MOBILE TECHNOLOGY FOR ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH (ASRH)

Produced by: Chen D, Dooley E, Lam-Hine T, Long J, Veenapani A
## Agenda

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</table>

Total Mins: 50
Executive Summary: mHealth deemed effective, needs more research around sustainability

- The Foundation believes mobile technology is an effective way to reach youth with limited access to SRH information
- However, there is limited knowledge around the efficacy of these programs since the field is in a pilot phase
- START team engaged to conduct literature review, interview experts, and deep dive into case studies

- Mobile based programs are showing improved ASRH behaviors and outcomes in low resource settings
- Focus on the overall ecosystem, not just the individual program
- Feature phones, smartphones, and digital media deserve consideration in tandem with SMS programs

- Gaps in evidence are primarily related to:
  - Longitudinal peer reviewed research
  - Sustainability & institutionalization (Costing, M&E)
  - Targeted customer segmentation
  - Metrics & analytics

- Potential next steps: investing in further evidence, convening stakeholders, and addressing broader systemic issues impacting ASRH
Methodology: A three-pronged approach to capture best of academic and non-academic thinking

Databases
- PubMed
- Business Source Complete
- CINAHL
- Embase
- Web of Science
- Scopus

Interviews
- "They (adolescents) have access to information, but do they have the capacity to act on that information?"
- "Shared consumption in text messaging..."
- "Attack one context at a time."
- "There is lots of evidence around the fact that dose is one of the most important things..."
- "It's tough, you have to be agile."
- "What you can definitively say is that you can't definitively say anything about the field."

Case studies
- USAID
- FOSTER
- mHealth Compendium

BMGF Work Order for UW START:
Mobile Tech for ASRH

12/9/15
Literature Review Overview: Focus on mobile ASRH solutions catering to adolescents in LMICs

BMGF Warehouse: 7 resources that led to 15-20 search terms

Electronic Database Search
(n = unique articles after removing duplicates)

- BSC (n = 490)
- EMBASE (n = 180)
- Google Scholar
- PubMed (n = 8,299)
- Web of Science (n = 60)

Exclusion Criteria
- No focus on LMICs
- Non-mobile web-based solutions
- Focus on gender dynamics & social norms that influence adolescent sexual behavior
- No description of or outcomes related to mHealth solution
- Adult-specific interventions

Inclusion
- All mHealth solutions: ASRH and other health outcomes
- Mobile based interventions:
  - Behavior modification
  - Improved health outcomes
  - Education and awareness outcomes
- Systematic reviews, analyses, conference abstracts, and discussion papers on mHealth

Title and Abstract Screening
(n = 241)

Full Article Review
(n = 88)

Full Article Library
(n = 22)

Exclusion Criteria:
- Information does not add to analysis
- eHealth focus outside the scope of this project
Interview Overview: focus on broader eHealth solution set for SRH catered to adolescents and adults in LMICs

Interview Takeaways

- **Systemic issues must be considered and addressed**
  - SMS programs cannot exist in isolation
  - The ability to act on information is critical

- **Program design is a way to get around systemic issues**
  - It’s not the technology, it’s the message that matters
  - Content needs to fit local context
  - Content has to take into account availability & access
  - Program design should embed human contact
  - Device ownership is tricky; must be kept in mind while designing interventions

- **The way forward is uncharted and exciting**
  - While there is not a lot of evidence out there, the field needs to move forward with intuition and adding value from a normative perspective
  - Technology evolves very fast and costing will evolve with it
  - There is a need for advocacy: lessons learned need to be disseminated widely as field transitions out of pilot phase

Interview List

- Kelly L’Engle (USF), 2/11
- Gywn Hainsworth (BMGF), 2/12
- Sylvia Wong (UNFPA), 2/17
- Jonathon Jackson & Ryan Hartford (Dimagi), 2/18
- Marion McNabb (Pathfinder), 2/19
- Catherine Lane (USAID), 3/2
- Stephanie Oula (UNF), 3/1
  - Hanna Smalley
  - Daniela Ligiera
**Case Study Overview:** focus on SRH and non-SRH eHealth solutions catered to adolescents and adults in LMICs.

