



MEXICO



Dulce Wireless Tijuana: Empowering Communities to Promote Diabetes Care and Prevention Through 3G Technologies

The current epidemic of diabetes in northern Mexico and around the world highlights the urgent need for innovative, efficient, technology-supported interventions to prevent and monitor the disease. Dulce Wireless Tijuana is a bi-national, multi-sector study that examines how the chronic care model, together with 3G wireless Internet access, can be used in diabetes management to improve patient care for marginalized communities. The main site of this project is the Family Medicine Unit #27 of the Instituto Mexicano del Seguro Social, (IMSS UMF 27) located in Tijuana, Mexico.

Challenge

- » The prevalence of diabetes has increased both in developed and developing countries.^{1,2}
- » According to the 2012 National Survey of Health and Nutrition, in Mexico the prevalence of diabetes in adults older than 20 years is 9.2 percent. In 2011, diabetes was the second cause of mortality (13.7 percent) in Mexico.³
- » In 2012, diabetes was the number one cause of outpatient visits and hospitalizations in the Mexican National Health Insurance provider (IMSS).⁴ Together, diabetes and hypertension account for 23.7 percent of the overall budget designated to for disease management and maternal health.⁵
- » According to the first U.S.-Mexico Border Diabetes Prevention and Control Project, out of the 7.5 million adults living at the U.S.-Mexico border, 15.7 percent, or approximately 1.2 million, have diabetes. Of these adults, 500,000 live on the Mexican side of the border and about 700,000 live on the U.S. side.⁶
- » Many patients in eastern Tijuana have limited access to primary care services and disease management programs because they live too far away from clinics and transportation is difficult. This lack of access exacerbates chronic diseases, like diabetes, since they require continuous monitored care.

Solution

- » The Dulce Wireless Tijuana Study works by consolidating and centralizing patient information and extending diabetes education to communities via 3G wireless technologies and community classes. Patients, promotores (community health workers), nurses and doctors access the system via mobile devices such as mobile phones, netbooks and laptops.
- » The Dulce Wireless Tijuana Study utilizes 3G wireless technologies to enhance a chronic care model based on the Project Dulce™ approach, where nurses work closely with an interdisciplinary group of physicians at a clinic and outreach workers in the community.
- » The clinical protocol was approved by the IMSS and research intervention began in January 2012.
- » A total of 300 patients have participated in the study. All patients are randomly assigned to one of three groups: approximately 100 patients participate in the control group, 98 participate in the clinical intervention, and 102 patients participate in the clinical and 3G technology intervention, which allows for the following functionality:
 - Electronic Diabetes Management Health Record: The health care workers that are part of the study can locate and receive confidential access to a patient's medical information in the study's database via a computer or laptop anytime, anywhere using 3G wireless technologies.
 - Manage Patient Reminders: Health care workers in the study can manage health data and patient reminders using a customized web application. The system sends automatic reminders to patients via SMS.
 - MyGlucoHealth Glucose Meter: Providers upload blood glucose readings to the project's network to monitor technology group patient's control and intervene if necessary.
 - Access to Diabetes Care Content: Patients use 3G mobile phones to access videos and health education on key diabetes self-management topics.

2013 Statistics

- » **Life expectancy: 76.9 years**
- » **Population: 118.8 million (est.)**
- » **GDP per capita: US\$15,400 (2012 est.)**
- » **Mobile penetration: 84.7%**

Sources: CIA World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/index.html>); mobile penetration data provided by Paul Budde Communication Pty Ltd.

In addition to using 3G technology in the Dulce Wireless Tijuana Study, another true innovation is the way in which all the organizations in this unique bi-national public, private and nonprofit community are collaborating together to advance our common commitment to empower patients with diabetes to take control of their health.

— Richard Kiy, President of ICF

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- Interactive Surveys: A mobile application on the smartphones provides a questionnaire to patients to monitor how they are managing their diabetes. Patients' responses are sent through their 3G mobile phones, making them instantly available in the database for the health care providers to review.
- Notification and Alert System: Promotores, nurses and doctors participating in the study can send voice and text messages to patients. Alerts are sent to clinical staff when patients report significantly out of range indicator levels or when the system identifies lack of adherence to appointments, tests or classes. These alerts appear in the health care workers' database for their immediate review and follow-up.

Technology

- » Mobile broadband connectivity via Iusacell's 3G BAM services.
- » 3G-enabled devices using products of Qualcomm Technologies, Inc.
- » Specialized mobile application using Iusacell's Geocontrol that relays patient data in real-time.
- » Glucose meters, from Entrahealth, able to upload patients' glucose levels to the project system.

