

Stanford SOCIAL INNOVATION^{Review}

Viewpoint
Deploying Technology
By Dr. Aparna Hegde

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Deploying Technology

TECHNOLOGY ALONE IS NOT THE INNOVATION. RATHER, THE INNOVATION LIES IN HOW TECHNOLOGY IS DEPLOYED.

■ BY DR. APARNA HEGDE

I pursued medicine and became a urogynecologist because I wanted to be of service to people, particularly women, while pursuing my love for science and research. But during my residency at Sion Hospital in Mumbai—a massive public hospital in the heart of the city—I wasn't satisfied, mostly because I realized that we were not able to meet everyone's needs.

At the hospital, we staffed the antenatal clinics for long hours, seeing one pregnant woman after another. But no matter how many I saw, there were always many more waiting outside. Sadly, much of the time I could barely examine them and didn't even get to notice their faces. Then, these same women would return in their ninth month of pregnancy with complications. I'd look at their records and see my signature, and realize that I had met with them in their first trimester, but the women had not followed through and come back for routine checkups, as advised.

The volume of patients I was seeing was only part of the problem. The greater issue was that what these women needed most was information about regular preventive care, how to maintain their health, and how to recognize signs of trouble, as well as someone to hold their hand through pregnancy and infancy.

I've seen numerous women die in labor. Unfortunately, many if not most of them could have been saved had we provided them with information at the right time. We did save the lives of many women, and it was intellectually and emotionally satisfying to do so. But in the bigger picture, what we were doing was akin to putting a Band-Aid on a gunshot wound. It was inadequate,

The root problem was the way our public health system in India addressed maternal and child health: There were too many resource-intensive pilot programs that were heavy on human capital and therefore expensive to scale up. As a result, India has some of the worst maternal and child mortality rates in the world. A woman dies in childbirth every 10 minutes, and more than 300,000 infants do not live beyond the first 24 hours of their life each year.

CONNECTING HEALTH CARE AND TECHNOLOGY

Despite these startling statistics, India also had more mobile phones than toilets. As early as 2008, I saw that women, even in the poorest slums of Mumbai, had access to a mobile phone. (By December 2015, the total number of mobile phone subscriptions in the country crossed one billion.) I began to think about how the two—access to health-care information and mobile phones—could be connected.

In 2008 I established a nonprofit, ARMMAN (Advancing Reduction in Mortality and Morbidity of Mothers, Children and Neonates). The aim was to create a homegrown nationwide NGO that implemented cost-effective programs that had objective outcomes and measurable impact and were designed for scale from the beginning. I realized that meaningful scale could be achieved only with the use of technology,

as it would help create programs that were lean in terms of resources needed, yet find the right balance between depth of impact and scale. If I could not personally connect with each woman, I could at least connect with her via technology.

In 2010, we rolled out ARMMAN's first program, Project HERO (Helpline for Emergency Relief Operations). HERO strives to provide real-time information on the availability of intensive care unit (ICU) beds and blood types in hospitals and at blood banks in Mumbai. I had seen women enduring blood loss during labor because they were being shuffled from hospital to hospital in hopes of finding a vacant ICU bed and the right blood type. The helpline, website, SMS (text services), and mobile app directs patients and doctors to this vital information.

Simultaneously, I dug deep into building a tech-based program just for moms-to-be, to solve the problem of lack of access to preventive care information during pregnancy and infancy. I initially toyed with SMS-based services but was hesitant about their efficacy. The approach seemed too one-dimensional: Did women, many of whom were illiterate, feel comfortable reading and responding to texts?

To find out, and to home in on the best

way to communicate with these women, we ran field tests. Across the street from Sion Hospital is Dharavi, one of Asia's largest and most industrious slums; here we spoke with 100 women to see how many of them were comfortable with SMS. The results were surprising: 56 percent of women could not understand how to receive an SMS, 62 percent could not read an SMS, and 72 percent could not send an SMS.

So rather than using texts to communicate with the women about health care, we assembled a team of volunteers in the United



DR. APARNA HEGDE is founder of ARMMAN. She is also a urogynecologist and founder of the Center for Urogynecology and Pelvic Health (CUP) in New Delhi, and a member of the editorial board of the *International Urogynecology Journal*. Hegde studied at Stanford University and the Cleveland Clinic Florida.



