
QUALCOMM
WIRELESS REACH™
Wireless Reach™
from Qualcomm
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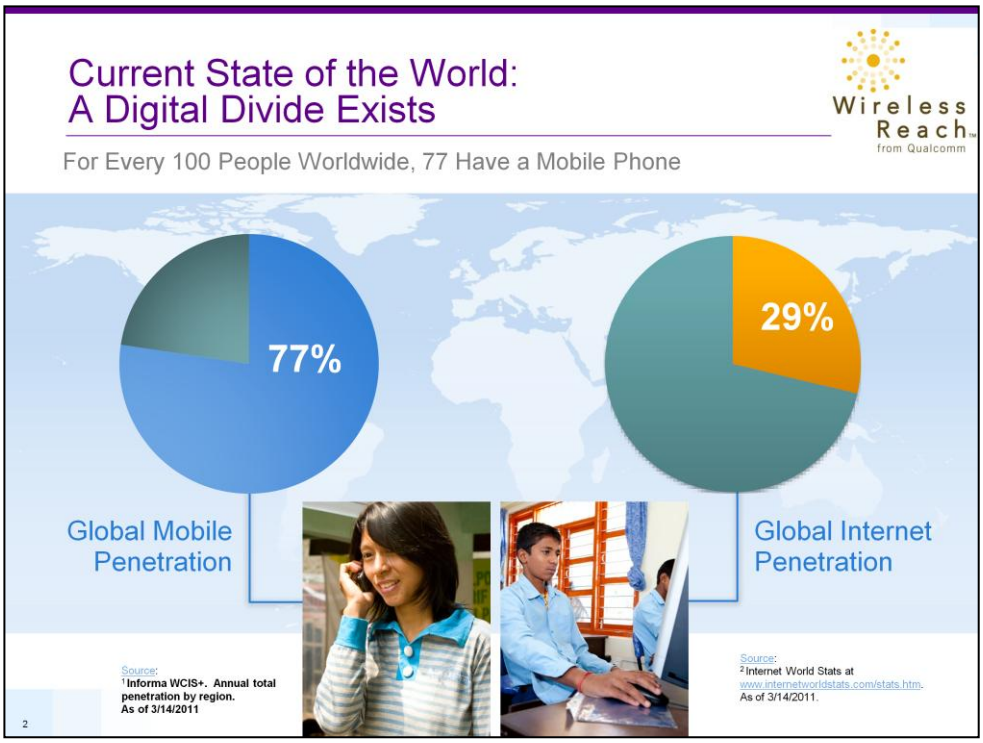
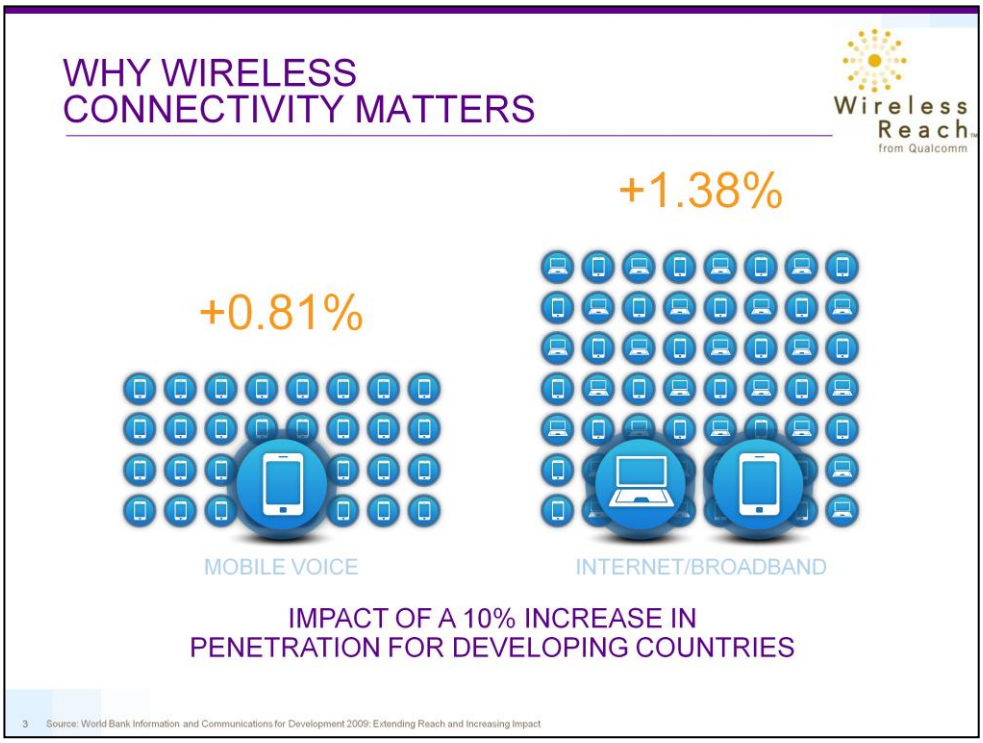


