td>Description of RCT</td>
<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
</tr>
<tr>
<td>Hardy</td>
<td>Mar 2011</td>
<td>RCT</td>
<td>SMS, interactive</td>
<td>ART adherence</td>
<td>ARemind</td>
</tr>
<tr>
<td>Dowshen</td>
<td>Mar 2012</td>
<td>Prospective pilot study</td>
<td>2-way SMS</td>
<td>HIV+ youth, ART adherence, MSM, minority</td>
<td></td>
</tr>
<tr>
<td>Simoni</td>
<td>Dec 2010</td>
<td>RCT</td>
<td>2-way pager</td>
<td>HIV, ART adherence</td>
<td></td>
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<td>Mbuagbaw</td>
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<td>Lit review</td>
<td>SMS</td>
<td>HIV+, (ART adherence)</td>
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<tr>
<td>Catalani</td>
<td>2013</td>
<td>Lit review</td>
<td></td>
<td>HIV+, various subgroups (no IDUs)</td>
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<td>Menacho</td>
<td>2013</td>
<td>Qualitative study</td>
<td>SMS</td>
<td>MSM, HIV testing</td>
<td></td>
</tr>
<tr>
<td>Eysenbach</td>
<td>2013</td>
<td>(Non-program study)</td>
<td>SMS/mobile phone calls</td>
<td>Homeless adults</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>2013</td>
<td>Evaluate mHealth potential</td>
<td>(SMS)</td>
<td>Hispanic migrant farm workers</td>
<td></td>
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<tr>
<td>Blyn</td>
<td>2009</td>
<td>Evaluate mHealth potential</td>
<td>SMS</td>
<td>HIV, resource-poor areas</td>
<td></td>
</tr>
<tr>
<td>Vidrine</td>
<td>2006</td>
<td>Evaluate mHealth potential</td>
<td>Mobile phone counseling sessions</td>
<td>HIV/AIDS, smokers, low-income</td>
<td></td>
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<tr>
<td>Granholm</td>
<td>2011</td>
<td>Pilot study</td>
<td>SMS</td>
<td>Schizophrenic patients</td>
<td>MATS</td>
</tr>
<tr>
<td>Ben-Zeev</td>
<td>2014</td>
<td>Trial study</td>
<td>Smartphone app</td>
<td>Schizophrenic patients</td>
<td>FOCUS</td>
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</tbody>
</table>

Table 2.6 Articles organized by the target audience of the study or intervention

Ethnic/sexual minority groups
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockwell</td>
<td>Apr 2012</td>
<td>RCT</td>
<td>SMS reminder</td>
<td>Low-income, urban, minority, pediatric vaccine reminders</td>
<td></td>
</tr>
<tr>
<td>Ahsan</td>
<td>2013</td>
<td>Survey results</td>
<td>SMS/call – info, reminders</td>
<td>Pregnant women, underdeveloped country</td>
<td>MAMA Bangladesh (Aponjon)</td>
</tr>
<tr>
<td>Hoff</td>
<td>2012</td>
<td>M&amp;E report</td>
<td>SMS</td>
<td>Minority, low-income women</td>
<td>Text4baby</td>
</tr>
<tr>
<td>Steinberg</td>
<td>2013</td>
<td>RCT, pilot study</td>
<td>SMS, 2-way</td>
<td>Minority women, obesity</td>
<td></td>
</tr>
<tr>
<td>Scott</td>
<td>2013</td>
<td>Feasibility study</td>
<td>Mobile phones (SMS and/or other functions)</td>
<td>Minority women, recent inmates, substance abuse</td>
<td></td>
</tr>
<tr>
<td>Eysenbach</td>
<td>2014</td>
<td>Qualitative study</td>
<td>SMS, automated</td>
<td>Low-income, urban Lations with diabetes</td>
<td></td>
</tr>
<tr>
<td>Tirado</td>
<td>2011</td>
<td>Policy review</td>
<td>SMS/mobile phone calls</td>
<td>Minorities, low-income</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>2013</td>
<td>Evaluate SMS potential</td>
<td>(SMS)</td>
<td>Hispanic migrant farm workers</td>
<td></td>
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<tr>
<td>Burns</td>
<td>2013</td>
<td>Project design</td>
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<td>Sexual minority teens</td>
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Table 2.7 Articles organized by the target audience of the study or intervention

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<tr>
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<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott</td>
<td>2013</td>
<td>Feasibility study</td>
<td>Mobile phones (SMS and/or other functions)</td>
<td>Minority women, recent inmates, substance abuse</td>
<td></td>
</tr>
<tr>
<td>Kurth</td>
<td>July 2013</td>
<td>Description of RCT</td>
<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
</tr>
</tbody>
</table>

Table 3 groups articles reviewed by the type of study: qualitative, quantitative, or a combination of qualitative and quantitative. Excluded are those articles for which these categories are not relevant (i.e. concept papers, literature review, etc.)

