mHealth and HIV
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mHealth: the promise

1. Deliver services everywhere
   - Present unique capability of delivering services wherever people are, e.g. to reach underserved populations, particularly in rural areas

2. Low cost
   - Can deliver a variety of services at affordable prices

3. Change health behavior & outcomes
   - Radically improve access to quality care and make financial services (savings, loans and insurance) available to everyone

4. Address healthcare challenges
   - Shortage and availability of skilled healthcare workers
   - Information asymmetry between health provider and patient
   - Accessibility & utilization of infrastructure, especially in rural settings
   - Treatment adherence and compliance
   - Timely and actionable disease surveillance
   - Availability of drugs, broken supply chain, counterfeits
   - Lack of diagnostic capacity
mHealth: the challenge(s)

- Over 1,500 mHealth pilots worldwide
- Less than 10 of which have reached scale
- Phenomenon referred to as “pilotitis”
- Little focus on financial sustainability & viable business models
## Little focus on sustainability & business models

<table>
<thead>
<tr>
<th>Application</th>
<th>Example</th>
<th>Evidence</th>
<th>Scalability</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS reminders</td>
<td>Drug adherence</td>
<td>++</td>
<td>++</td>
<td>?</td>
</tr>
<tr>
<td>Call center</td>
<td>Medical hotline</td>
<td>+</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Closed user group</td>
<td>Consult colleague(s)</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Telemedicine</td>
<td>International Medical Guide for Ships</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Tele-dermatology</td>
<td>Send picture</td>
<td>+</td>
<td>-</td>
<td>?</td>
</tr>
<tr>
<td>Remote diagnostics</td>
<td>Doc-in-a-box</td>
<td>+</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Decision support</td>
<td>Protocol on PDA / smartphone</td>
<td>++</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>Stock counts</td>
<td>SMS for Life</td>
<td>+</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>Whatsapp</td>
<td></td>
<td>?</td>
<td>++</td>
<td>?</td>
</tr>
</tbody>
</table>
The mobile revolution is already happening

Mobile money

- 22 m active mobile money subscribers
- 73.9 m mobile money transactions in volume
- 192.6 bn mobile money transactions in value (KES/month)

Mobile phones

- 33 m Kenya
- 91 m East Africa
- 608 m Sub-Saharan Africa
mHealth from a patient perspective: 2 pillars

Information / Communication
- Health hotline
- Health worker

Financial Transactions
- Mobile wallet
- Insurance

Consumer / Patient
75% mobile penetration rate in Africa

Rich in mobile phones + Rich in mobile money

Mobile connections and penetration rate
Sub Saharan Africa

Kenya transformed from an informal, cash-driven economy to a mobile-money economy in 5 years time

- 2007 Launch of M-PESA as a money transfer service, now serving >85% of households
- In the first half of 2015, 24.3 $ billion was transacted via mobile money (>70% of GDP by volume)

Source: GSMA: The Mobile Economy - Sub-Saharan Africa 2015
M-PESA is Kenya’s income redistribution model

1. More users in Nairobi & Central region than elsewhere (remitting money from urban to rural)
2. Typical transaction size is KES 500-1000 (5-10 euro)
3. Larger amounts (>25 euro) are sent by a small group of people: more receivers than senders

Source: FinAccess Annual Survey 2013
mHealth at PharmAccess

• Non-profit organization that seeks to make better healthcare accessible in Africa

• We see huge opportunities to extend the mobile revolution to healthcare

• We are exploring innovative ways to finance and provide healthcare in Kenya leveraging mobile technologies

• Our work in mobile health reduces financial barriers for people to access quality healthcare
mHealth at PharmAccess: mobile health wallet

• In our mHealth Research Labs, we have been designing and testing mHealth concepts in since 2013. One such innovation is the mobile health wallet

• Unique and revolutionary concept that unites the demand for, supply of, and financing of healthcare

• Allows family members, at home or abroad, to pay into a virtual wallet on people's mobile phones where their contributions are exclusively earmarked for healthcare expenditure
Payments linked to utilization data

1: Preauthorization medical care
2: Treatment information
3: Equipment usage data
4: Reporting on allocated funds

Condition: based on pay-per-use
Condition: only if medical data submitted
Condition: only for specific purpose
Example: mobile health wallet for HIV/AIDS

**Objective**
Introduce an HIV/AIDS mobile wallet, in order to change from supply-side to demand-side financing for the HIV/AIDS “Sunshine” program of Gertrude’s Children’s Hospital in Nairobi

- 1,715 Family wallets
- 2,637 Beneficiaries (71% women, 839 children)
- 5,598 Visits
- 77% HIV-related visits
Real-time data collection & reporting

Top-10 diagnoses
- HIV-infection/AIDS
- Tuberculosis
- Allergic rhinitis
- Dermatophytosis
- Hypertension uncomplicated
- Upper respiratory infection acute
- Worms/other parasites
- Respiratory infection
- Urinary disease
- Muscle pain

Top-10 laboratory tests
- Full Haemogram (FHG)
- ALT
- Viral load
- Chest x-ray
- Stool: Microscopy
- Creatine
- CD4 count
- Urine: Urinanalysis (strip)
- Sputum microscopy for AFBS
- Sputum for TB culture
## Fixed prices to prevent leakage