Project Stakeholders

- » The Family Medicine Unit #27 of the IMSS, a Primary Health Care Delivery Institution, serves as the main implementation/operation site where clinical care is provided to patients.
- » Fronteras Unidas PRO SALUD manages the promotores and directs community-outreach coordination in underserved areas.
- » The International Community Foundation (ICF) serves as the fiscal agent providing evaluation oversight, develops and oversees a financial sustainability plan and fosters private and international funding. Its sister organization, la Fundación Internacional de Comunidad (FIC) is facilitating Mexican charitable giving to support the project by providing the fiscal due diligence and programmatic support making the in-kind contributions possible.
- » The School of Medicine and Psychology of the Universidad Autónoma de Baja California (UABC) oversees academic and evaluation aspects of the project and provides administrative support.

Project Sponsors

- » Entra Health Systems supplies the MyGlucoHealth Wireless blood glucose meters that patients use to support testing and online health management.
- » Iusacell has donated the mobile devices and applications and is providing the 3G connectivity.
- » Qualcomm Wireless Reach is the main project funder.

Advisors

- » BG Digital Solutions develops the customized web application and database system of the study and provides technical support.
- » The Scripps Whittier Diabetes Institute (SWDI) provides trainings on diabetes on the successful Project Dulce Chronic Disease Management Model and the Diabetes Among Friends Curriculum.
- » Telematic City provides technical consultancy services in 3G wireless technologies and supports staff communication with the technical and carrier representatives.

¹INTERNATIONAL DIABETES FEDERATION. 2010. THE IDF DIABETES ATLAS. FIFTH EDITION. INTERNATIONAL DIABETES FEDERATION. [HTTP://WWW.IDF.ORG/DIABETESATLAS/5E/THE-GLOBAL-BURDEN](http://www.idf.org/diabetesatlas/5e/the-global-burden).

²KING, H., AUBERT, R.E., HERMAN, W.H. 1998. GLOBAL BURDEN OF DIABETES, 1995-2025. PREVALENCE, NUMERICAL ESTIMATES AND PROJECTIONS. *DIABETES CARE* 21:1414-1431.

³GUTIERREZ, JUAN PABLO; JUAN ÁNGEL RIVERA DOMMARCO, TERESA SHAMAH LEVY, SALVADOR VILLALPANDO HERNÁNDEZ, AURORA FRANCO NÚÑEZ, LUCÍA CUEVAS NASU, MARTÍN ROMERO MARTINEZ Y MAURICIO HERNÁNDEZ ÁVILA. ENCUESTA NACIONAL DE SALUD Y NUTRICIÓN 2012. RESULTADOS NACIONALES. CUERNAVACA, MÉXICO: INSTITUTO NACIONAL DE SALUD PÚBLICA, 2012. AVAILABLE ONLINE: [HTTP://ENSANUT.INSP.MX/INFORMES/ENSANUT2012RESULTADOSNACIONALES.PDF](http://ensanut.insp.mx/informes/ENSANUT2012RESULTADOSNACIONALES.PDF)

⁴INEGI/SS (INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA/SECRETARÍA DE SALUD). BASE DE DATOS DE MORTALIDAD 1979-2011 (PRINCIPALES CAUSAS DE MUERTE CON LISTA GBD). MÉXICO: DGIS, 2012A. AVAILABLE ONLINE: [HTTP://WWW.SINAIS.SALUD.GOB.MX/BASEDEDATOS/CUBOS.HTML](http://www.sinais.salud.gob.mx/basededatos/cubos.html)

⁵IMSS, PROGRAMA INSTITUCIONAL DEL INSTITUTO MEXICANO DEL SEGURO SOCIAL (PIIMSS) 2014-2018. ACUERDO ACDO.SA3. HCT.230414/84.P.DF DIARIO OFICIAL, MONDAY, APRIL 28TH, 2014.

⁶PANAMERICAN HEALTH ORGANIZATION. 2004. THE U.S.-MEXICO BORDER DIABETES PREVENTION AND CONTROL PROJECT, FIRST REPORT OF RESULTS. [HTTP://NEW.PAHO.ORG/PRFEP/INDEX.PHP?OPTION=COM_CONTENT&VIEW=ARTICLE&ID=82&ITEMID=3&LANG=EN](http://new.paho.org/prfep/index.php?option=com_content&view=article&id=82&Itemid=3&lang=en).

Qualcomm® Wireless Reach™

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