Table 3.1 Articles organized by type of study

| Type of study: Qualitative
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westmarland</td>
<td>2014</td>
<td>Smartphone app review</td>
<td>Smartphone apps</td>
<td>Domestic, sexual violence</td>
<td></td>
</tr>
<tr>
<td>Vidrine</td>
<td>2012</td>
<td>(ongoing) RCT</td>
<td>SMS, cell phone counseling calls</td>
<td>Low-income smokers</td>
<td>Project ACTION</td>
</tr>
<tr>
<td>Agyapong</td>
<td>2012</td>
<td>RT perception of usefulness</td>
<td>Supportive text messages</td>
<td>Alcohol abuse, depression</td>
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</tbody>
</table>
### Table 3.1 Articles organized by type of study

**Type of study: Qualitative**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
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<tr>
<td>Cohn</td>
<td>2011</td>
<td>Needs assessment</td>
<td>Review of smartphone apps (SA)</td>
<td>Alcohol abuse</td>
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</tr>
<tr>
<td>Boyer</td>
<td>2010</td>
<td>Position paper</td>
<td>Wireless sensors, SMS</td>
<td>Drug users, HIV+ drug users (adherence)</td>
<td></td>
</tr>
<tr>
<td>Menacho</td>
<td>2013</td>
<td>Qualitative study</td>
<td>SMS</td>
<td>MSM, HIV testing</td>
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</tr>
<tr>
<td>Eysenbach</td>
<td>2014</td>
<td>Qualitative study</td>
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</table>

### Table 3.2 Articles organized by type of study

**Quantitative**

<table>
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<th>Intervention type</th>
<th>MARP group(s)</th>
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<tr>
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<td>RCT</td>
<td>HIV reminder</td>
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<tr>
<td>Haug</td>
<td>2013</td>
<td>M&amp;E, no control</td>
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<td>At-risk teens, problem drinkers</td>
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<td>HIV dialog</td>
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<td>2013</td>
<td>RCT</td>
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<td>Kurth</td>
<td>July 2013</td>
<td>Description of RCT</td>
<td>HIV, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
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<td>Dowshen</td>
<td>Mar 2012</td>
<td>Prospective pilot study</td>
<td>2-way HIV</td>
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<td>Simoni</td>
<td>Dec 2010</td>
<td>RCT</td>
<td>2-way pager</td>
<td>HIV, ART adherence</td>
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<td>Vidrine</td>
<td>2006</td>
<td>Evaluate HIV potential</td>
<td>Mobile phone counseling sessions</td>
<td>HIV/AIDS, smokers, low-income</td>
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<td>Author</td>
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<td>Substance abuse, continuing care</td>
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<td>Feasibility study</td>
<td>Mobile phones (SMS and/or other functions)</td>
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<td>Alcohol abuse, depression</td>
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<td>Development of tool</td>
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<td>Development of tool</td>
<td>2-way SMS</td>
<td>ART adherence + drug use</td>
<td>TxTEXT</td>
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<td>SMS, interactive</td>
<td>ART adherence</td>
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<td>(SMS)</td>
<td>Hispanic migrant farm workers</td>
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<tr>
<td>Ben-Zeev</td>
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<td>Trial study</td>
<td>Smartphone app</td>
<td>Schizophrenic patients</td>
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Table 4.1 Scope of program

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<th>Intervention scope: Trial/pilot</th>
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<tr>
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</tr>
<tr>
<td>Stockwell</td>
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<tr>
<td>Steinberg</td>
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### Table 4.1 Scope of program

**Intervention scope: Trial/pilot**

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<thead>
<tr>
<th>Author</th>
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<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
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<td>(ongoing) RCT</td>
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<td>Low-income smokers</td>
<td>Project ACTION</td>
</tr>
<tr>
<td>Haug</td>
<td>2013</td>
<td>M&amp;E, no control</td>
<td>Individually tailored SMS</td>
<td>At-risk teens, problem drinkers</td>
<td>Alk-Check</td>
</tr>
<tr>
<td>Suffoletto</td>
<td>Apr 2013</td>
<td>RCT</td>
<td>SMS dialog</td>
<td>At-risk youth, binge drinking</td>
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<tr>
<td>Stoner</td>
<td>Jun 2012</td>
<td>RCT (ongoing)</td>
<td>Tailored SMS</td>
<td>Adult alcoholics, medication adherence</td>
<td></td>
</tr>
<tr>
<td>Chih</td>
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<td>RCT</td>
<td>Mobile app, SMS</td>
<td>Substance abusers (alcohol) (relapse prediction and intervention)</td>
<td>A-CHESS</td>
</tr>
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<td>Exploratory study</td>
<td>SMS</td>
<td>Substance abuse, continuing care</td>
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<td>CARE+ Corrections</td>
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<td>Dowshen</td>
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<td>Simoni</td>
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<td>2013</td>
<td>Qualitative study</td>
<td>SMS</td>
<td>MSM, SMS testing</td>
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<td>TexT-MED</td>
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<td>Ben-Zeev</td>
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<td>Trial study</td>
<td>Smartphone app</td>
<td>Schizophrenic patients</td>
<td>FOCUS</td>
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</table>

### Table 4.2 Scope of program

**Intervention scope: Ongoing programs**
The majority of interventions reviewed were located in the United States. Table 5 organizes the remaining articles reviewed by country. We have included those programs covered in the literature review to show the full range of intervention locations.

