

# Improving maternal child health with CHW using mHealth technology in a middle-income country.

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# Disclosure Susan Bonnell, PhD, RN, PNP-PC

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## Learning Objectives

1. The learner will understand the value of community health care workers in providing primary care for 3<sup>rd</sup> trimester women in the Dominican Republic.
2. The learner will understand the application of mobile health technology in a middle-income country for improving maternal-infant mortality and morbidity outcomes.















# Cooking



# Growing food



# Elders



# Children



# USD involvement

- Since 2003 USD SON faculty and students have traveled to the DR for service-learning health missions
- Primary focus on evaluation school-aged children by providing annual physical assessment
- Home visits in rural campos
- Malnutrition, stunting and anemia; sexual health education
- Our service began in El Cercado in 2011

# Stories

- During January trips the community began to share with us their concern over the frequency of young mothers who die in childbirth
- Little to no factual history
- Difficulty getting to prenatal clinic if a mother was not well
- Commonly the mother was brought to the hospital only when in labor, despite having been acutely ill
- Began to look at statistics for the region

# Background

- Maternal-infant mortality in the Dominican Republic ranks among the highest in Latin America/Caribbean Area
- Millennium Development Goal 5 (MDG) 2000
- Target improvement at decreasing rate by 25% by the year 2015
- M-I M/M ranked as a high global priority for patient safety research (WHO, 2009)

# MDG 5 and DR statistics

- Maternal mortality 130/100,000  
Infant mortality 22/1,000 (WHO, 2000)
- 2012 maternal mortality stats: **150/100,000**
- Risk factors: high rate of c/s (45%) with co-morbidities of
  - 1) hemorrhage and sepsis
  - 2) hypertension and eclampsia
  - 3) obstructed labors
- 60% infant mortality occurs during the period before and after delivery
- 21% are adolescent pregnancies associated with poor health & social outcomes



# Dominican Republic

- Primary care “universally” available
- A low-middle income country (World Bank, 2011)
- Considered to have an adequate health care infrastructure
- 34% live below the poverty line
- On average women receive 4 prenatal visits
- 97% births occur in hospitals



# Community resources & strengths

- Adequate prenatal clinic in El Cercado
- Very poor transportation system and roads
- CHW workers already working in 13 distinct rural campos
- 2 or 3 CHW involved for past 7 years in the Pastoral Maternal Infantil program
- “Promotoras” receive monthly educational updates to improve maternal-infant health
- Well-respected and accepted in each communities and seen as leaders and helper to gain access for social and health needs
- “Everyone” has a cell phone



# Literature review

- Statistics point to the need to identify high risk pregnancies and improve interventional services for the third trimester pregnant woman
- Studies have shown that 85% of maternal deaths could be avoided with timely, effective care
- Limitation in care found to be centered on poor clinical and administrative services, limited staff supervision, and other institutional weaknesses in the health system

\* Rathe & Moline, 2011; WHO 2011

# Primary care

- Prenatal care is essential in order to identify women at risk for pregnancy complication that may lead to preterm labor, and the consequences of late pregnancy complications affecting the health of both the mother and infant (Newfield, 2012).
- 62<sup>nd</sup> World Health Assembly  
“keep the issues of strengthening health systems based on the primary health care approach high on the international agenda” (WHO, 2009).

# Mobile Health Technology

- 90% of the world population have cellular signal
- Mobile phone useful in improving health
- mHealth technologies are primed to play a significant role in providing CHW support in decision making and improving health outcomes when used for teleconsultations with more highly skilled members of the health care team

\* Campbell, 2014

## So we proposed to:

- teach CHW skills & provide basic equipment for 3<sup>rd</sup> trimester antenatal assessments in mothers homes in 3 campos in the region
- Backpack supply kit with data collection guide, subjective symptom questionnaire, scale, tape measure, urinalysis dipsticks, BP & blood glucose devices, hemoglobin device, infant kick count data collection sheet
- Cell phone and application with data collections points
- 6 month pilot goal of 45 mother's approximately 15 per community
- Community-based participatory as research guiding framework (Emanuel, Wendler, Killen, & Grady (2004))

# Data Collection Points

## Subjective questions

1. Mom feels well, no problems; or has a headache; vaginal discharge; abdominal pain; nausea, vomiting; visual change; other: describe.
2. Swelling (None, Feet/ankles, face, cough)
3. Mental Health: no problems; anxious; overwhelmed; alcohol, drug use, smoking; failure to prepare for baby

# Physical assessment data points:

- Mother's weight:
- Urinalysis: Glucose, Protein
- Mother's temperature
- Blood pressure
- Blood Glucose
- Hemoglobin
- Kick Count
- Send information to Dr. Gina



# Schedule for home visits

3<sup>rd</sup> trimester (weeks 28-40)

- every 2 weeks: 28 weeks, 30 weeks, 32 weeks
- Every week: 36, 37, 38, 39, 40, 41, 42 weeks until childbirth

# Building an app

- A scalable cloud service for mobile field data collection, visualization and mapping application that runs on GPS enabled mobile device.