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**mHealth Compendiums**

**Case Study Analysis**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Source</th>
<th>Year</th>
<th>Demographic</th>
<th>Health focus tags</th>
<th>Geography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chakrus Interactive Radio Program</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2010-11</td>
<td>Married girls</td>
<td>HIV, Family planning</td>
<td>Kenya</td>
</tr>
<tr>
<td>Workplane-based SMS Awareness Campaign</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2006-present</td>
<td>Private sector ampl.</td>
<td>HIV, STIs</td>
<td>Uganda (4 privat</td>
</tr>
<tr>
<td>MAMA Bangladesh, South Africa, Nigeria, India</td>
<td>USAID mHealth Compendium vol 2</td>
<td>2012-present</td>
<td>Parents</td>
<td>MINCD, Bangladesh, Sen</td>
<td></td>
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<tr>
<td>MRA Channel</td>
<td>USAID mHealth Compendium vol 2</td>
<td>2012-present</td>
<td>Low-literate women</td>
<td>MINCD, India</td>
<td></td>
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<tr>
<td>Wired Mothers</td>
<td>USAID mHealth Compendium vol 3</td>
<td>2009-2010</td>
<td>Women of childhood</td>
<td>Antenatal care</td>
<td>Zambia</td>
</tr>
<tr>
<td>EPM Power II</td>
<td>USAID mHealth Compendium vol 4</td>
<td>2012-2014</td>
<td>Adolescent</td>
<td>HIV, Ghana</td>
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<tr>
<td>No-Yawo</td>
<td>USAID mHealth Compendium vol 4</td>
<td>2010-present</td>
<td>Adolescent Family planning</td>
<td>Ghana</td>
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<td>Akela &amp; Thiva</td>
<td>USAID mHealth Compendium vol 5</td>
<td>2010-present</td>
<td>Adolescent Newborn Health</td>
<td>Nigeria originally</td>
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<tr>
<td>mCanal</td>
<td>USAID mHealth Compendium vol 5</td>
<td>2013-2014</td>
<td>Adolescent Family planning</td>
<td>Mexico</td>
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<tr>
<td>CyteTel™</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2009-present</td>
<td>Women of child Care</td>
<td>Family planning</td>
<td></td>
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<tr>
<td>Mobile 4 Reproductive Health (m4RH)</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2009-present</td>
<td>Adolescents, GYF Family planning</td>
<td>Kenya, Tanzania</td>
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<tr>
<td>SMS and IVR to Improve Family Planning Services</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2011-present</td>
<td>Women of childhood Family planning</td>
<td>Kampala, Uganda</td>
<td></td>
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<tr>
<td>Text Me! Flash Me! Call me!</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2008-2013</td>
<td>7 Junicor</td>
<td>HIV, STIs</td>
<td>Ghana</td>
</tr>
<tr>
<td>Just Texted</td>
<td>USAID mHealth Compendium vol 1</td>
<td>2012-present</td>
<td>Everyone</td>
<td>HIV</td>
<td>South Africa</td>
</tr>
<tr>
<td>Tobacco Kills: Say No &amp; Save Lives</td>
<td>USAID mHealth Compendium vol 2</td>
<td>2013-present</td>
<td>Everyone</td>
<td>Smoking cessation</td>
<td>Uganda</td>
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<tr>
<td>Project Khuluma</td>
<td>USAID mHealth Compendium vol 3</td>
<td>2013-present</td>
<td>Adolescent</td>
<td>HIV, South Africa</td>
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</tr>
<tr>
<td>MomConnect</td>
<td>USAID mHealth Compendium vol 3</td>
<td>2014-present</td>
<td>Pregnant women</td>
<td>Maternal Health</td>
<td></td>
</tr>
<tr>
<td>CycleBeads™</td>
<td>USAID mHealth Compendium vol 4</td>
<td>2010-present</td>
<td>Women of child Family planning</td>
<td>Worldwide</td>
<td></td>
</tr>
<tr>
<td>Wazazi Nipendani (Parents, Love Me)</td>
<td>USAID mHealth Compendium vol 5</td>
<td>2012-present</td>
<td>Parents</td>
<td>MINCD, Malaria, HIV, Tanzania</td>
<td></td>
</tr>
<tr>
<td>NightWatch: Mobile</td>
<td>USAID mHealth Compendium vol 3</td>
<td>2012-present</td>
<td>Everyone</td>
<td>Malaria</td>
<td>Tanzania</td>
</tr>
<tr>
<td>Shigaaz FM</td>
<td>USAID mHealth Compendium vol 3</td>
<td>2011-2013</td>
<td>Adolescents</td>
<td>Political Engagement</td>
<td></td>
</tr>
</tbody>
</table>

**Data dimensions:** program description, year, demographic, health focus, geo, scale, intended outcome, behavior change, rev/cost, dosage, intensity, implementer, donor, social media use, learnings
Analysis: Creating a framework to aggregate insights from literature review, interviews, and case studies.

