Vitality INSTITUTE

SHARED VALUE

BUSINESS CASE STUDY: Qualcomm

Company Overview

Sector: Manufacturing (mobile technology)
Number of Employees: 26,000
Headquarters: San Diego, California
Revenues: $24.87 Billion

Initiative Overview: Wireless Reach, Care Beyond Walls and Wires

Department: Government Affairs
Geography: Flagstaff, Arizona
Time Frame: December 2011-Present

Background

With more than 1 million new smartphone users added every day, mobile technology is a major factor in technological advancement, innovation, and economic growth. The total value of physical and digital goods purchased via mobile device is on pace to exceed $730 billion a year by 2017.

Vision & Goals

The Qualcomm® Wireless Reach™ initiative brings advanced wireless technologies to underserved communities globally, to strengthen economic and social development. Formalized in 2006, it has grown to include over 100 projects in more than 40 countries. The program aims to foster entrepreneurship, aid in public safety, enhance the delivery of healthcare, enrich teaching and learning, and improve environmental sustainability. One of its initiatives, *Care Beyond Walls and Wires*, integrated smart phones and wireless peripheral devices into the care of heart failure patients following hospitalization in Northern Arizona.

Shared Value

Care Beyond Walls and Wires ("Care Beyond Walls") allowed Qualcomm to develop, pilot, and test the feasibility of using commercially available mobile tools to improve remote care delivery. The program simultaneously promoted efficiency and quality of healthcare delivery and generated measurable outcomes for the health system and local population.

Community Choice Driven By

- **Market Saturation**: Qualcomm considered the potential of the initiative to inform aid in the development of mobile health activities, engage with thought leaders in the mobile health space, and aid in branding.
- **Relationships with External Stakeholders**: Care Beyond Walls emerged from the business's relationship with the Public Private Partnerships Office of the National Institutes of Health (NIH), which facilitated a connection to the Flagstaff Medical Center (FMC) in Northern Arizona to implement the initiative.

Assessing Community Risk & Disease Burden

- FMC identified patients who could benefit from a mobile health intervention based on their health status and vulnerability to lacking access to care (see Data Collection, Inputs).
- 30% of the FMC inpatient volume is Native Americans living on reservations in the area and 20% are patients in transit or tourists. Due to its remote location in the mountains, the hospital and its patients are vulnerable to being cut off from care by changes in weather and travel time.

Engaging Stakeholders

- Qualcomm Wireless Reach staff engaged the NIH Office of Public Private Partnerships, which connected the business to Flagstaff Medical Center as an implementing partner.
- Verizon Wireless provided 3G enabled devices and data services for the duration of the project.
- The National Institutes of Health assisted FMC with clinic planning and evaluation.
- Zephyr Technology provided advanced health-monitoring systems to patients and hosted the data on its secure servers for evaluation by caregivers.

- Partners entered a one-year planning phase before enrolling any patients in the program. Each partner set formal expectations and identified resources they could contribute. Partners also identified what would be mutually beneficial and what would be mutually exclusive benefits.
- Site visits and weekly phone calls supported the development of the relationship, provided teaching opportunities for partners, and contextualized decision-making.

Partner	Role & Resource Allocation
Qualcomm	• Funded the pilot program from December 2011 – 2012 including monitoring kits which cost $650 per participant • When the program ended on April 1, 2013, Northern Arizona Healthcare took on the costs of continuing the program • Qualcomm is still involved with the program by continuing to provide technical support
Flagstaff Medical Center (FMC) and Internal Review Board (IRB)	• Reviewed program and evaluation plan to obtain IRB approval • Identified participants primarily from heart failure admission diagnoses in the electronic health record, followed by project staff querying the patient's healthcare team about potential participation • Facilitated patient and care team co-management of heart failure in a predominantly rural, disproportionately Native American patient population in Arizona[1] • Tracked hospital readmissions, medical utilization, ER visits, and costs savings for 50 patients enrolled
Indian Health Service (IHS)	• Many of these patients lived in underserved and rural communities, including Native American reservations
National Institutes of Health (NIH) Office of Public Private Partnerships and Heart Lung and Blood Institute	• The NIH was looking for better ways to monitor patients with Congestive Heart Failure who live in rural areas, and facilitated the partnership between Qualcomm and FMC • The NIH conducted an external evaluation of *Care Beyond Walls and Wires*, which included identifying appropriate evaluation metrics and comparing data against cohorts not enrolled in the program
Verizon Wireless	• Supplied with Motorola Droid X2 smart phones and connectivity to Zephyr technology through data service
Zephyr	• Provided monitoring software throughout the duration of the pilot program • Patients input measurements into a Zephyr mobile application • Data was hosted on Zephyr servers and used by care coordination staff at Flagstaff