- Despite the rapid pace of technology, a digital divide still exists. As these charts show, 23 percent of the world's population does not have a mobile phone[1] and 71 percent of the population does not use the Internet.[2]
- However, mobile communications is growing at an unprecedented pace.
- According to statistics from the market database Wireless Intelligence, it took about 20 years for the first billion mobile phones to sell worldwide. The second billion sold in four years, and the third billion sold in two. Eighty percent of the world's population now lives within range of a cellular network (and those networks are increasingly 3G), which is double the level in 2000. And figures from the International Telecommunication Union showed that by the end of 2008, two-thirds of the world's mobile phone use was in developing countries.[3]
- There are now over 5 billion mobile phone users[4] and many young people have grown up never giving a thought to fixed line telephony; yet still there is this gap between those with access and those without. Women are a significant part of the population without mobile phone access. In fact, a woman in the developing world is 21% less likely to own a mobile phone than her male counterpart.[5]

Sources:

- [1] Informa WCIS+. Annual total penetration by region. As of 3/14/2011. http://www.wcisplus.com/wcisplus/NumericalDataPage.html
- [2] Internet World Stats at www.internetworldstats.com/stats.htm. As of 3/14/2011.
- [3] MacInnis, Laura. "Mobile Phone Growth Helps Poorer States: U.N." Reuters. 2 Mar 2009. http://www.reuters.com/article/technologyNews/idUSTRE5211GJ20090302
- [4] Wireless Intelligence, July 2010.
- [5] GSMA, Cherie Blair Foundation for Women, and Vital Wave Consulting. "Women and Mobile: A Global Opportunity." http://www.gsmworld.com/documents/women_mobile.pdf



- Why Connectivity Matters
- The World Bank found that a ten percentage point increase in mobile penetration increases per capita GDP by .8 percent in developing countries.[1]
- Furthermore, a ten percentage point increase in Internet penetration increases per capita GDP by 1.4 percent in developing countries.[2]
- A 2007 study, published by Deloitte Consultancy found that a 10% increase in mobile phone penetration rates is linked to an increase in developing country GDP of 1.2%.[3] Women in particular can benefit from mobile services; up to 41% of women business owners in developing countries report increasing their incomes or professional opportunities because of their mobile phones.[4]
- So, the digital divide doesn't just mean that people don't have a computer or a phone. It means that they are cut off from the tools that both help them develop the skills to compete in the 21st century and provide them and their families an economic advantage.
- 3G is the most affordable way to provide voice and data access to rural areas where landline access is limited or simply doesn't exist.
- For governments, wireless broadband is a fundamental way of increasing their countries' teledensity and Internet penetration rates.
- For citizens, 3G may represent their first (or only) experience in accessing the Internet.

Sources:

- [1] Figure 3.1 Growth Effects of ICT.World Bank: Christine Zhen-Wei Quang and Garlo M. Rossotto with Kaoru Kimura. "Chapter 3: Economic Impacts of Broadband."Information and Communications for Development 2009 – Extending Reach and Increasing Impact." http://books.google.com/books?id=_5DL8RXJUbgC&pg=PA35&lpg=PA35&dq=World+Bank+Information+and+Communications+for+Development+2009:++Extending+Reach+and+Increasing+Impact%2BChapter+3.+Economic+Impacts+of+BroadbandChristine+Zhen-Wei+Qiang+and+Carlo+M.+Rossott#v=onepage&q&f=false
- [2] Ibid.
- [3] Press Release, "Deloitte analyses top trends for the telecommunications industry for 2008." 28 Jan 2008. http://www.deloitte.com/view/en_CZ/cz/press/en-press-releases/8fc7f4021a001210VgnVCM100000ba42f00aRCRD.htm: Retrieved 2 Aug 2010.
- [4] GSMA, Cherie Blair Foundation for Women, and Vital Wave Consulting. "Women and Mobile: A Global Opportunity." Source: http://www.gsmworld.com/documents/women_mobile.pdf

