

THE mHEALTH CASE IN INDIA

Telco-led transformation of healthcare service delivery in India



Table of Contents

3	Abstract
3	What is mHealth?
4	The Appetite for mHealth in India
5	Different Markets, Different Opportunities
7	The Telco mHealth Opportunity in India
8	Conclusion

India's healthcare system is ripe for innovation. The capacity of the healthcare system to deliver care is unlikely to meet both the demands of the growing urban middle and upper classes, or the needs of the urban and rural poor. The over 75% of healthcare costs paid out-of-pocket create a consumer-driven market capable of rapid change.¹ Using technology to enable greater access to care at a lower price point is critical.

Telcos have a unique role to play in the delivery of healthcare in India. The vastly underserved healthcare market combined with high mobile phone penetration and rapidly growing smartphone adoption creates conditions that are ideal for mHealth adoption. This paper presents the opportunities for mHealth adoption in rural and urban markets, and explores the role that telcos can play in the delivery of mHealth services in India.

In other global markets, eHealth services are driven by desktop computers and medical devices. The widespread availability of landline internet connections and a vendor preference towards proprietary eHealth software platforms have slowed the rapid growth of mHealth in more developed markets. In India, rapid mHealth adoption is likely to occur before widespread eHealth. Today, only 3% of households have a computer with internet access, while 69% of Indian households have a mobile phone.² Smartphone adoption has increased dramatically in recent years with shipments growing by 167% in 2013.³ Leading operators are beginning to offer 3G and 4G services at affordable price points. These factors are likely to both spur data usage and drive the adoption of mHealth services.

Traditionally, healthcare systems are viewed as the “iron triangle” of access, quality and cost. No one factor can change without affecting another. Improving access or quality requires increased investment, and lowering costs will either affect quality or access. In India, mHealth is one of the disruptive technologies that can sever the iron triangle by increasing access, improving quality and lowering costs for all of its market segments.

What is mHealth?

mHealth is generally viewed as the delivery of healthcare services or information with a mobile phone. The services available today in global markets vary greatly in their level of sophistication. Some provide static information about a disease or illness, while others move considerably up the value chain by providing comprehensive healthcare management beyond what could be delivered by only a face-to-face interaction with a healthcare provider. The following guide helps differentiate mHealth services at different levels of the value chain:

Information Services

Information services, the lowest tier of mHealth MVAS, generally offer one-way communication or message-board style question and answer services. A well-known example of this is Vodafone's Ask a Doctor – Health@5 mobile app. This service allows individuals to read basic information about disease management, common healthcare myths and wellness. Users can also send questions to a panel of medical experts that are answered within 24 hours. All of these services are offered at a cost of Rs. 5 per day. While these services are useful, the lack of two-way interaction with a healthcare professional limits their credibility and sense of personalized care.

Enabling Services

As a basic platform to share information between patients and healthcare providers, mHealth MVAS services could be categorized as enabling services. At this stage, they start to function as substitutes for traditional care and as such they can either serve as competition for traditional care, or serve to expand the healthcare market. Today, there are a number of partnerships between both healthcare and telecom providers including: Aircel and Apollo, Airtel and Fortis Hospitals (enabled by Health force), and Idea with Apollo Hospitals. These partnerships offer services such as teleconsultation, video consultation over 3G, appointment scheduling, triaging and SMS prescription services.

Transformative Services

mHealth bridges the gap from enabling services to transformative services when objective healthcare data can be collected. Currently, this type of MVAS is mostly limited to health monitoring for the treatment of chronic conditions such as diabetes and cardiovascular disease (CVD). In India, partnerships between BlackBerry, technology enablement organizations and Vodafone provide vital sign monitoring during healthcare transport, as well as monitoring high-risk patients for early warning signs of heart failure. In other global markets services such as blood glucose and pacemaker monitoring via mHealth have also been implemented.

Physicians always struggle to collect accurate data to make informed decisions. If monitoring and data collection can be implemented in a cost-effective manner, mHealth could both increase quality to individuals with the ability and willingness to pay, as well as expand access to broader market segments in a low-cost manner.

