



THE GEORGE INSTITUTE

for Global Health INDIA



*Support the innovative use of technology
for affordable healthcare in rural India*



Australia | China | India | UK

SMART Health India

A new model of healthcare for rural India

The Challenge:

- Rural India is home to 750 million people living in 650,000 villages
- Most premature deaths in adults are due to chronic conditions, such as heart disease
- More than 25 million rural people have diabetes and the number is rising rapidly
- Most people with these conditions receive no effective treatment whatsoever

The Solution:

- Innovative, simple and low-cost smartphone technologies
- A larger, less expensive healthcare workforce
- State-of-the-art electronic clinical decision support systems
- Evidence-based, quality-controlled, affordable healthcare for all

How you can help:

Help create a new model of healthcare for rural India. Support the innovative smartphone technology that will enable community health workers to deliver state-of-the-art personalised healthcare for a fraction of the price that it would otherwise cost.



Executive Summary

In India's rural communities, heart disease and related illnesses, such as diabetes, account for a very large proportion of all premature death and disability. These chronic conditions strike at a much younger age in India than they do in the West – as a consequence, they are now the most common killers of people of working age, as well as the most common causes of “catastrophic” personal and family expenditure on emergency medical care. Not surprisingly, therefore, these diseases represent a rapidly growing cause of poverty in India today.

Unfortunately, most people in rural India do not have reliable access to the healthcare required to prevent and manage serious chronic diseases. For example, most people with heart disease in rural India receive no regular medical care whatsoever. The George Institute for Global Health has responded with a major programme in India devoted to developing innovative affordable strategies that will provide high-quality, effective care to people with chronic disease or at very high risk of its occurrence.

“SMART Health India” has been developed by George Institute researchers in India, Australia and the UK for this purpose. It is a unique low-cost, high-quality healthcare delivery system that enables both community health workers and doctors to provide state-of-the-art healthcare for common chronic diseases for a fraction of the price it would otherwise cost. It utilises advanced mobile health technologies that provide the healthcare worker with personalised clinical decision support to guide the Systematic Medical Appraisal Referral and Treatment (SMART) of individual members of the community.

Since wireless networks now reach over 80 per cent of India's population, SMART Health India has the potential to revolutionise the delivery of essential healthcare to those who previously had little or no access. Our goal is to improve the lives of the many millions of vulnerable or disadvantaged people who would otherwise suffer a fatal or disabling disease, or would face destitution as a result of a loved one's death or disability.

SMART Health India is a low-cost, high-quality healthcare delivery system



Hard life, early death

In rural India, heart disease and other serious chronic conditions frequently kill or disable people of working age, making them a common cause of poverty in many communities.

Like many other rural communities in India, life in the rural communities of Andhra Pradesh, a state on India's east coast, is hard. Most people earn their living by fishing or working on the land, and with an average income of about US\$50 per month, they are poor. Earning the means to live is critically dependent upon staying healthy. And ill-health is a constant threat to these communities.

Heart disease is now the most common cause of premature death and disability among people of working age in rural Andhra Pradesh. Those at highest risk are typically over 40 – an age group that has doubled in size in India during the past 20 years.

For reasons that are still not entirely clear, heart disease strikes at a much younger age in India than it does in high-income countries such as the UK, US and Australia. As a consequence, it is not unusual for a young working father to die suddenly of heart disease, leaving a wife and several children without financial support and making heart disease a devastating cause of poverty in India.

The immediate causes of heart disease in India are the same as those elsewhere in the world: diabetes, high blood pressure and high cholesterol, which are now common in both men and women. Furthermore, diabetes is a very common cause of kidney disease, blindness, and amputation. India also suffers the world's largest burden of tuberculosis, and there is growing evidence of a causal link between diabetes and tuberculosis. Today around sixty million Indians have diabetes and around three million have tuberculosis. The World Health Organization has recently prioritised action for the control of both conditions.

People living in rural areas face major obstacles accessing the care they need. In most Indian states, there are too few doctors to provide essential medical care to all who need it. And for many, the cost of the care that is available is unaffordable. As a result, most people in India who are likely to develop serious chronic disease receive no regular medical care whatsoever. The solution is a smarter way to deliver healthcare.