- Wireless Reach was formalized in 2006 to demonstrate how 3G can improve people's lives.
- Qualcomm believes access to 3G and next-generation mobile technologies can improve people's lives. Qualcomm's Wireless Reach™ initiative is a strategic program that brings wireless technology to underserved communities globally. By working with partners, Wireless Reach invests in projects that foster entrepreneurship, aid in public safety, enhance the delivery of health care, enrich teaching and learning and improve environmental sustainability. For more information please visit www.qualcomm.com/wirelessreach.
- To date we have 64 Wireless Reach projects in various stages of development in 27 countries.
- This slide shows where we have had or have projects.


QUALCOMM
ENABLING CHRONIC DISEASE MANAGEMENT
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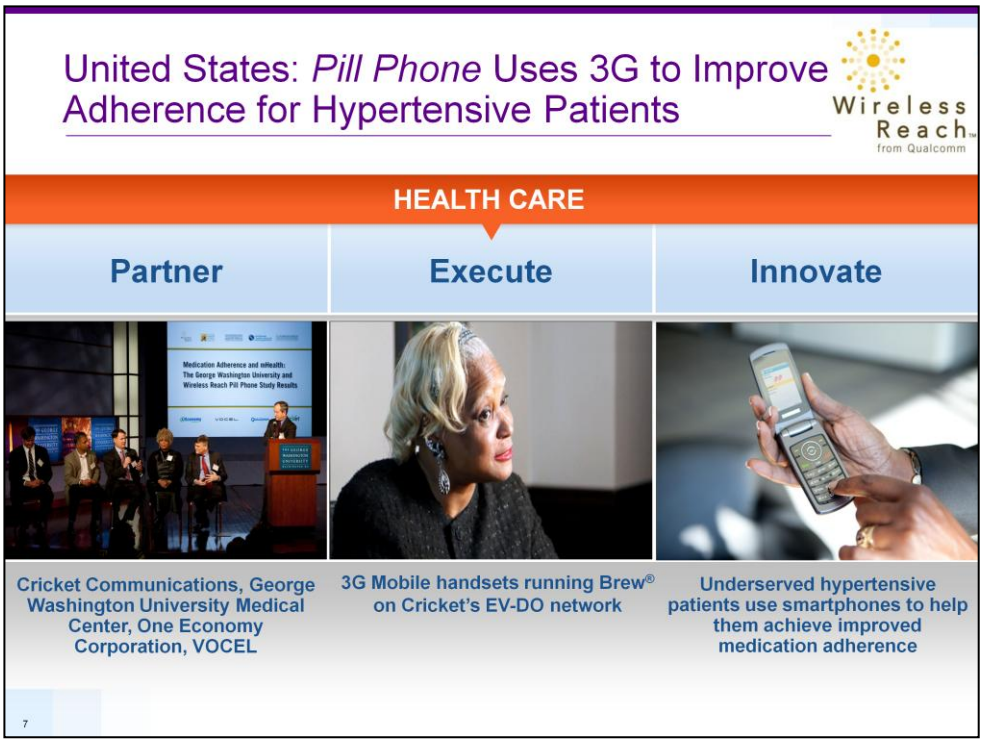
- There are regions in Japan where emergency and advanced health care are lacking, particularly in rural, snowy areas such as Hokkaido where issues with transportation during the winter and other circumstances make access to health care facilities difficult. In such areas, the ability for people to manage their own health at home is important to preventing illnesses from becoming serious.
- The current trend is to reduce the number of long-term care beds in hospitals to promote shorter hospital stays and home-based nursing to decrease health care costs. This being the case, home medical care is fast becoming important in Japan. For remote locations, even a home visit by a doctor or nurse requires considerable time and effort. Therefore, there is a need to increase efficiency through using devices that enable remote collection of patient vital signs.
- The Wireless Health Care at Home project allows 300 residents in Hokkaido, with lifestyle diseases such as high blood pressure, to send critical health information to doctors in larger urban centers through KDDI's 3G network.
- The devices include blood pressure cuffs, weight scales and pedometers that can gather the data and then transmit it easily and immediately to the patient's physicians. From the data physician's can then advise their patients to adjust their activities in order to improve their physical condition. The health data is also further analyzed by correlating them with clinical data and other factors.