The Appetite for mHealth in India

A recent primary research study conducted by Wipro and the Internet and Mobile Association of India found increasing consumer demand for mHealth in India. One in four of survey respondents had used some form of mHealth service within the last three months, with one in seven actually receiving care over their mobile device.⁴

Current Use of mHealth in India

Not surprisingly, one of the strongest indicators of both the awareness and use of mHealth services is monthly spending on mobile phone service.

However, this indicator may not hold for very long. When examining the major barriers to mHealth adoption, the differences between lower and high mobile spending individuals became statistically insignificant.

Individuals with lower monthly mobile spending are significantly more likely to believe that mHealth services were easier to use than the services they are currently receiving. This is not surprising, considering one of the biggest problems in the low-cost and free public healthcare system is employee absenteeism.⁵

However, consumers with low mobile spending are price conscious and either unable or unwilling to pay for high-cost, facility-based private healthcare facilities. mHealth has potential to fill the gaps in the system by providing expanded access at a lower cost.

mHealth Awareness and Use by Service Type and Monthly Spending

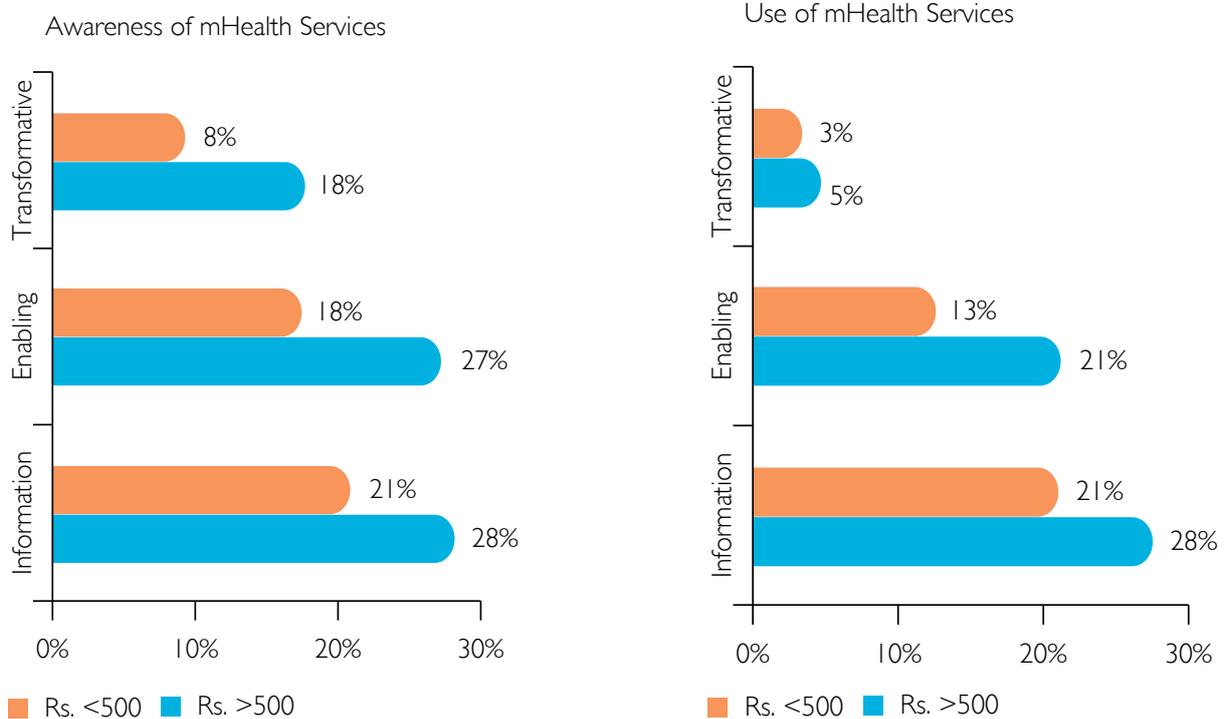


Figure 1: mHealth Awareness and Usage Levels

Source: Wipro and IAMAI Study, 2012

Key Drivers and Barriers of mHealth in India

Across market segments, survey respondents overwhelmingly agreed that mHealth services are valuable. The key drivers show that mHealth services are viewed as a convenient way to access high-quality information.

