E-PARTO
Digital WHO Partograph

An effective use of technology to identify and manage labor complications.

Kenya – Bungoma County

EVENT
ICT4D Conference – Hyderabad, India (17th May 2017)

Presenters Information
Owen Onyango – MEAL Officer
Michael Asiyo – IT Manager
INTRODUCTION
Save the Children Kenya

Who we are?
• Child-focused organization working in 120 countries (Been in Kenya since 1950s)
• Programme Implementation - Direct and through local partners (e.g. MOH, MOE).

Where we work?
1. Turkana; 2. Wajir; 3. Mandera,

Our Approach?
• Working with Government of Kenya to scale-up successful innovative programmes through evidence-based approach.

UNICEF’s Child Deprivation Index 2013
INTRODUCTION
• What is a Partograph?
• Problem Statement
• Scope of the project

E-PARTO
• About WHO Partograph? System Workflow
• How the App works? DEMO

MODELS
• User Centered Design (UCD),
• Next step - Assessment using the MAPS Toolkit

QUESTION?
INTRODUCTION
What is a Partograph?

A paper based tool that shows a graphic representation of the progress of labor.

- Its aim is to provide a pictorial overview of labor, to alert nurses about deviations in maternal, Foetal condition and progress of labor.
- It facilitates the tracking of maternal condition, fetal condition and cervical dilation versus the time during labor.

- Useful in early detection of serious maternal and Foetal complications during labor which include postpartum hemorrhage, uterine rupture, birth trauma, stillbirths, neonatal sepsis, and most cases neonatal deaths.
INTRODUCTION

Problem statement?

✔ According to the World Health Organization (WHO), approximately 800 women die every day due to pregnancy and childbirth complications and 73% of all global maternal deaths are because of direct obstetric causes.

✔ In a study recently done in Kenya, 88.2% of the 1,057 evaluated patient records contained a Partograph and only 23.8% of these forms had been filled in correctly.

✔ Problems faced when using the paper-based partograph include;

1. Recording of Errors
2. Time Wastage
3. Plotting Complications
4. Data loss (Partograph papers missing)
INTRODUCTION

Scope of the Project

- Implemented in Bungoma County, Kenya in 15 health facilities. (2 being referral)
- The project aims to compare 15 sites using the E-PARTO against 15 sites with the same demographics using paper-based version.
- Funded by DFID to support the Ministry of Health (MOH) through the County Innovations Challenge Fund (CICF) Grant.

**Objective:** Develop a digital WHO partograph that provides real-time decision making to health caregivers in monitoring the labor process and trigger the appropriate interventions.
INTRODUCTION

Sections of the WHO paper-based Partograph!
**SYSTEM WORKFLOW**

**REGISTRATION**
- Collecting client information (profile, vitals, abdominal and VE readings)

**ALERTS** (Decision Making)
- System generated reminders for next readings.
- Checks for abnormalities i.e. Foetal heart rate, blood pressure and temperature.

**DATA SUBMISSION**
- Data is submitted in real time to the cloud (web-server).
- Health facility staff use it for monitoring, reporting and decision-making.

**DELIVERY**
- Client is removed from list of active patients.
- Records retained on the phone for future reference.
How the App works!
System overview

• The system consist of an android app and web-based application.
• The app is installed on Android tablets (7 inch screen).
• Internet access is provided through Wi-Fi hotspots around the Maternity wards.
• Unique usernames are created for all midwives who have been trained on the use of the application and gadget.
How the App works!
Mobile Interface #1

- Register Patient
- Summary
- Admit Patient
- Deliveries
- Start Partograph
- Transfer Client
- Active Clients
- Pending Transfers
- Partographs
How the App works!

Data entry...

• The app works by synchronizing data in real time.
• All data entered by the person attending to the woman in labour is synchronized to three other people.
  • The Nurse in charge
  • Reproductive Health Coordinator
  • Web Application Administrator
  (This allows for informed decision making in instances of complication.)
• During labour monitoring, the nurse enters their unique login details and begins monitoring the mothers in labor.
• Different modules on the app allow for data entry of different fields of the standard partograph
• The app allows for multiple labor monitoring and in case a nurse changes shift, another nurse logging into the system through the same facility is able to continue the process.
How the App works!
Mobile Interface #2

Name: janet kemboi
Age: 31 years
Gravida: 4
Para: 2+1
Started On Thu 11 May 2017 At 12:16 PM

Please select the option that you want to record

- Fetal Heart Rate
- Cervical dilation and Descent of the head
- Contractions
- Pulse and Blood pressures
- Temperature
- Liquor And Moulding
- Urine
- Oxytocin And Drops
- Drugs given
How the App works!
Mobile Interface #3

Record Cervical Dilatation And Descent of the Head - janet kemboi

Cervical Dilation (cm)  Descent Of The Head  Notes

TAKE

Cervical Dilatation And Descent of the Head

Time in Hours

Save the Children  E-PARTO (Digital WHO Partograph)  ICT4D CONERENCE  17th May 2017
How the App works!
Mobile Interface #4

**Delivery Report**

**Patient Information**
- **Name:** kemboi janet
- **Hospital Number:** 7
- **Gravida:** 4
- **Para:** 2+1
- **Date of Admission:** 11-May-2017
- **Time of Admission:** 04:04 PM
- **Raptured Membranes:** 0 Hours: 0