States and in India to establish a voice-based communication system. These are simple weekly or twice-a-week phone calls, albeit placed by a computer, to pregnant women and new mothers, offering tips on what to do at each stage of their pregnancy and their baby's infancy. When the woman answers her phone, she is greeted by a woman's voice, which is warm and inviting; she speaks in the same language, and at times even in the same regional dialect. Because it was like having a friend on the line, not a doctor, I named the platform mMitra (*mitra* means "friend" in Hindi).

Now our challenge became ensuring that women received our messages. Many women, we learned, didn't own their own

expanded beyond Mumbai to Nasik, Pune, Madhya Pradesh, Haryana, Rajasthan, Bihar, Hubli, and Delhi through partnerships with government hospitals and NGOs. As important as the technology is, a major reason for the program's success is the personal touch that we provide.

We don't start by sending calls to women whose phone numbers we obtained. Instead, we station trained health workers in the antenatal clinics of government hospitals; they introduce the program to women who come for their first visit and enroll them in mMitra. However, many women do not visit a government hospital until very late in their pregnancy. To address this gap, we partnered with community NGOs to develop women

antenatal and infancy care, including basic diagnostic and treatment interventions for a nominal fee. They are supported by a mobile app that guides them through the care process, helps identify high-risk signs and symptoms, and gives alerts if the patient needs a referral or a more specialized consultation. In addition to helping the women we were trying to reach, this program has had a major ancillary benefit: We've trained 166 women health entrepreneurs who can now supplement their family income. Each Arogya Sakhi earns between INR 1,500 and 3,000 per month (\$25 to \$50).

In parts of the country where some public health infrastructure exists—for example, in Nandurbar in Maharashtra and parts of Rajasthan—we also support the work of government health workers with the help of tablet and mobile phone encoded apps that digitally coordinate the activities of these health workers, guide them through their activities, and provide intuitive and real-time situational medical instructions on the care needed and referral required.

Technology has enabled us to bring down the cost of the mMitra service to just INR 300 (\$5) for each woman over the course of a pregnancy and her infant's first year.

phone. They used their husband's phone or a phone in the family. To address that issue, we asked them to register that phone number and a one-hour time frame each week when they could be reached each day. We realized early on that there would be other challenges. For example, network problems often make it impossible to communicate via cell phone. Also, we knew that women might not have access to the phone on some days or might be too busy to take the call. Consequently, we make three tries for every call on three successive days in the chosen time slot.

If the woman still doesn't answer, she can send a "missed call" notice to our call center at her convenience, and the system will call her back immediately with the automated message. In total, a woman receives 145 calls of 1.5 to 2 minutes' duration over the course of her pregnancy and through her child's first birthday.

TECHNOLOGY WITH TOUCH

By 2014, we had more than 23,000 women registered on mMitra. By 2016, that number had grown to more than 610,587 subscribers, and the program had

leaders (called Sakhis, or "friends") in each urban slum. Through these women, we reach out to other women and enroll them in the program before their crucial second trimester. We have established a network of health workers in 77 government hospitals, partnered with more than 43 community NGOs, and deployed more than 5,853 Sakhis in the slums of urban India.

But there was still one more major challenge—providing health care to women in rural India, where facilities are sparse, and transportation is cumbersome and untimely. These women are daily wage earners, and they often need a chaperone or a spouse to go with them even to a nearby clinic, resulting in loss of daily wages for both. As a result, most women prefer to go to local "doctors," commonly referred to as "quacks," in the evenings. These individuals have little to no formal training in medicine.

To deter women from falling prey to these quacks, we developed and tested a home care system, called Arogya Sakhi. To deliver this service, we trained women from the community to become health entrepreneurs providing home-based

INNOVATION ISN'T JUST A DEVICE

Technology has enabled us to bring down the cost of the mMitra service to just INR 300 (\$5) for each woman over the course of a pregnancy and her infant's first year. That includes the cost of the technology, voice calls, and a staff of more than 85 people to coordinate the programs. Could we as doctors provide care to so many women for INR 300 a person? Certainly not. But over the last eight years, I've come to the conclusion that technology is not the innovation. Rather, the innovation lies in how that technology is deployed.

If we were merely sending out texts, by now we might have blasted out far more messages. But would doing that make a real difference? Unlikely. Scale, I would argue, is not just about the number of people reached. It's about the quality of care they receive and the eternal struggle of finding depth in breadth—especially in a country of 1.3 billion.