Partners:

- Chealcomm – a Japan-based MVNO that specializes in advanced wireless and wellness services
- Medical Platform Asia (MedPA) – Provides 3G-enabled communication equipment in collaboration with Chealcomm



- Hypertension, or high blood pressure, has been estimated to affect more than 65 million adults in the United States. Slightly more than 50% of hypertensive individuals are on treatment and approximately one third of treated patients still do not achieve blood pressure control below140/90 mmHg. [1]
- Poor adherence to blood pressure medications is a major cause for failure to control hypertension. Studies have shown that patients with high blood pressure often take only 40-60 percent of prescribed pills[2]
- Blood pressure control in patients with hypertension is often inadequate, particularly in underserved populations. In the United States, Medicaid insured patients in urban medical clinics have a high prevalence of uncontrolled hypertension, and increased rates of morbidity and mortality (e.g. heart attack, stroke, renal failure, death).[3]
- The *Wireless Reach Pill Phone Study* aims to improve health outcomes for hypertensive patients in underserved urban communities by examining how wireless technology may improve medication adherence rates and consequently, improve health outcomes.
- The Pill Phone mobile application engages patients and empowers them to participate in their own disease management.
- Patients, doctors, nurses, and the project research team used the Pill Phone with Qualcomm's 3G technology offered through Cricket's 3G EV-DO network.
- Conducted over a seven-month period, 50 Medicaid patients were recruited from the internal medicine, renal/hypertension, and cardiology clinics of the George Washington University Medical Center in Washington, D.C. to see if access to the Pill Phone application could help them remember to take their medicines more frequently.

Results:

- The data gathered during the *Pill Phone Study* indicates participants were generally satisfied with the medication reminder software.
- There was a trend toward increased prescription refill rates with the use of the Pill Phone application and a decrease after the application was discontinued.[4]
- When patients were asked to rank their medication adherence on a scale from 0-4, with higher scores indicating better medication adherence; the mean pre-study score was 2.4. When asked to rank adherence after the study the score rose to 3.2, which is a statistically significant increase.[5]
- Larger studies with longer follow-up periods are needed to see if similar mHealth systems improve health outcomes and are cost-effective.

Partners:

- Cricket Communications – Operator
- George Washington University Medical Center – Conducted the Pill Phone Study
- One Economy Corporation – Nonprofit Partner
- VOCEL – Pill Phone Application Developer

Sources:

[1]Hajjar I, Kotchen TA (2003) Trends in prevalence, awareness, treatment, and control of hypertension in the United States, 1988-2000. *JAMA* 290:199-206.

[2]Krousel-Wood M, Thomas S, Muntner P, Morisky D. (2004) Medication adherence: a key factor in achieving blood pressure control and good clinical outcomes in hypertensive patients. *Curr Opin Cardiol*;19:357-362.

[3] Ibid.

[4]SMS survey results pre and post intervention; 46 patients had both pre and post intervention data.

[5] Ibid.


QUALCOMM
EMPOWERING DISABLED AND ELDERLY PEOPLE
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- The possibility of extending people's independence represents a significant cost savings in a country and continent where the percentage of people over 65 is expected to be over 20 percent in the next 10 years. The European Commission and European governments have launched different initiatives to look for technological solutions that assure independent living and healthy aging to address this issue.
- Since 2008, Wireless Reach has been working with Vodafone Spain Foundation and the Spanish Red Cross on a social inclusion pilot for senior citizens called 3G for All Generations. Using a video conferencing system, a wireless HSPA modem, a desktop phone configured for pre-programmed dialing, and a 3G handset with videoconferencing capabilities on Vodafone's network, elderly participants are able to connect with care workers at the Red Cross call center and with family members.
- The pilot began with 100 participants and the response has been so positive that it has been expanded to include 150 elderly people, as well as approximately 200 relatives. In addition, working with the Spanish Deaf Association, the service has been extended to assist a group of hearing impaired seniors using text messaging, sign language and pictograms. Through this program, elderly citizens have been given the tools to remain independent longer, enabling them to continue to live in their own homes, and improving their quality of life. Participants report that the video conferencing system is easy to use and helps them stay connected, healthy and socially integrated.