# Teaching tool

- Developed a 60 page teaching and reference guide...in Spanish
- 3<sup>RD</sup> TRIMESTER PREGNANCY
- PRENATAL CARE GUIDELINES
- COMMUNITY HEALTH CARE MANUAL\*

# Making the backpacks

- Backpack
- Solar phone charger
- Phone, cord, protective case
- Clipboard
- Scale
- Urine dipsticks
- Dixie cups
- Hemoglobin analyzer
- Blood glucose plus blood pressure monitoring system
- Glucose monitor strips
- Lancets
- Gloves
- Alcohol swabs & cotton balls
- Waste disposal bags
- digital oral thermometers with disposable covers
- Extra batteries

# Aims

- 6 month project: August 29 - February 28
- Aims
  - Enroll 45 mothers
    - with follow-up visits as scheduled
    - Data collected manually and recorded, completely added to the application, uploaded to Dr. Gina
    - Data point reviewed by research team in San Diego
    - Are 'red flags' recognized by CHW?
    - Are they appropriately managing those 'red flags'?
      - Direct immediate communication with Dr. Gina

# Results

- 50 mothers successfully enrolled  
Ages: 15-19 (24%)  
35 mothers delivered
- Vaginal delivery: 21 including 1 VBAC
- C-section 14 (40%)
  - 3 primips (1 late to care)
  - 8 repeat c/s
  - Identified medical problems: HBP; transverse breech infant; twins; and placenta previa
- Several CHW “saves”
- Difficulty: meeting visit schedule as planned

# 35 infants assessed postpartum

- 35 infants assessed and evaluated
- Mothers also received post-partum evaluation
- Most infants had received some breastfeeding with complementary supplementation
- All infants were UTD on immunizations
- One mildly anemic mother
- 9 mothers with persistent hypertension, some on medications; all given anticipatory guidance for continued medical management
- Obtained anecdotal Edinburg Depression Scale scores

# Teaching and skill building





# Dulce “graduated” with new backpack



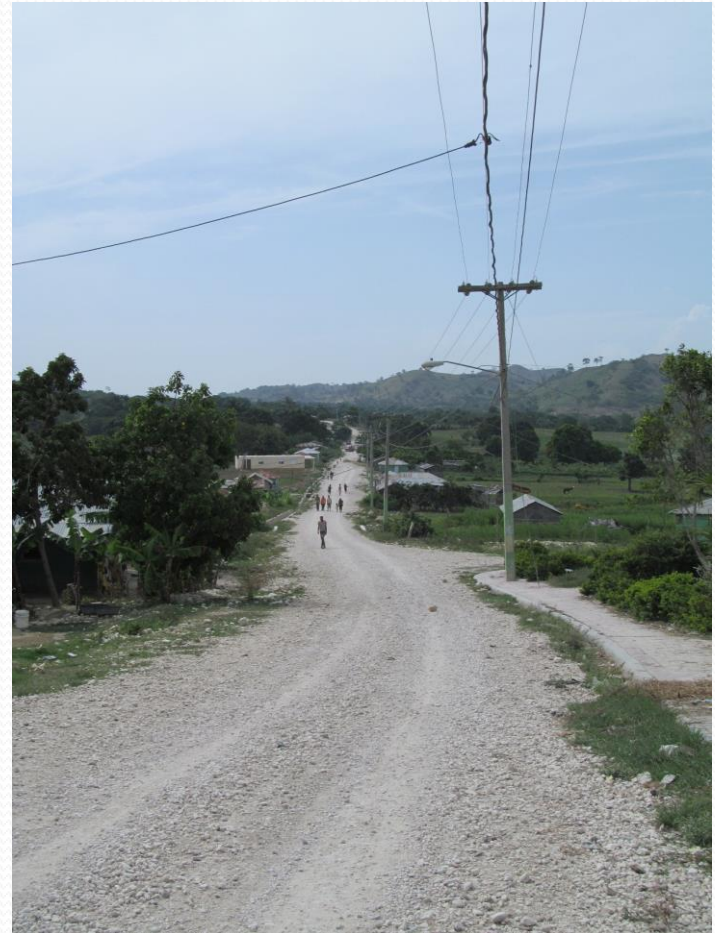
# “In the field” with CHW



# Taking care of women where they live



# Lots of walking



# technology



# Questions?



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