



SOUTH KOREA



2015 Statistics

- » Life expectancy: 80 years
- » Population: 49 million (est.)
- » GDP per capita: US\$35,300 (2014 est.)
- » Mobile penetration: 106.9% (est.)

Sources: CIA World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/>); Mobile penetration data provided by Informa UK Limited and based on market intelligence.

As is evidenced in the Q-Care study, advanced mobile technologies have the potential to improve health outcomes by empowering patients with chronic diseases, like diabetes and hypertension, to build knowledge about their condition and engage more deeply in self-care.

— Soo Jeong Kim, Ph.D., Research Assistant Professor

Q-Care: Using Mobile Broadband to Improve Health Outcomes of Diabetic Patients

Q-Care is a randomized, controlled study to evaluate the effectiveness of a 3G-enabled system, including a home health gateway (HHG), web portal and smartphone application, used to improve health outcomes of diabetic patients in Korea's Gyeonggi Province. Q-Care aims to minimize problems associated with type 2 diabetes mellitus (T2DM) and hypertension.

Q-Care is the second phase of the Self Quality Care project that began in 2011 in Gyeonggi Province. The pilot phase kicked off with the prototype development and in-home user testing of the 3G HHG. In 2012, the gateway device was further integrated with 3G-enabled applications and services, and the Q-Care study began. In 2014, the data collection was completed, and results described below were analyzed and disseminated.

The United Nations and World Health Organization are calling for national and pan-social efforts to prevent and manage chronic diseases. Gyeonggi Province is leading the way with this new model leveraging 3G for health management in Korea.

Challenge

- » Diabetes, which is commonly associated with hypertension, is one of the fastest-growing chronic diseases in Korea. According to the 2012 Korea National Health and Nutritional Examination Survey conducted by the Korea Centers for Disease Control and Prevention and the Korean Ministry of Health and Welfare:¹
 - Approximately 1 in 3 Korean adults was diabetic or had potential risk for diabetes.
 - Korea's diabetic population is expected to reach about 6 million in 2050, a 183 percent increase over 2010.
 - For patients suffering from diabetes and other chronic diseases, poor medication adherence and low patient engagement can lead to potentially serious complications and higher treatment costs.

Solution

- » 591 diabetic patients ages 30-64 with type 2 diabetes and/or hypertension were randomly assigned to one of four groups: patients in the control group, those receiving individual consultation, those participating in wireless self-management only, and patients participating in a combination of wireless self-management and individual consultation.
- » Users received a Bluetooth-enabled glucometer, blood glucose testing strips, a 3G HHG and a specialized mobile application to self-monitor their blood sugar.
- » The glucometer automatically sends patients' data to the gateway, which then sends the data over the 3G network to the Q-Care portal, to patients' smartphones and to patients' electronic medical records.
- » Patients can view their data through the Q-Care mobile application on their smartphones, empowering them to manage their illness.
- » The portal stores, manages and transmits data to the health clinics where patients normally receive

SOUTH KOREA

their care and to counseling centers. The portal also gives patients' access to diabetes-related educational information.

- » Doctors and counselors use the system to monitor patients' glucose trends and contact patients, as needed.

Impact

- » Study results indicate that diabetic and/or hypertensive patients using the 3G tools and services have sustained significantly improved health outcomes. Pairing other clinical services, such as counseling, may result in significantly improved health outcomes.
- » The Q-Care service had a positive impact on improving participants' chronic-disease-related knowledge, health behaviors and self-efficacy.
- » The group that used only the 3G services had a higher self-measurement rate (34.6 percent) of three times or more per week. 80.6 percent of the group using the 3G services and receiving counseling had the lowest HbA1c level of all the groups during the 12-month intervention. HbA1c is a blood indicator which is high in patients with uncontrolled diabetes, during 12 months. Controlled HbA1c levels represent a direct impact on reductions of diabetic complications (heart attack, death, vision complications, etc.).
- » The group that used the 3G services and received counseling had the highest positive change rate (81.1 percent) of improved health knowledge. This was compared to the control group, which saw only a 58.4 percent positive change rate.

Technology

- » Bluetooth-enabled glucose meters and blood glucose testing strips
- » 3G home health gateway devices enabled by Qualcomm® Snapdragon™ processors, a product of Qualcomm Technologies, Inc.
- » Smartphones and a specialized Q-Care mobile application
- » Q-Care services based on Korea Telecom's (KT) u-Health platform and u-Health services; mobile broadband connectivity via KT's advanced 3G wireless network

Project Stakeholders

- » Gyeonggi Province provides human resources to manage, monitor and educate patients.
- » Korea Centers for Disease Control and Prevention leads the study's implementation, manages the electronic medical record and provides human resources, administrative and regulatory support.
- » Korea Telecom developed and provides the u-Health Platform and portal, branded "Q-Care" for this study, and the web service solutions and smartphone applications that allow patients and health workers to monitor patients' diabetes. KT also provides 3G network connectivity and services.
- » Kwang-Myung City Community Health Center provides education resources and logistical support.
- » The Qualcomm Wireless Reach initiative provides project funding, management support, the 3G gateways and is supporting the evaluation of the overall project.



¹ KOREA CENTER FOR DISEASE CONTROL AND PREVENTION & MINISTRY OF HEALTH AND WELFARE. KOREA HEALTH STATISTICS 2012 : KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (KNHANES V-3). 2013. 12.

Qualcomm® Wireless Reach™

Qualcomm believes access to advanced wireless technologies can improve people's lives. Qualcomm Wireless Reach is a strategic initiative that brings wireless technology to underserved communities globally. 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.