The commonly identified barriers to mHealth adoption are not unique, but become more complex than other MVAS when applied in a healthcare context. Poor network coverage concerns are one example. While not being able to receive cricket game updates may cause a heart murmur, a patient being monitored for a heart attack cannot be left at the mercy of an underdeveloped mobile network.

Security and privacy of healthcare information are always a concern. Adding a new technology, such as mobile, creates additional concern simply because it is unknown.

The third most cited barrier to adoption was a general concern that mHealth applications will be too complex. With literacy issues and over 120 widely-spoken languages, these concerns are legitimate.⁶

Compared to other identified barriers to mHealth adoption, willingness to pay and a lack of value were cited half as often as other barriers. Given the perceived value and that cost-effective, high-quality healthcare services are not readily available in the marketplace, mHealth has the potential to be both a substitute and a complement to traditional, in-person healthcare services.

mHealth Barriers
Percentage of Respondents who "Agree"

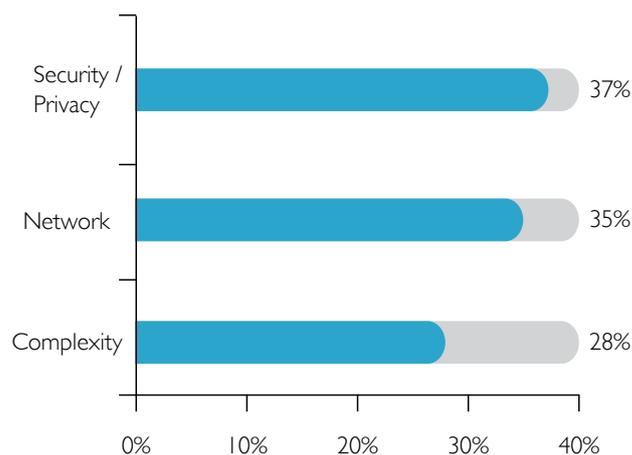


Figure 3: mHealth Barriers
Source: Wipro and IAMAI Study, 2012

Different Markets, Different Opportunities

Rural Indians drive many of the statistics commonly viewed as national health issues. Basic infrastructure problems, such as the lack of running water and toilets on premises, spread disease rapidly which is evident in basic health statistics. However, there is room for care improvement throughout India. For example, the infant mortality rate is 51 per thousand people in rural India, compared with 31 in urban areas and less than 7 in the United States.⁷

In addition to basic public health issues, hospital & physician supply is limited in rural areas. For physicians to receive the best pay they need to work in private pay hospitals which are located mostly in urban areas where people can afford to self-pay.

India's healthcare problems are exacerbated by its high non-communicable disease burden. Chronic diseases are the leading cause of death and disability in India, and their contribution to India's disease burden is projected to increase significantly.⁸ India has the second highest prevalence of diabetes in the world after China with more than 61 million diabetes patients. By 2030, the diabetes population is expected to exceed 100 million.⁹ mHealth services can play a key role in addressing India's chronic disease problem.

Telecom, healthcare and other organizations can develop mHealth strategies in two distinct market opportunities. In one model, healthcare access would be expanded to rural communities and bring services where there is limited capacity. In the other, care would be focused on the urban wealthy who have the ability to pay for costly monitoring services that stand to improve their health.

mHealth Drivers

Percentage of Respondents who "Agree"