In most parts of India, there are too few doctors to provide essential medical care to all who need it



SMART Health: 21st century healthcare for rural India

The George Institute for Global Health has established a major programme devoted to developing innovative, scalable strategies that will provide effective, affordable care to people with chronic disease.

SMART Health India is the product of many years of research and development, and its impact on the care of people with heart disease and others who are at very high risk is now being evaluated in rural communities in Andhra Pradesh. Village community health workers and doctors are being trained and equipped with new technologies and programmes that have the potential to transform rural healthcare.

Each village in India has an Accredited Social Health Activist or ASHA, usually a mature woman recruited to work within her own community. She is a familiar and trusted figure, who has usually achieved a modest education, at most a high school diploma.

'People just aren't aware of the importance of things like high blood pressure and diabetes for heart disease. And even when they get treatment they often don't start taking their pills or they stop taking them early.'

ASHA, Kumdavalli village, Andhra Pradesh

SMART Health India has made ASHAs, together with local doctors, the focus of this important initiative designed to deliver affordable healthcare to rural communities. Working in villages in Andhra Pradesh, the programme team has already demonstrated that ASHAs can be trained to identify individuals with heart disease, and to make appropriate treatment recommendations.

SMART Health India recently expanded to more than 50 villages – home to over 200,000 people – and will incorporate innovative new technologies designed to provide ASHAs with patient-specific information to guide their appraisal, referral and treatment. The impact of this programme on the proportion of people receiving appropriate care will be evaluated, together with the impact of such care on the risks of serious medical problems such as a heart attack.

Affordable healthcare no longer means low-quality healthcare. Wireless technology now enables a broad range of healthcare providers to deliver high quality affordable care. Since wireless networks now reach over 80 per cent of India's population, SMART Health India has the potential to revolutionise the delivery of essential healthcare to those who previously had little or no access.

Each ASHA will use an inexpensive tablet device connected to custom-designed cloud-based software that enables information about the patient to be entered and recommendations received for personalised, evidence-based healthcare. They can also determine if a patient is at risk of developing heart disease and put together a plan to help prevent it.

Meanwhile, the tablet transmits the patient information to a secure server for storage in an electronic medical record accessible to local doctors and hospitals. The system also allows patients to access their personal healthcare information using their own phone, as well as receive reminders and prompts (e.g. to take medication or to stop smoking).

SMART Health India is now being expanded to more than 50 villages – home to over 200,000 people

ASHA:
Accredited
Social Health
Activist

Innovation and impact

SMART Health India is a collaboration between The George Institute for Global Health and the University of Oxford, both of whom have impressive track records of innovation and impact, and both of whom are committed to finding sustainable solutions to the major health challenges facing the world in the 21st century.

In 2011 and 2012, The George Institute for Global Health was ranked among the top five research institutions in the world for the impact of its research (SCImagoResearch Institutions Rankings). Similarly, in both years, the University of Oxford was ranked among the top five universities in the world (Times University Rankings).

The George Institute has a large research and development programme across more than 40 countries worldwide, with dedicated facilities in India, China, Australia and the UK. In India, The George Institute's programme involves a network of several hundred collaborating institutions, hospitals and medical centres throughout the country.

The University of Oxford also has a large health research programme across many countries globally. One of its flagship centres is the Oxford Institute of Biomedical Engineering (IBME), which has developed sophisticated software algorithms that can be loaded onto smartphones and tablet devices to enable the real-time analysis of personal medical information and the provision of clinical decision-making support. The IBME has also developed a range of low-cost smart biosensors designed to reliably measure key biological parameters, such as blood pressure, heart rate and respiratory rate.

These smart devices link by cable or Bluetooth to the smartphone, enabling the data to be directly integrated into algorithms for diagnosis and treatment. Wireless connectivity provides speedy, secure exchange between the mobile device and central databases that store electronic patient records and enable continuous quality control. Healthcare providers and patients alike are enthusiastic about the technology, which has been tested in a range of clinical settings.

A new model of healthcare for rural India

Innovative smartphone technology will enable community health workers to deliver state-of-the-art personalised healthcare for a fraction of the price that it would otherwise cost.