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[1] Riley, William T. et al. Program Evaluation of Remote Heart Failure Monitoring: Healthcare Utilization Analysis in a Rural Regional Medical Center. Telemedicine and E-Health. 2014

Evaluation Framework: Impact on Community

Inputs	Process	Output/Outcome
Patient Recruitment Criteria: • Identified as being able to benefit from frequent monitoring, health assessment and education • Was discharged after an inpatient, observation or emergency department (ED) admission with a diagnosis of Congestive Heart Failure (CHF) • Has primary care provider who agrees to participate in the program and receive regular updates on patient progression toward individualized treatment plan goals • Struggle with compliance in medication and follow-up appointments • Are isolated from the health system either by geography, lack of caretaker identified, or other non-medical reasons • Have the desire to participate • Are able to learn, use and be responsible for the equipment Patient Enrollment: • After receiving physician approval, project staff screened patients for eligibility, described the project, and obtained informed consent from 50 patients with CHF • Enrolled patients are assigned to a Chronic Disease Registered Nurse (RN) Care Coordinator • A matched cohort was identified for comparison group by gender, racial/ethnic group, age decile, severity of illness rating for the reference hospitalization, and date of hospitalization (within 7 days of the enrolled patient)	• Those agreeing to participate were provided heart failure educational information, trained in the use of the tele-monitoring system, and asked to use the system daily for 3–6 months • *Care Beyond Walls and Wires* provides patients with a backpack containing the equipment they need to check their blood pressure, measure their oxygen level, and check their weight daily. Some of the program's patients had no electricity at home, so they were also given solar chargers • Data is transferred to a smart phone that transmits the information to Northern Arizona Healthcare's care coordination office • Information is reviewed by FMC nursing staff, including changes in parameters over time and missing data indicative of non-adherence to monitoring • The nursing care coordination team follows up with the patients and/or family members to discuss the data, diet adherence, medication management, and other care delivery issues on a daily or weekly basis depending on patient need • Reminders via text messages or mobile phones can encourage patients to take medication at the suggested time and dosage, improving the quality of patient care • Patients are monitored for 3-6 months	For 30, 90, and 182 days prior to and following enrollment, the medical records of the enrolled, declined, and matched control patients were queried to collect: • The number of inpatient and ED admissions • Length of stay • Total FMC charges for admissions • Level of acuity attached to those visits to measure if patients who were readmitted came in sicker or healthier than previously • Psychological PHQ9 on every patient on admission and on discharge • Heart Failure score pre and post admission Other Metrics • Minnesota Heart Failure Quality of Life scores pre and post enrollment • PHQ-9 scores pre and post enrollment • Patient and provider satisfaction as measured by self-report and anecdotal surveys on equipment and case management support

Impact

Community Impact

- **Health Outcomes:** Among 50 patients admitted to FMC that participated in the project from December 12, 2011-2012, readmissions decreased by 44%, average number of days hospitalized decreased by 64%, and mean total charges per patient decreased by 72% or $92K.
- **Sustainability**: Since the inception of the program 2.5 years ago, the hospital continues to operate the program and pays for it as part of its regular operations. It continues to work with Qualcomm regarding ongoing iterations of the program. The NIH accepted the mobile delivery model as a routine standard of care and have recommended the model to other small-medium sized hospitals in rural areas.
- **Scaling the Program**: FMC is expanding the program beyond patients with congestive heart failure. It plans to extend reach to new patient groups with a variety of chronic conditions in the coming year.

Business Impact: Qualcomm

- Qualcomm Wireless Reach uses lessons learned in programs like Care Beyond Walls to provide insights to business units like Qualcomm Life. Qualcomm Life focuses on medical device connectivity and data management to empower medical device manufacturers to deliver wireless medical data quickly and easily.[2]
- Qualcomm is currently exploring the scale up of the program with FMC.

This case study was adopted from a semi-structured qualitative interview and publicly available information. To learn more about the link between workforce and community health and the strategies businesses are implementing to invest in community health, read the Vitality Institute's report "Beyond the Four Walls: Why Community is Critical to Workforce Health."

To access the report and additional case studies, visit www.thevitalityinstitute.org/communityhealth or look us up on social media @VitalityUSA (previously @VitalityInst) #Beyond4Walls.

[2] https://www.qualcomm.com/info/analyst-relations/qualcomm-life
William T. Riley, PhD, Pamela Keberlein, RN, MSN,Gigi Sorenson, RN, MSN,Sailor Mohler, BS, Blake Tye, MPIA, A. Susana Ramirez, PhD, and Mark Carroll, MD. Original Research Program Evaluation of Remote Heart Failure Monitoring: Healthcare Utilization Analysis in a Rural Regional Medical Center