

## **Text4baby in the United States and Russia: An Opportunity for Understanding How mHealth Affects Maternal and Child Health**

**RUTH M. PARKER**

School of Medicine, Emory University, Atlanta, Georgia, USA

**ELENA DMITRIEVA AND SERGEI FROLOV**

Health and Development Foundation, Moscow, Russia

**JULIE A. GAZMARARIAN**

Department of Epidemiology, Rollins School of Public Health,  
Emory University, Atlanta, Georgia, USA

*Text4baby uses new technology to deliver health messages and engage pregnant women and new mothers in healthy behaviors. The authors describe the need for carefully conducted early adopter epidemiologic evaluation and describe one such evaluation in a women, infant, and children clinic population in the United States and its proposed adaptation for use among early users of Text4baby in Russia. Collaborative efforts among countries can guide international understanding and use of best practices of this emerging technology.*

A recent report by the International Telecommunication Union documenting that mobile-cellular subscriptions reached 78 per 100 inhabitants worldwide confirms that cell phone use has become a part of daily life for most people, with more than 2 trillion text messages sent in 2009 (CTIA-The Wireless Association, 2010; International Telecommunication Union, 2011). Mobile technology represents an opportunity to deliver health-related information, and text messaging in health-related settings appears to be well received (Chandler et al., 2012; Cornelius & St. Lawrence, 2009; Harris et al., 2010; Kharbanda et al., 2012; Person, Blain, Jiang, Rasmussen, & Stout, 2011; Woolford et al., 2011; Woolford, Clark, Strecher, & Resnicow, 2010; Wright, Fortune, Juzand, & Bull, 2011). A few studies have examined how text messages affect various health outcomes, including use of services and health behaviors (Battistotti, Quaglini, & Cuoco, 2006; Castaño & Martinez, 2007; Castaño, Westhoff, Martinez, & Lara, 2009; Hou, Hurwitz, Kavanagh, Fortin, & Goldberg, 2010; Nelson, Berg, Bell, Leggott, & Seminario, 2011; Shapiro et al., 2008). Only a couple small studies

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Address correspondence to Ruth M. Parker, School of Medicine, Emory University, 201 Dowman Drive, Atlanta, GA 30322, USA. E-mail: rpark01@emory.edu

have specifically focused on pregnant women or those with newborns and findings documented interest in receiving text messages containing health information (Jareethum, 2008; Kharbanda et al., 2011; Patrick et al., 2009).

Text4baby (T4B) started as a U.S. mobile health information text messaging service (mHealth) that sends free text messages to women who are pregnant or have children younger than 1 year old, providing them with information and reminders to improve their health and the health of their babies. Women sign up for the service by sending a text message with their child's expected birth date and they receive three messages a week offering evidence-based information relevant to the stage of pregnancy they are in. T4B U.S. is a program of the National Healthy Mothers, Healthy Babies Coalition supported by a public-private partnership that includes Johnson & Johnson (founding sponsor), the White House Office of Science and Technology Policy, Health & Human Services, Department of Defense, and other private and nonprofit partners.<sup>1</sup> The T4B U.S. project launched in February 2010 and currently has approximately 240,000 enrollees.

Earlier this year, USAID/Russia worked with Johnson & Johnson and a leading Russian nongovernmental organization, the "Health and Development Foundation" to develop the T4B Russia public-private partnership.<sup>2</sup> With ongoing modernization of the health care system in Russia, the national project team viewed T4B as an opportunity to advance a new era of client-doctor relationships, with women more actively participating in conversations with their doctors. Cell phones are widely used by the T4B Russia target audience, with 94% of women aged from 18 to 24 years old having cell phones.<sup>3</sup> The text messages would be a vehicle for providing evidence-based information that pregnant and postpartum women could use in more active communication during their visits. Messages would serve to educate women not only about pregnancy and baby care topics, but also topics of social welfare, such as delivery certificate and maternal capital, which are important and relevant to Russian women. The Russian language poses unique challenges because words are longer and require more characters, and the team used experts in philology and focus group pretesting with women to ensure messages could be understood. The Russia T4B project functions similarly to that of the T4B U.S. project and founding partners include Johnson & Johnson, the technology company Voxiva, Moscow's Kulakov Center and the Ministry of Health and Social Development, and researchers at Moscow State University.

The T4B Russia project is the first project in Russia based on mobile technology whose intended goal is that of improving maternal and child health. The program is expected to launch in December, 2011, in Moscow and St. Petersburg, with marketing limited to these two locations initially, but text enrollment accepted from throughout the country. Over subsequent months, T4B will be promoted throughout all eight federal regions of Russia, using multiple channels for program dissemination. The implementers hope to reach 100,000 women in the first year, resulting in improved knowledge of prenatal care among expectant mothers, behavior changes, and improved health outcomes for mothers and infants.