Partners:

- Spanish Red Cross – Nonprofit partner and project implementer
- Vodafone Spain Foundation - Nonprofit partner and telecommunications provider

- In Portugal, Wireless Reach is working with Portugal Telecom Foundation, local hospitals and rehabilitation clinics on a two year, six-pronged project that helps connect people with disabilities, mainly focused on those with paralysis, Cerebral Palsy, Down's Syndrome, and speech disorders. Each of the six projects addresses a different group of people in need with specially crafted text-to-speech software and hardware to provide them with connectivity and the ability to communicate. Portugal Telecom's GRID software is used on mobile phones and laptops that can be attached to wheelchairs, which allows people to type using symbols and communicate with care givers and loved ones. These tools can be modified with special equipment, such as an eye-tracking device or text-to-speech, to empower people with diverse sets of disabilities.

- Portugal Projects:
  - Projecto Estrela (Star Project) - Equipped 16 resource centers for people with cerebral palsy with 3G enabled smartphones for personal development and social inclusion
  - Projecto Girassol and Girassol II (Sunflower Project I &II) – donated communication and mobility support technologies to those who otherwise could not afford it
  - Bola de Neve (Snowball Project) – Provided 23 health care units and rehabilitation clinics with information and communication technology to facilitate autonomy and social inclusion
  - Projecto Luz (Light Project) – Equipped 8 centers nationwide with systems for augmentative communication and 3G Internet access for children and young adults with intellectual disabilities, namely Down's Syndrome
  - Projecto Lua (Moon Project) – Allowed 6 recovery centers to work with children with several intellectual and/or multiple disabilities by using 3G solutions for education and training

Partner:

- Portugal Telecom Foundation – Nonprofit partner

- Collaborating with the City of Seoul, Community Chest of Seoul, Korea Telecom and MacroEye, Wireless Reach is supporting a pilot to help these senior citizens stay connected. A team of 500 caregivers throughout South Korea, called “Helpers,” visit elderly participants in their homes once every few weeks to check their health and welfare. The pilot, now in Phase II, gives 5,000 seniors a small, lightweight device called SHOWCare, which uses Qualcomm mirasol™ display technology. It also provides 500 mobile handsets to the Helpers to assist with efficient and timely care of the elderly patients in cases of emergency, as well as preventative health care needs.
- Services and applications include: automatic reception, providing direct access to a Helper by allowing senior citizens to be heard and seen by the caregiver even when they are unable to reach the device; direct access, devices are programmed for direct dialing to the Seoul Family Helper helpline; and remote functionality, enabling Helpers to establish personalized communications with senior citizens using video, photos and other applications. This device also allows Helpers to check on the participants without having to wait for scheduled visits.

Partners:

- City of Seoul
- Community Chest of Seoul – Nonprofit Partner
- Korea Telecom – 3G Operator


QUALCOMM
INCREASING MEDICAL RECORD EFFICIENCY
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- The *Mobile Health Information Systems (MHIS)* project is a collaborative effort among partner organizations, including the Eastern Cape Department of Health, the Port Elizabeth Hospital Complex, MTN-South Africa, Nelson Mandela Metropolitan University, and the funders.
- The MHIS project was designed to improve the ability of health workers in urban and rural areas to care for their patients by equipping them with locally relevant, reliable and accurate clinical information at the point of care. The MHIS project allows nurses at the Port Elizabeth Hospital Complex to access health literature through mobile devices and affordable 3G wireless technology.
- 89 percent of nurses involved in the MHIS pilot project indicated that nursing practice was enhanced by making information accessible at the point of care, and 100 percent reported they would continue using the mobile computing device in future.
- 50 Nurses will be part of the initial pilot.

