The Case of Mariama and Boubacar
Zaza District
At the Lava Clinic

- Mariama presented to Lava Clinic 35 weeks pregnant with her first baby with a severe headache.
- Her BP was elevated at 174/110; clinic was out of urine dipsticks (rule out pre-eclampsia).
- Nurse told Mariama to find transportation to nearest hospital as soon as possible.
- Mariama and her husband decided to wait one day until they could borrow money and arrange transportation.
At the hospital… next day

- Next morning on way to the hospital Mariama suffered a seizure
- Once at hospital told to wait in a long queue
- 10 hours later Mariama admitted to hospital and Magnesium Sulfate started (eclampsia)
- Following morning Mariama delivered a small baby son who never started breathing; a neonatal bag and mask could not be found in the delivery room
- Mariama and her husband named their deceased baby son Boubacar
- Subsequent review of Mariama’s antenatal record during a death audit showed that Mariama’s BP had been elevated on 2 prior ANC visits
Leveraging mHealth to Help Cross the Quality Chasm.....

Institute of Medicine 2001
Critical Quality & System Gaps for Mariama and Boubacar

**Clinic:**
- Failure to detect and act on Mariama’s elevated BP prior ANC visits (*pre-eclampsia red flag*)
- No urine dipstick in clinic (*diagnosis pre-eclampsia*)

**Linkage between Clinic and Hospital:**
- Communication and timely transport failure between clinic & hospital
- Nurse didn’t know who to contact (even though she had a cell phone)

**Hospital:**
- Delayed wait (3rd delay) and no triage at hospital
- No timely administration Magnesium Sulfate (*treatment eclampsia*) and corticosteroids (*maturation lung in pre-term fetus*)
- No timely resuscitation Boubacar (no resuscitation bag & mask)
What m/eHealth technologies might have helped Mariama and Boubacar if integrated into an improvement effort?

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>PROCESSES</th>
<th>RESULTS</th>
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<tbody>
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<td>EMR w/automatic alert for elevated BP</td>
<td>Mobile phone communication between nurse and hospital</td>
<td>Mariama’s elevated BP detected early</td>
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<td>EMR Integrated eClinical decision support tool to guide clinic nurse</td>
<td>e-referral protocol and SMS messaging e-assisted triage process at hospital</td>
<td>Prompt transfer to hospital with loading dose MgSO4 &amp; ACS in clinic</td>
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<td>MgSO4, ACS &amp; Bag&amp;Mask available bedside</td>
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<td>Resuscitation and survival of Boubacar</td>
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One year later in Zaza District: District Management Team Takes Action
Key District Team Actions

• Improvement team formed and supported in every facility in Zaza district:
  – Competency based training/supervision coupled with on-site **e-clinical decision support**
  -- **e-referral** protocol and tools
  – Improved care processes (hospital **e-automated triage**)
  – **EMR** to track patient info across time & system levels
  – **Mobile phones** with emergency contact #s and call schedule
• **Supply chain e-tools** to ensure essential commodities at the bedside (MgSO4, ACS, bag & mask)
• **Automated run charts** generated by EMR to track common quality measures across district facilities (DHIS-2)
• Quarterly district meetings to assess progress & share learning
Competency Based Newborn Resuscitation
Peer to Peer Observation
(could use an e-checklist…)

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Moving beyond building blocks to grow dynamic systems that strategically integrate mHealth technologies
The Opportunity….leveraging mHealth to strengthen dynamic systems