The T4B program is a large-scale initiative using new technology for health messaging and will soon have been implemented in two large countries, becoming the first mHealth international initiative intended to improve maternal and child health.

<sup>1</sup> See <http://www.text4baby.org>

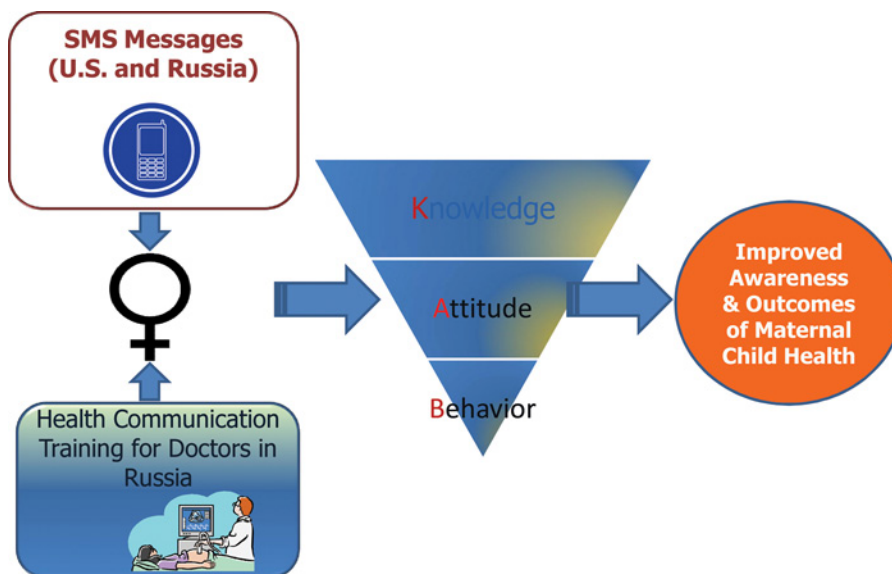
<sup>2</sup> See <http://www.fzr-eng.ru>

<sup>3</sup> See <http://www.levada.ru/press/2009041302.html>

Experience in the United States over the last year demonstrates that the program has rapid uptake among users; however, careful and systematic evaluation, which is now underway in the United States, is critical for understanding and evaluating the program's diffusion and potential for affecting health behaviors. As mHealth is increasingly used for dissemination of health information across various countries and populations, a prototype that allows for systematic collection of data for evaluation across populations can help to define best practices, effectiveness, and impact. Our team has experience in implementing monitoring and evaluation strategies of T4B in the United States and Russia, and in this article we describe the logic used to define project evaluation that we propose adopting for use in both countries. This approach will provide international data collected in the United States and Russia, as well as other countries in the future, to define best practices and impact for this emerging technology.

### T4B Interventions and Intended Outcomes

Figure 1 describes the model we created to describe the components of the T4B program in both countries. Of note, in the U.S. program, implementation has only one component: text messages based on practice guidelines delivered three times a week throughout pregnancy and during first year of life of newborn to subscribers. In Russia, focus group testing results and input of the national technical advisory team determined that the program needed two interventions, as noted in Figure 1. Pregnant women and mothers of newborns would receive two messages a week (on the basis of input from focus groups of users in Russia) and another national intervention would be a 1-day health communication training program for all doctors who see pregnant women and mothers of newborns to raise awareness of the T4B program and encourage



**Figure 1.** Text4baby logic model for project interventions, process, and outcomes. SMS messages=short message service messages (commonly referred to as text messages). (Figure available in color online.)

improved health communication. In Russia, T4B is hoped to contribute to a culture of proactive clients, more able to communicate with their doctors not as a passive listeners, but as peers asking questions and sharing information related to maternal and child health. Figure 1 shows that the interventions are expected to more greatly affect knowledge than attitude and behavior in leading to the desired outcomes of heightened awareness of and improved outcomes for maternal and child health.

### **U.S. Early Adopter Evaluation Strategy**

The Emory University team (J.G. and R.P.) created an Early Adopter Study of T4B Users and began data collection for this project 6 months after T4B was launched in the United States. The primary goal of the Emory Early Adopter Study was to evaluate the potential impact of the early users of the T4B program who were women, infant, and children recipients in Georgia. This project in Georgia will provide critical insights but may not be generalizable to all users across the United States. This evaluation was designed to (a) assess the receptivity of the program, including barriers to adoption and continued usage; (b) determine other benefits of T4B, such as referral to helplines and other health services; (c) evaluate whether text messages increase knowledge and change behaviors, and (d) offer early systematically collected data on T4B participants in an underserved population.

Early and carefully conducted evaluations such as the Emory Early Adopter Survey provide formative and summative information to guide ongoing use of this new media as more are enrolled in T4B over the next years, and can also guide epidemiologic design and data collection of national and international efforts.