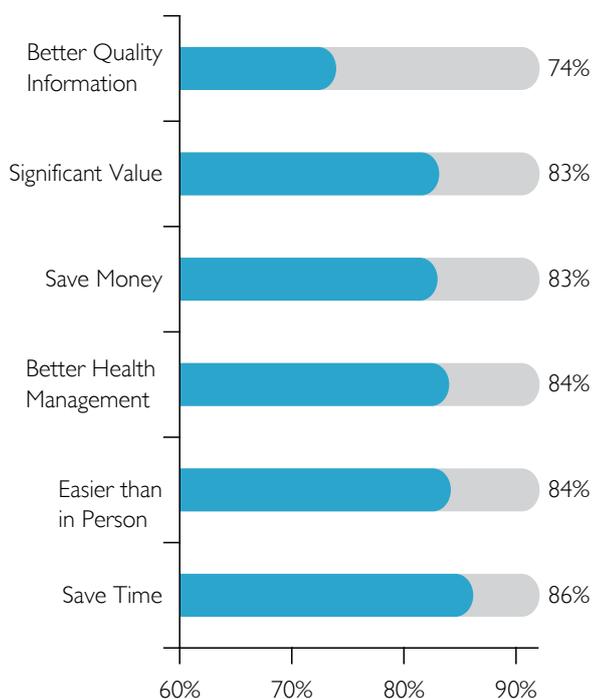


Figure 2: mHealth Drivers
Source: Wipro and IAMAI Study, 2012

Rural Health: Expanding Access in a One-to-Many Approach

Rural areas face the biggest shortages of healthcare capacity in India. Although two-thirds of the population lives in rural areas, only one fourth of healthcare infrastructure and manpower is located in rural areas.¹⁰ This situation is unlikely to be improved in the near future by government spending or traditional private healthcare. The costs are simply too high. mHealth has the potential to supply cost-effective care to rural India.

Unlike a more urban setting, rural individuals are unlikely to be able to access mHealth services at the household level. While almost all (94%) of urban households have a mobile phone, only about half (58%) of rural households have phone access.¹¹ Reliable power to charge phones can also be an issue. Not all mobile phones will be smartphones capable of data exchange either. Additionally, illiterate individuals in rural communities may have issues using mHealth applications.

Grassroots networks in rural India are an effective solution to the issue of technology access. One of the most well-known models is ITC e-Chaupal which offers rural internet access to farmers at the village level, who are often assisted by a peer capable of using the system. The service allows farmers to access agricultural information as well as market prices, enabling them to boost production and receive the best possible price for their goods. Community-driven networks like ITC eChaupal, which match rural mind sets and technology, should be the basis of any rural mHealth initiative.

For mHealth to succeed in rural areas a community-based strategy will be needed. Unlike more common mHealth partnerships that establish a link between a wireless carrier and a healthcare provider, rural mHealth may require a more complex model. A previously presented model, designed to address an array of mHealth barriers in rural areas, recommended a combination of using human resources, improving supply chains, providing micro-insurance and using low-bandwidth applications.¹² Resources must be shared to lower per user costs and foster community involvement.

The Human Health Enabler

A realistic model for rural healthcare would have a competent individual willing to invest in a phone and the required accessories, provide help people access mHealth services. This individual would help mHealth consumers use an application that uses diagnostic services and clinical decision support to triage patients and determine whether their care could either be provided on-site or require referral to a physician.

Supply Chain Improvement

A diagnosis via mHealth is useless without the capability to treat it. Disease treatments that cannot be delivered due to broken supply chains will hinder mHealth's success in rural areas. Medical supply and purchasing capabilities can be expanded via mobile enablement. Additionally, direct links with hospitals and other healthcare providers may provide the ability to send laboratory samples and deliver results requiring complex diagnostic capabilities.

Micro Insurance

Microfinancing models have proven successful in rural areas throughout the world. While relatively more recent, microinsurance models have received both community support and government underwriting in rural Indian communities. Yeshavani, a health insurance scheme supporting farmers in a few rural states, covers surgeries for just Rs. 5 per month.¹³ However, the insurance plan does not cover primary care. Low cost plans are likely to be able to provide basic diagnostic and primary care services while remaining affordable using mHealth services.