<table>
<thead>
<tr>
<th>Unit</th>
<th>Price (KES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV consultation fee</td>
<td>500</td>
</tr>
<tr>
<td>HIV test per patient (for free)</td>
<td>0</td>
</tr>
<tr>
<td>CD4 tests per patient (subsidized from 3,850)</td>
<td>700</td>
</tr>
<tr>
<td>Viral load tests per patient</td>
<td>600</td>
</tr>
<tr>
<td>3-monthly dose of Cotrimoxazole (for free)</td>
<td>0</td>
</tr>
<tr>
<td>3-monthly dose of Fluconazole (for free)</td>
<td>0</td>
</tr>
<tr>
<td>Full hemogram test (subsidized from 1,280)</td>
<td>470</td>
</tr>
<tr>
<td>ALT test (subsidized from 800)</td>
<td>400</td>
</tr>
<tr>
<td>UEC test (subsidized from 3,320)</td>
<td>1,000</td>
</tr>
<tr>
<td>DNA PCR Test (EID)</td>
<td>949.5</td>
</tr>
<tr>
<td>First-line ARVs (for free)</td>
<td>0</td>
</tr>
<tr>
<td>Second-line ARVs (for free)</td>
<td>0</td>
</tr>
<tr>
<td>Third-line ARVs (price slightly going down in 2017)</td>
<td>12,910</td>
</tr>
<tr>
<td>HIVDR test</td>
<td>15,000</td>
</tr>
<tr>
<td>HIV counselor visit</td>
<td>250</td>
</tr>
<tr>
<td>Treatment HIV opportunistic infections per quarter</td>
<td>800</td>
</tr>
</tbody>
</table>
## Real-time monitoring of quality indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2015</th>
<th>YTD</th>
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</thead>
<tbody>
<tr>
<td># HIV tests performed</td>
<td>5874</td>
<td>73.4%</td>
</tr>
<tr>
<td># HIV+ patients newly identified</td>
<td>512</td>
<td>8.7%</td>
</tr>
<tr>
<td># HIV+ children newly identified (&lt;18Y)</td>
<td>112</td>
<td>21.9%</td>
</tr>
<tr>
<td># HIV+ adults newly identified</td>
<td>400</td>
<td>78.1%</td>
</tr>
<tr>
<td># HIV+ adults qualifying for ART (CD4&lt;500)</td>
<td>311</td>
<td>77.8%</td>
</tr>
<tr>
<td># HIV+ adults actually on ART</td>
<td>269</td>
<td>86.5%</td>
</tr>
<tr>
<td># HIV+ children qualifying for ART</td>
<td>112</td>
<td>100.0%</td>
</tr>
<tr>
<td># HIV+ children actually on ART</td>
<td>101</td>
<td>90.2%</td>
</tr>
<tr>
<td># consultations for patients not (yet) on ART</td>
<td>577</td>
<td>51.5%</td>
</tr>
<tr>
<td># consultations of patients on ART</td>
<td>2157</td>
<td>16.0%</td>
</tr>
<tr>
<td># viral load tests performed</td>
<td>344</td>
<td>93.0%</td>
</tr>
<tr>
<td># viral failures</td>
<td>33</td>
<td>9.6%</td>
</tr>
<tr>
<td># CD4 tests performed</td>
<td>486</td>
<td>86.3%</td>
</tr>
<tr>
<td># CD4 counts &lt;200 (=AIDS for adults)</td>
<td>67</td>
<td>16.8%</td>
</tr>
<tr>
<td>% of CD4 counts &lt;14% (=AIDS for children)</td>
<td>22</td>
<td>19.6%</td>
</tr>
</tbody>
</table>
Direct recipient of peer-to-peer funding

OPTION 1
Support Jane and 99 other mothers and children in Nairobi who have HIV/AIDS. With only $77 per year you contribute to 1 year of access to HIV/AIDS care & treatment.

OPTION 2
Only 22 cents a day supports Jane and 99 other mothers and children in Nairobi, to lead a healthy life. Your support provides 1 year of HIV/AIDS care & treatment.

Proposition 1: target group

Target: $7,700 to support 100 mothers and children for 1 year

Proposition 2: small amount
Only 22 cents a day provides a mother such as Jane and her child with HIV/AIDS care & treatment for one year.

Target: HIV/AIDS treatment for 1 mother and child only costs $77 for 1 year
HIV/AIDS wallet in Labrique’s mHealth framework

<table>
<thead>
<tr>
<th>Client education &amp; behavior change communication</th>
<th>HIV testing &amp; counselling</th>
<th>Linkage to care</th>
<th>CD4 screening</th>
<th>ART initiation</th>
<th>Treatment adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>Data collection and reporting</td>
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<tr>
<td>5</td>
<td>Electronic health records</td>
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<tr>
<td>6</td>
<td>Electronic decision support</td>
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<tr>
<td>7</td>
<td>Provider-to-provider communication</td>
<td></td>
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<tr>
<td>8</td>
<td>Provider workplanning &amp; scheduling</td>
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<tr>
<td>9</td>
<td>Provider training &amp; education</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>Human resource management</td>
<td></td>
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<tr>
<td>11</td>
<td>Supply chain management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Financial transactions &amp; incentives</td>
<td></td>
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</tr>
</tbody>
</table>
Advantages for different actors

1. **Patient**
   - Empowerment to go to facility of choice
   - Reduced out-of-pocket expenditure & related health shocks
   - Options for saving and/or receiving remittances
   - Ability to quickly mobilize funds (harambee)
   - Trusted brand

2. **Provider**
   - Faster reimbursement
   - More paying customers
   - Less negotiations with patients about rates
   - Improved cash-flow
   - Income security
   - Less administration and cash handling
   - Better investment potential

3. **Payer**
   - Low overhead costs
   - Fewer reconciliations
   - Reduced costs
   - High volume / impact
   - Real-time insight into utilization data & payments
   - Transparent money flows
   - Predictable outcomes
   - Larger risk pools
   - Less adverse selection
   - More control over quality

Reduce risk, increase investments, transparency, and scale in the system, for better access to quality healthcare