### **Adapting U.S. Early Adopter Evaluation for Russia**

Using insights from the United States on T4B message testing and early adopter evaluation, our team collaborated to design a comprehensive monitoring and evaluation strategy for T4B Russia that will allow for bilateral assessment of the impact of T4B across countries. Experience in the United States reinforced the need for early adopter evaluation, which allows a quantitative look at message receipt, receptivity to messages, whether messages were perceived as useful.

Table 1 outlines some of the types of measures that are targeted for data collection, which will be done by researchers at Moscow State University. Most of these measures represent the attitudinal and behavioral outcomes directly related to the T4B-recommended behaviors. These include (a) demographic characteristics, including reproductive history; (b) receptivity of participating in the T4B program; and (c) current knowledge and behaviors during pregnancy and childbirth (for those pregnant) or during the postpartum period (for those with infants); such as avoiding smoking and alcohol use, prenatal vitamins, safe sleep, breastfeeding, immunizations, and so on. We anticipate the baseline interview will take approximately 15 min to complete, which is similar in length to that in the United States.

### **Implications**

When implemented in the United States, T4B was viewed as a novel health-literate intervention using principles of health literacy to ensure messages were understandable, navigable, and actionable. Program implementers acknowledged the prevalence of

**Table 1.** Potential indicators to evaluate Text4baby U.S. and Russia programs

Construct	Pregnant	Postpartum (new baby)	Providers <sup>R</sup>
Knowledge, attitude, and behavior	Registration at maternity center <sup>R</sup>	Health care utilization	T4B program Recommended tests
	Selection of doctor <sup>R</sup>	Smoking	Importance of commu- nication
	Prenatal testing/ ultrasound	Drinking	
	Smoking	Breastfeeding	
	Drinking	Newborn testing	
	Healthy lifestyle	Umbilical cord care	
	Exercise	MCH nutrition	
	Nutrition	Newborn skin care <sup>R</sup>	
	Medication/illness during pregnancy	Newborn massage/ nurturing <sup>R</sup>	
	Vitamins	Newborn development	
	Personal hygiene <sup>R</sup>		
	Pregnancy rights <sup>R</sup> : work; benefits; allowance; maternity leave		
	Prenatal classes		
	Hospital preparation and documents <sup>R</sup>		
	Signs of delivery		
	Secondhand smoke exposure		
	Awareness	Number of women registered in T4B	
Number of messages sent			Awareness of T4B
Access to websites			Promotion of T4B to patients
Number of outreach/promotional efforts			
Satisfaction with T4B			
Outcomes	Improved health care utilization		Improved commu- nication with patients
	Increased birth rate		
	Birthweight		
	Maternal and infant mortality and morbidity		

*Note.* MCH=maternal and child health; T4B=Text4baby.

<sup>R</sup>Questions unique to T4B in Russia.

limited health literacy and its association with excess costs, higher mortality, and negative health outcomes like less use of preventive care such as prenatal visits and immunizations. In the United States, the majority of health information offered is not understood by those in need of the information. The T4B U.S. program embraced the lessons of a health-literate approach to recruit, engage, and impact healthy habits for underserved populations.

As Russia readied for its national launch of T4B, USAID supported U.S. colleagues to share their experience and expertise designing an evaluation with Russian project leaders. As the U.S. collaborators worked with the Russian team to share their experience in message development and testing and evaluation, they (R.P. and J.G.) were able to use their U.S. experience and collaborate with the Russian team (E.D., S.F., W.S.) to create a model and evaluation strategy that can be useful within and across countries.

The model created by this international collaboration defines the goals of monitoring and evaluation of the use of this new media. It is important to note that the model captures the types of interventions in each country, their mechanism of potential action, and intended outcomes. This logic model has important implications for others as they implement mHealth to address maternal and child health. In addition, our collaborative efforts led to the creation of a prototype for an epidemiologic evaluation that can be used to compare data findings across countries. Ensuring monitoring and evaluation as an a priori component of project implementation is critical for ensuring the ability to capture an evidence base regarding this new technology. From this, all can learn of best practices and come to understand the impact of mHealth on maternal and child health.

The Mobile Alliance for Maternal Action was recently announced as another partnership expected to mobilize \$10 million and work in countries of Bangladesh, India, and South Africa using mobile technology to improve maternal health.<sup>4</sup> The efforts described in this article highlight the need for collaborative evaluation efforts across countries. These efforts provide an opportunity to obtain data that can be useful to critically evaluate the effectiveness of text message strategies and mobile applications across populations and countries to understand best practices, lessons learned, and to determine realistic expectations of this new technology.

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<sup>4</sup>See <http://health.gbiportal.net/2011/09/29/usaids-mama-initiative-leading-the-way-in-mobile-for-maternal-health-projects>

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