Technology

A current model used to enable rural mHealth employs a single-use device designed only for mHealth. This model is not likely to foster the same level of innovation as an open platform. Using a standard, a Bluetooth-enabled smartphone would provide the opportunity to add new diagnostic and interactive features as they become available and financially viable. For example, a simple tele-health service could provide basic consultation services with physicians and health information during early adoption. Later, diagnostic tests such as pulse oximetry, blood pressure testing and electrocardiograms could be added. All of these can be scaled as consumer demand and mobile bandwidth increase.

India has over 247 million rural households that drive the market opportunity for rural health. If rural families and/or their government contributed Rs. 10 per month, over USD 0.5 bn would be available for rural care. Given the cost advantages and rapid scalability, this care could be best delivered via mHealth and supplemented by in-person care when travel to a physician's office becomes necessary. The rural mHealth market will continue to grow with consumer demand, technology adoption and infrastructure improvement.

Urban Care: Providing Transformational mHealth Monitoring Services

Urban individuals, especially those in higher income brackets, present a completely different market opportunity. Getting to a healthcare facility for an appointment is a less arduous task and house calls are a likely possibility. However, people are busy, and travelling even a short distance in a congested city can be unpleasant. Convenience and the best quality of care outweigh cost for this segment.

Enabling mHealth services such as telephone-based appointment scheduling and SMS prescription refill services, save consumers time while the availability of consultations via telephone or 3G video lets users know that quality care is just a smartphone button away. Services showcasing partnerships between respected healthcare providers and technology-enabling organizations are likely to increase the perceived value.

Monitoring services, while expensive, are especially valuable for individuals with chronic conditions. Diabetes, heart disease and obesity are all common in urban areas¹⁴. At the most basic level, a patient may enter his/her weight every day into an application so that a physician can view trended data. A more complex service might transmit the results of blood glucose monitoring. At the highest level of value add and cost, 24/7 heart monitoring could be conducted via a 3G equipped pacemaker that automatically sends physicians text messages and web-based reports.

These services would likely only be used by the top 10% of urban wage earners, representing a limited market with high spending potential. Still, there are almost 17 million households. Within the next five years, this market could easily reach \$300M.

The Telco mHealth Opportunity in India

With their vast customer reach and access to network and infrastructure resources, telcos can play a critical role in the delivery of mHealth services. From offering high-quality network access to managing end-to-end service delivery, telcos can facilitate the effective delivery of mHealth services in multiple ways. These include:

- **Guaranteeing Quality of Service.** Despite the launch of 3G and 4G services, network coverage and quality continue to be inadequate for mHealth services in many parts of India. To encourage mHealth

adoption, telcos will need to deliver assured, affordable connectivity, especially in rural areas where connectivity is sparse.

- **Providing Hosted Infrastructure Services.** The compute, storage and network costs involved in delivering mHealth services can be prohibitive for a healthcare provider. For example, to support a remote health monitoring service, hospitals will need to collect and store vast amounts of patient vitals data. To reduce capital costs, telcos can offer infrastructure resources on a cloud-based pay-per-use model.
- **Delivering Managed Security Services.** Widespread mHealth adoption will depend in large measure on how effectively healthcare providers can safeguard patient data. However, the costs associated with protecting patient data can be very high. Telcos can help address data security concerns cost-effectively by providing managed security services.
- **Managing Integration Complexity.** mHealth services will involve significant integration challenges as new products, applications,