Partners:

- Eastern Cape Department of Health
- Port Elizabeth Hospital Complex
- AED-SATELLIFE Center for Health Information and Technology
- MTN-South Africa
- Nelson Mandela Metropolitan University

- Wireless Access for Health utilizes 3G wireless technology to enable a locally developed electronic health record system. In the Philippines, local health care providers compile and report public health data to the Field Health Service Information System (FHSIS), which is the major source of data used for policy analysis and planning.
- The Wireless Access for Health project aims to streamline this reporting process by building on and strengthening the existing Community Health Information Tracking System (CHITS), an electronic medical record system developed by the University of the Philippines Manila. CHITS improves patient care and access to public health information by consolidating data captured during patient visits into reports for health care workers in four health units in the Tarlac region of the Philippines.
- Results at the conclusion of the pilot phase, which recorded over 12,000 patient consultations, indicate that such a system is not only feasible and improves patient care in rural health clinics, but also has a real impact for decision makers by providing them with accurate and timely health data that allows them to identify and prevent disease outbreaks across the Philippines.

Partners:

- Local government units in Tarlac
- Philippines Department of Health
- RTI International – Nonprofit project implementer
- Smart Communications – 3G Operator
- University of the Philippines Manila National Telehealth Center
- United States Agency for International Development
- Tarlac State University

- Wireless Reach is teaming with organizations, including the Kenyan Ministry of Medical Services, to increase efficiency and improve the accuracy of reporting in the supply management of antiretroviral medicines (ARVs) using 3G wireless connectivity.
- In the past, pharmacists needed to handwrite their inventory on paper, calculate the orders each month and spend time traveling to the Kenya Medical Supplies Agency (KEMSA) to drop off orders of ARVs.
- As part of the project, 12 participating antiretroviral therapy (ART) sites in Nairobi, Kenya have been provided computers, software and support equipment for wireless connectivity on Telkom Kenya's 3G CDMA EV-DO Rev. A network.
- The software developed in the project automates this manual reporting system and the newly converted electronic reports can now reach KEMSA quickly via e-mail.
- With the immediate improvements in efficiency and accuracy of reporting, pharmacists are able to concentrate on more in-depth tracking of ART adherence and patient care.
- Time spent updating daily ART records has been reduced from 7.5 to 2.8 minutes per patient.
- ART report delivery being reduced from eight hours to five minutes.
- The system also eliminates hand delivery and transportation costs.

Partners:

- Axesstel, Inc. – 3G Device manufacturer
- Communications Commission of Kenya – Kenyan regulator
- Ministry of Medical Services – Kenyan government health agency
- RTI International – Nonprofit partner and software developer
- Telkom Kenya – 3G Operator

- The project provides a mobile application and smartphones, which will contribute to improving the convenience and efficiency of the national health survey. The annual survey is conducted by the Korea Centers for Disease Control to promote public health and prevent disease.
- The smartphone application, which will be developed by Hubilion – a location-based solutions company, will provide investigative officials with schedule management, emergency paging, and location information services. In addition, it will enable two-way data transmission between the KCDC center and investigators by utilizing the 3G wireless network.
- Investigators are expected to benefit from the phones, not only in terms of work efficiency and convenience in data collection, but also in terms of safety.

Partners:

- Hubilon – Location-based software solution company
- Korea Centers for Disease Control


QUALCOMM
PILOTING INNOVATIVE SOLUTIONS
Wireless Reach
from Qualcomm
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- Wireless Reach and its partners are studying the feasibility of using EV-DO Rev. A-enabled laptops controlled by trauma surgeons in Miami to maneuver a robot in battlefield hospitals in Iraq and Afghanistan – bringing doctors from the Ryder Trauma Center in Miami, Florida to injured soldiers abroad. Using a laptop with special controls and a wireless broadband connection, doctors can provide guidance to the attending medical team on how best to treat the injuries. With EV-DO Rev. A connectivity, physicians can be anywhere, anytime - extending the reach of trauma surgeons.
- The InTouch Health RP-7 robot and five specially configured laptops with EV-DO Rev. A wireless data cards were donated to the William Lehman Injury Research Center by Wireless Reach. Surgeons can now use a laptop to autonomously drive the robot to a patient's bedside to offer consultation during an emergency, monitor patients and train nurses and residents from the doctor's home, office or from virtually anywhere. The robot's two-way audio-video capabilities allow physicians to check vitals, zoom in on the patient and provide advice to attending doctors, nurses or clinicians. Enabling surgeons to instantly connect to the ICU through high-speed wireless technology can help lower the preventable death rate by speeding up the delivery of trauma care during the "golden hour," the critical 60 minutes after an injury.
- Furthermore, doctors have found that using the robot to conduct their rounds helps reduce the spread of bacterial infections, a serious issue in hospitals where doctors visit approximately ten to fifteen patients per hour. During the study, physicians will examine deeper this new and potentially significant use of the robot.