The initial phase of this work was launched in 2002. It identified that heart disease is the leading cause of premature death in rural India and proved that non-physician health workers can be trained to identify high-risk people and make reliable recommendations for their care. SMART Health India now takes this programme to another level. The partners are currently working with ASHAs, other community health workers and doctors from across 50 villages, to implement and evaluate the impact of SMART Health India, creating a new model of healthcare for rural India.

Both organisations are strongly committed to finding sustainable solutions to the major health challenges in the 21st century

Diabetes is a very common cause of kidney disease, blindness, amputation, heart disease and stroke

How you can help

You can help deliver results and generate real social impact by supporting one of the following important areas.

- Integration of SMART Health into the existing Indian rural primary healthcare infrastructure is vital to success and requires the development of a related digital operations support system. This operations support system will ensure maintenance of the electronic health records, monitor the quality and efficiency of service delivery, staffing and supplies (including equipment for point-of-care assessment and essential drugs) and manage patient workflow. **Developing a robust digital operations support system will require approximately Rs 1.7 crore (US\$300,000) over 12 months.**
- SMART Health was initially developed with a focus on cardiovascular diseases (heart attack and stroke) as the core module. However it has the capability to address a much wider range of health issues, including diabetes, kidney disease, respiratory disease and tuberculosis. Module development requires an intensive process of summarising multiple clinical guidelines and expert opinion taking local contextual factors into consideration, converting this into a programmable algorithm, performing clinical validation of the algorithm, developing a user interface, and pilot testing in the field. **Developing robust modules for all “top ten” causes of poor health and premature death in rural India will require approximately Rs 14 crore (US\$2.5 million) over 3 years.**
- Demonstrating a clear impact of SMART Health in reducing illness and premature death is crucial for scale-up and sustainable large-scale implementation across India and other low- and middle-income countries. We will perform a rigorous study in 300 villages, utilising the most cost-effective and robust methods of evaluation. **Demonstrating the clear impact of SMART Health in India will require approximately Rs 56 crore (US\$10 million) over 5 years.**

The George Institute for Global Health is able to provide tax deductible receipts for gifts given in US dollars, Australian dollars, and British pounds.

Sappide Kannarao is a 49 year old farmer in rural India.

He's hard working, earns roughly 5000 INR (US\$80) per month and is the sole breadwinner for his household, which includes his wife, three children and parents. The family teeters dangerously close to the poverty line. Should anything happen to Sappide that stops him from working, the entire family would be destitute.

Fortunately, that is less likely to happen since we enrolled Sappide in our SMART Health pilot project in Andhra Pradesh. Using a backend software solution and analysing a series of simple questions and answers, we diagnosed Sappide to be at clinically high risk of cardiovascular disease. This news was a shock to Sappide because he has no personal history or family history of cardiovascular disease.

We recommended that Sappide stop smoking (for which we provide support), go see a doctor, begin taking specific blood pressure lowering medication, and come back for screenings every 3-6 months. Thanks to the SMART Health program, he is now taking medications for his cardiovascular disease to help prevent a catastrophic event.



A healthy future for India starts today

SMART Health will address in parallel the greatest threats to the health of rural people in India and other low and middle-income countries in Asia.

Over the next few years, SMART Health India is expected to deliver major improvements in access to quality affordable healthcare for people with high blood pressure and heart disease. A key aspect of our work is to ensure that new innovations result in desired outcomes, are cost-effective and can be expanded for widespread use.

Too many new healthcare programs are brought to scale without any reliable evidence of effectiveness, potentially resulting in worthless and grossly inefficient use of resources. Through the performance of high-quality trials, the SMART Health India program will be rigorously evaluated for impact and to identify barriers and facilitators to widespread uptake. We will directly measure improvements in health, the use of resources to deliver such improvements, and the acceptability of SMART Health to patients, communities, healthcare providers and administrators.

Our ultimate goal is to determine whether this approach will deliver meaningful reductions in death, disability and 'catastrophic' healthcare expenditure (e.g. healthcare costs that endanger the financial security of patients and their families) across a range of geographies and cultures. We believe that such evidence will provide a strong case for scale-up to all disadvantaged communities in the region and many other parts of the world, with implications for the health and wellbeing of billions of people.

We invite you to be part of this world-changing initiative.

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Dr Praveen recently won an iMedical Apps and Medicine 2.0 mHealth Award in London for his work in rural India.

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