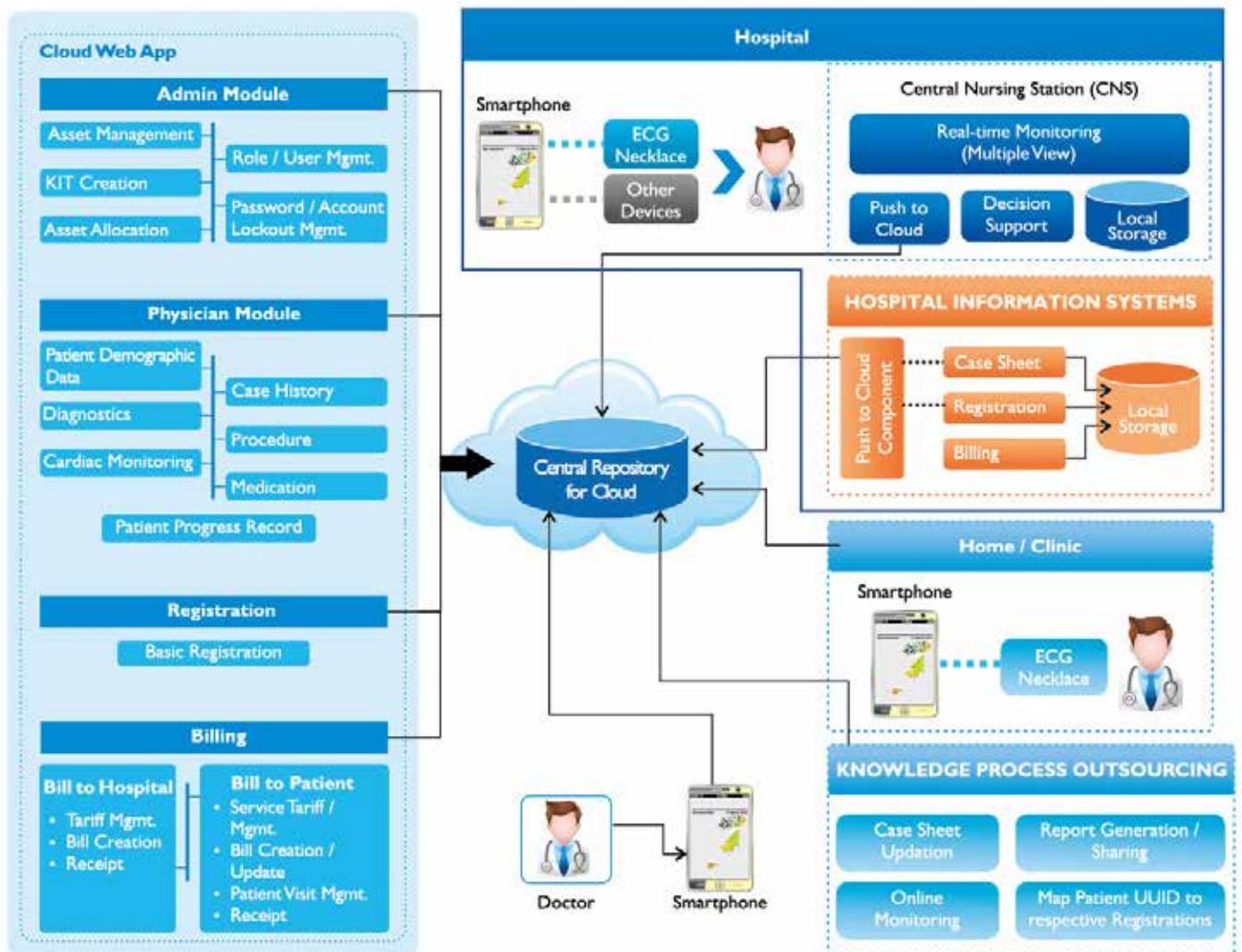


Figure 4: Framework for Non-Invasive Remote Health Monitoring Platform

Source: Wipro Ltd.

and processes will need to operate seamlessly with existing systems. Telcos can leverage their ownership of network and IT assets to own end-to-end system integration and service delivery.

Figure 4 illustrates a framework for a remote health monitoring platform. The platform allows patients of cardiac and other chronic conditions to be monitored continuously. The platform involves multiple stakeholders including patients, hospitals, medical device vendors, doctors and nursing staff, as well as healthcare information systems vendors. Successfully implementing the solution will involve bringing together all of the stakeholders and addressing major costs, integration and security challenges. Telcos can play a central role in addressing each of these challenges with the delivery of cloud-based services, managed data security and end-to-end system integration and service management.