**Labour Summary**
- **Stage 1**
  - **Induction of Labour:** Y
  - **Duration:** 2 hours
  - **No of VEs:** 2
- **Stage 2**
  - **Mode of Delivery:** SVD
  - **Duration:** 5 minutes
- **Stage 3**
  - **AMSTL:** Y
  - **Placenta:** Complete
  - **Blood loss:** 0 ml
  - **Blood Pressure:** 145/98
  - **RR:** 5
  - **Placental Wt:** 3 g
  - **Perineal:** Intact
  - **Temperature:** 36.8
  - **Pulse:** 74
  - **Uterotonic:** Misoprotol
  - **Repair:** N

**Baby Information**
- **Still Birth:** Y
- **Birth weight:** 980 Gms
- **Sex:** Male
- **Apgar score 1min:** 2
- **5min:** 5
- **Resuscitation/HBB:** Y
- **Vit. K / other drugs:** Ytu
- **Baby length:** 56 cms
- **Drugs given:** k
- **Delivered by:** onyango Owen
- **Date of delivery:** Thu 11 May 2017
- **Time of delivery:** 05:22 PM
- **Partoograph Started At:** 2017-05-11 12:16:02

**Additional Information**
- **Admitted On Thu 11 May 2017 at:**
- **Delivered on Thu 11 May 2017 at:**

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**Save the Children**

E-PARTO (Digital WHO Partograph)
How the App works!
Web Interface #1

Total Parographs Started: 698
Total Admissions: 775
Total Deliveries: 492
Total Transfers (Out, In): 23, 10

Country Statistics

Enter Year to View Statistics for:
Enter Year to View...

Deliveries within the last 7 days

<table>
<thead>
<tr>
<th>Day</th>
<th>Deliveries</th>
<th>Successful</th>
<th>SB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fri</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thu</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Wed</td>
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<td>Tue</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Mon</td>
<td>12</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Sun</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Sat</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Deliveries within this Year

<table>
<thead>
<tr>
<th>Month</th>
<th>Deliveries</th>
<th>Successful</th>
<th>SB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Feb</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Mar</td>
<td>126</td>
<td>125</td>
<td>0</td>
</tr>
</tbody>
</table>

System Users in the Facility

Total Number of Users: 121
Total Active Users: 121
Total Inactive Users: 0

View Users
How the App works!
Demonstration

E-PARTO DEMO!
E-PARTO BENEFITS

✓ Some of the benefits for using the digital partograph system include:

1. Reduced errors in plotting
2. Multiple Patient Monitoring
3. Instant Notifications (Distress Alerts)
4. Human Errors eliminated
5. Better Accountability
6. Easy to share / refer patient
7. Backup of partograph data
8. Data / information Security
MODEL
User Centered Design (UCD)

✓ End-user given attention at each stage of the software development process

✓ **Principles** applied;
  - **Early focus on users and tasks;**
    1. Structured and systematic information gathering (consistent across the board)
    2. Designers trained by experts before conducting data collection sessions.
  - **Empirical Measurement and testing of system utilization;**
    1. Focus on ease of learning and ease of use (this is very critical)
    2. Testing of prototypes with actual users (usability testing)
  - **Iterative Design;**
    1. Product designed, modified and tested repeatedly.
    2. Allow for the complete overhaul and rethinking of design by early testing of conceptual models and design ideas.
### METHODOLOGY
Principles for Digital Development (checklist)

<table>
<thead>
<tr>
<th>Principle</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design with user</td>
<td>Interview with HF staff, MOH (County) and Domain Experts</td>
</tr>
<tr>
<td>2. Ecosystem</td>
<td>Visited 3 Health Facilities in Bungoma</td>
</tr>
<tr>
<td>3. Design for Scale</td>
<td>[currently a pilot – but scalable]</td>
</tr>
<tr>
<td>4. Sustainability</td>
<td>[currently a pilot – but scalable]</td>
</tr>
<tr>
<td>5. Data Driven</td>
<td>System Generated Reports / Dashboards available</td>
</tr>
<tr>
<td>6. Open Standards</td>
<td>Developed using open source software. (<em>Working on a model of how the source codes can be made available to the public.</em>)</td>
</tr>
<tr>
<td>7. Reuse and Improve</td>
<td>The main objective is to make the application Open Source.</td>
</tr>
<tr>
<td>8. Address Privacy &amp; Security</td>
<td>Access Control (password protected), Hosted in secure servers.</td>
</tr>
<tr>
<td>9. Collaboration</td>
<td>Worked with MOH, Health Facilities, Mothers, Domain Experts – WhatsApp group used to get feedback from health workers.</td>
</tr>
</tbody>
</table>
METHODOLOGY
mHealth Assessment and Planning for Scale (MAPS Toolkit)

✓ Tool designed to help project teams conduct self-assessments, review progress and develop plans to improve their ability to scale up mHealth solutions. (Developed by WHO, United Nations Foundation)

✓ Contains 6 Axes of Scale;

1. **Groundwork** – The initial steps of specifying the key components of the project you need to scale up.

2. **Partnerships** – Collaboration with external groups to support the process of scaling up.

3. **Financial Health** – Projection of scale-up costs, and the development of a financial plan for securing and managing funds.

4. **Technology and Architecture** – Steps taken to optimize the mHealth product for scaling up. (Data, Interoperability and Adaptability)

5. **Operations** – Organization and Programmatic measures for supporting the implementation, use and maintenance of the product. (Personnel, Training, Outreach and Sensitization, Contingency Planning)

6. **Monitoring and Evaluation** – Decisions and activities that enable effective process monitoring and in-depth outcome evaluation.
THANK YOU

Save the Children
The TEAM

QUESTIONS?