Partners:

- American Telemedicine Association – Nonprofit partner
- Army Trauma Training Center
- Ryder Trauma Center
- U.S. Army's Telemedicine and Advanced Technology Research Center


QUALCOMM
FACILITATING REMOTE CARE
Wireless Reach
from Qualcomm
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- Wireless Reach is helping to improve the delivery of care in rural health clinics using 3G handsets and 3G-ready PCs, pre-installed with a customized health care application.
- The system allows doctors and 21 clinics to quickly access medical information and treat patients more effectively.
- Using China Telecom's EV-DO network, clinic workers can retrieve real-time medical treatment and regulation information, communicate with other physicians for remote medical consultation, and manage patient profiles and records any time, from any location.
- Educational health care content designed to address the specific needs of rural doctors also is available. The system gives rural physicians the tools they need to improve the accuracy of diagnosis and provide timely treatment, which is particularly beneficial for groups at higher medical risk such as women and children.

Partners:

- China Children and Teenagers' Foundation – Nonprofit partner
- China Rural Doctors Training Center, affiliated with the Ministry of Health – Chinese federal health agency
- China Telecom – Operator
- Hebei Province Women's Federation – Nonprofit partner
- Xi'an Kingtone Information Technology Co., Ltd. – Software developer

- Wireless Reach is working with several US partners to help fund webcam-enabled laptops, mobile phones, IT equipment and wireless broadband service for various clinics in Peru. Local health care professionals use the connectivity to communicate with teams of doctors from the United States who visit Peru to provide volunteer medical services for residents that would otherwise have no access to health care.
- One partner, Capitol City Medical Teams, works with the Kausay Wasi Clinic in Coya. Prior to Qualcomm's involvement, the clinic had extremely unreliable fixed line communications that often failed due to the harsh mountainous terrain. Today, medical specialists from around the world communicate with the clinic in real time to complete pre- and post-operative assessments of patients. Furthermore, through the use of wireless technology, nurses travel to surrounding areas to visit patients that are unable to travel to the clinic on their own.
- Another Wireless Reach partner, FACES Foundation, provides critical maxillofacial, cleft lip and cleft palate surgery and remote post-operative speech therapy. Using 3G wireless connectivity, a laptop and a webcam, doctors conduct speech therapy sessions from the United States and have changed how health care is provided in extremely rural villages in northern Peru.

Partners:

- Capitol City Medical Teams – Nonprofit partner
- FACES Foundation – Nonprofit partner
- Kausay Wasi Health Clinic – Nonprofit clinic

- The Technology for Life project, supported by Wireless Reach, helps improve health care throughout Thailand's rural areas. Fifty health clinics and hospitals in nine provinces in northern, northeastern and southern Thailand within the Princess Mother's Medical Volunteer Foundation's network have been provided wireless connectivity, computers and webcams.
- Patients at participating clinics now have the ability to communicate with doctors in major cities via CAT Telecom's 3G broadband Internet connection. By using a computer and webcam, doctors assist in diagnosing and providing consultation on various medical conditions. In addition, administrators in rural clinics can now send reports and updates regularly via the Internet to provincial public health offices, major hospitals and the Ministry of Public Health.

Partners:

- CAT Telecom Public Company, Limited – Operator
- Huawei Technology Company, Limited – Device manufacturer
- Ministry of Public Health of Thailand
- Princess Mother's Medical Volunteer Foundation – Nonprofit partner