### Table 5 Remaining articles reviewed by country

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Country</th>
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<td>SMB</td>
<td>Tuberculosis patients</td>
<td>Argentina, South Africa, Kenya</td>
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<tr>
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<td>2013</td>
<td>Survey results</td>
<td>SMS/call – info, reminders</td>
<td>Pregnant women, underdeveloped country</td>
<td>Bangladesh</td>
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<td>App description</td>
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<td>Australia</td>
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<td>M&amp;E report</td>
<td>Individually tailored SMS</td>
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<td>Lit review</td>
<td>SMS</td>
<td>HIV+, (ART adherence)</td>
<td>Kenya, Cameroon</td>
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<td>Qualitative study</td>
<td>SMS</td>
<td>MSM, HIV testing</td>
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</table>

Table 6 organizes articles reviewed by the main mobile technology used in the intervention. We did not distinguish whether the interventions were mobile only, or combined mobile and offline/other components. Excluded are those articles for which these categories are not relevant (i.e. concept papers, literature review, etc.)

### Table 6.1 Articles organized by the main mobile technology used in the study/intervention

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study type</th>
<th>Intervention type</th>
<th>MARP group(s)</th>
<th>Program name</th>
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<td>Smartphone apps</td>
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<td>App description</td>
<td>Smartphone app, hotline, online</td>
<td>Sexual assault in the military</td>
<td>Safe Helpline</td>
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<td>App description</td>
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<td>Sexual/partner violence</td>
<td>Circle of 6</td>
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<td>App</td>
<td>Mobile app</td>
<td>Domestic</td>
<td>Aurora</td>
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<td>Author</td>
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<td>Substance abusers (alcohol) (relapse prediction and intervention)</td>
<td>A-CHESS</td>
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<td>Cohn</td>
<td>2011</td>
<td>Needs assessment</td>
<td>Review of smartphone apps (SA)</td>
<td>Alcohol abuse</td>
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<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
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<td>RCT</td>
<td>SMS reminder</td>
<td>Low-income, urban, minority, pediatric vaccine reminders</td>
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<td>Ahsan</td>
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<td>Survey results</td>
<td>SMS/call – info, reminders</td>
<td>Pregnant women, underdeveloped country</td>
<td>MAMA Bangladesh (Aponjon)</td>
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<td>M&amp;E report</td>
<td>SMS</td>
<td>Minority, low-income women</td>
<td>Text4baby</td>
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<tr>
<td>Steinberg</td>
<td>2013</td>
<td>RCT, pilot study</td>
<td>SMS, 2-way</td>
<td>Minority women, obesity</td>
<td>ShapePlan</td>
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<td>Vidrine</td>
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<td>Low-income smokers</td>
<td>Project ACTION</td>
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<td>M&amp;E, no control</td>
<td>Individually tailored SMS</td>
<td>At-risk teens, problem drinkers</td>
<td>Alk-Check</td>
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<td>RCT</td>
<td>SMS dialog</td>
<td>At-risk youth, binge drinking</td>
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<td>RCT (ongoing)</td>
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<tr>
<td>Muench</td>
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<td>Exploratory study</td>
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<td>Alcohol abuse, depression</td>
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<td>Development of tool</td>
<td>2-way SMS</td>
<td>ART adherence + drug use</td>
<td>TxTEXT</td>
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<td>SMS, computerized counseling</td>
<td>ART adherence, drug use, recent inmates</td>
<td>CARE+ Corrections</td>
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<td>RCT</td>
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### Table 6.1: Articles organized by the main mobile technology used in the study/intervention

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<th>Program name</th>
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<td>SMS, automated</td>
<td>Low-income, urban, Lations with diabetes</td>
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### Table 6.2: Articles organized by the main mobile technology used in the study/intervention

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<td>Ben-Zeev</td>
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<td>Trial study</td>
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### Table 7: All the articles included in the literature review

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<td>Hoff</td>
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<td>M&amp;E report</td>
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<td>Individually tailored SMS</td>
<td>At-risk teens, problem drinkers</td>
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<td>Suffoletto</td>
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<td>RCT</td>
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<td>Scott</td>
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<td>RT</td>
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<td>Cohn</td>
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<td>Needs assessment</td>
<td>Review of smartphone apps (SA)</td>
<td>Alcohol abuse</td>
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</tr>
<tr>
<td>Boyer</td>
<td>2010</td>
<td>Position paper</td>
<td>Wireless sensors, SMS</td>
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<tr>
<td>Boyer</td>
<td>2012</td>
<td>Development of tool</td>
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<td>RCT</td>
<td>2-way pager</td>
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<td>Lit review</td>
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Works Cited


Gow, G., Quinn, K., & Barlott, T. *Sexual Exploitation Outreach with Text Messaging: Introducing Project Backpage.*


Bibliography


Gow, G., Quinn, K., & Barlott, T. *Sexual Exploitation Outreach with Text Messaging: Introducing Project Backpage*.