Conclusion

mHealth can potentially transform the healthcare landscape in India by improving healthcare access for the vast underserved rural market and enhancing patient care for urban consumers. However, rural and urban markets in India have distinct requirements. This paper presents models and strategies for successful adoption of mHealth in rural and urban markets. The paper also envisages a central role for telcos in mHealth service delivery in India, given their access to consumers and their ownership of network and infrastructure resources.

References

1. India Census 2011, Wipro Analysis
2. India Census 2011, Wipro Analysis
3. http://www.business-standard.com/article/companies/indian-smartphone-segment-grows-by-167-113070800206_1.html
4. Wipro and IAMAI Research, 2012
5. Westhead, R. "How India's Health Care Woes Gave Birth to Private Medicine." Toronto Star. November 11, 2011.
6. Bhatia, Tej K and William C. Ritchie. (2006) Bilingualism in South Asia. In: Handbook of Bilingualism, pp. 780-807. Oxford: Blackwell Publishing
7. United Nations 2011, India Census 2011
8. Chronic diseases and injuries in India, WHO, 2011
9. Dealing with diabetes, The Hindu, 2013
10. Patil AV, Somasundaram KV, Goyal RC. Current health scenario in rural India. Australian Journal of Rural Health. 2002;10(2):129-35.
11. India Census 2011
12. Tiwari P. Providing Healthcare Services in Rural India: Innovative Application of Mobile Technology. Healthcare and Informatics Review Online. 2010. 14(2) pp 3-9
13. India Can Show the Way on Health. The Economist. November 21, 2012
14. India Human Development Survey, 2005

About the Author

Sean Lunde is a Solutions Consultant for Wipro's Healthcare and Life Sciences Consulting Group where he is responsible for mHealth and telehealth solutions. Sean has held a broad variety of healthcare industry positions including combat medic in the US Army, population health researcher/policy analyst for the Commonwealth of Massachusetts and corporate strategy manager for a healthcare payer. Sean holds Master's degrees in Business and Public Health from Boston University and a Bachelor's degree from the University of Massachusetts Boston.

Winning in a Digital World

Wipro's comprehensive suite of converged services and solutions addresses the entire digital value chain - from the network core to device applications. Our vertically aligned business model ensures that we understand the business and technology imperatives of specific industries, while our technology service lines allow us to architect integrated technology solutions. In an era of digital disruption, Wipro is uniquely positioned to partner with Telco-Media organizations to deliver the business and technology expertise that enables them to do business better.

About Wipro Council for Industry Research

The Wipro Council for Industry Research, comprised of domain and technology experts from the organization, aims to address the needs of customers by specifically looking at innovative strategies that will help them gain competitive advantage in the market. The Council, in collaboration with leading academic institutions and industry bodies, studies market trends to equip organizations with insights that facilitate their IT and business strategies. For more information please visit www.wipro.com/insights/business-research

About Wipro Ltd.

Wipro Ltd. (NYSE:WIT) is a leading Information Technology, Consulting and Outsourcing company that delivers solutions to enable its clients do business better. Wipro delivers winning business outcomes through its deep industry experience and a 360 degree view of "Business through Technology" - helping clients create successful and adaptive businesses. A company recognized globally for its comprehensive portfolio of services, a practitioner's approach to delivering innovation and an organization wide commitment to sustainability, Wipro has a workforce of 140,000 serving clients across 57 countries.

For more information, please visit www.wipro.com



DO BUSINESS BETTER

WWW.WIPRO.COM

NYSE:WIT | OVER 140,000 EMPLOYEES | 57 COUNTRIES | CONSULTING | SYSTEM INTEGRATION | OUTSOURCING

WIPRO LTD, DODDAKANNELI, SARJAPUR ROAD, BANGALORE - 560 035, INDIA

TEL: +91 (80) 2844 0011, FAX: +91 (80) 2844 0256

North America South America United Kingdom Germany France Switzerland Poland Austria Sweden Finland Benelux Portugal Romania Japan Philippines Singapore Malaysia Australia

© Copyright 2013. Wipro Ltd. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without express written permission from Wipro Ltd. All other trademarks mentioned herein are properties of their respective owners. Specifications subject to change without notice.