Localization

Program Learning

mHealth ASRH Applications

Feedback Loop

Monitoring & Evaluation

User Feedback Collection

Technical Evolution

Current Ecosystem

Robust Evidence

System Properties

Individual Requirements

Technical Requirements

Weak Evidence

Program Learning

Program Design
Illustrative Case Study: Chakruok Radio Programme - Expanding access to reproductive health and HIV information for married adolescent girls in Kenya

System Properties

- Low education levels
- Lack of trained health staff in area

Individual Requirements

- 15-19 years
- Married (mostly monogamous)
- Need interactivity
- Limited access to mobile phone (45%) vs. expanded access to radio (80%)

Technical Requirements

- Multiple platforms: radio, social media, SMS
- Online information connected to offline channel
- Compatibility to local language
- Ability to play on-demand

Program Design

- Aimed to increase FP for MAGs in Kenya since HIV risk rate higher than unmarried peers in 2010-11
- 10 month intervention
- Pre- and post-intervention design with comparison group
- 3 pronged approach: 1) Interactive media campaign 2) CHW training 3) offline materials

Program Overview

Location: Kenya, 2010-11
Implementers: Population Council through the APHIA II Operations Research Project, in partnership with Well Told Story and the Kenyan Ministry of Public Health and Sanitation
Donor: USAID
Users: 485 MAG and 202 partners
Platforms: Radio, Facebook, SMS
Outcome: Increased uptake of FP services among married girls, increased ability and willingness to negotiate with partners, increased partner support for MAGs

Lessons Learned:

1. Focus on adolescent couples, not just girls
2. CHW need incentives and monitoring
3. Spousal violence requires further investigation and intervention
## Analysis: Success criteria and challenges to overcome

<table>
<thead>
<tr>
<th></th>
<th>What worked</th>
<th>What didn’t work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Properties</strong></td>
<td>✅ Collaborating with stakeholders and leveraging partnerships</td>
<td>✗ Oppressive cultural norms</td>
</tr>
<tr>
<td></td>
<td>✅ Enabling legal framework</td>
<td>✗ Limited access to education</td>
</tr>
<tr>
<td></td>
<td>✅ Accessible mobile infrastructure</td>
<td>✗ Legal barriers</td>
</tr>
<tr>
<td><strong>Individual Requirements</strong></td>
<td>✅ Interactivity &amp; storytelling</td>
<td>✗ Device ownership</td>
</tr>
<tr>
<td></td>
<td>✅ Ability to move from online-to-offline channel</td>
<td>✗ Gender power dynamics (control, access)</td>
</tr>
<tr>
<td></td>
<td>✅ Low cost to users</td>
<td></td>
</tr>
<tr>
<td></td>
<td>✅ Confidentiality</td>
<td></td>
</tr>
<tr>
<td><strong>Technical Requirements</strong></td>
<td>✅ Integrating multiple platforms</td>
<td>✗ Mobile coverage (rural; monopoly)</td>
</tr>
<tr>
<td></td>
<td>✅ Ease of use</td>
<td>✗ Variability regarding provider preference</td>
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<tr>
<td></td>
<td>✅ Ability to make information available “on demand”</td>
<td>✗ Simplicity of use vs. complexity of content</td>
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<td></td>
<td>✅ Evolution of audience preferences (social media)</td>
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<tr>
<td><strong>Program Design</strong></td>
<td>✅ Customized and localized content</td>
<td>✗ Sustainability beyond funding</td>
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<tr>
<td></td>
<td>✅ Regular dosage</td>
<td>✗ Not participatory</td>
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<tr>
<td></td>
<td>✅ Publicity and Marketing</td>
<td>✗ Data integrity during feedback collection</td>
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<tr>
<td></td>
<td>✅ Incentives</td>
<td>✗ Dosage</td>
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</table>
**Analysis:** Strength and level of evidence in case studies

Impact evaluation in progress: Project Khuluma, NightWatch: Mobile  
No evaluation: CycleTel, JustTested, SMS and IVR for FP, Tobacco Kills, MomConnect, iCycleBeads

Positive finding:
- MIRA Channel
- EMPower II
- Wired Mothers

Negative finding:
- MAMA Bangladesh
- mCenas!

Weaker evidence:
- Text me! Flash me! Call me!
- No-Yawa
- Wazazi Nipendeni

Strong evidence:
- m4RH

Alive & Thrive
Analysis: Significant variance in program scale*

Pilot programs
Research Studies
Time Bound
Cumulative

CycleTel
715 women in pilot

mCenas!
2,005 young people in pilot

Wired Mothers
2,550 study participants

Workplace-based SMS Campaign
3,099 study participants

Text me! Flash me! Call me!
9,800 clients reached in 1 year

MIRA Channel
27,600 women registered in first year

NightWatch Mobile
192,000 responses over 8 weeks

Tobacco Kills
147,262 reached per week

Project Khuluma
100 adolescents in focus groups

EMPower II
850 young people enrolled

Chakruok Radio Program
3,407 comments, 406 fans

iCycleBeads
8,000 downloads

m4RH
70,000 users

Wazazi Nipendeni
100,000 registered

No-Yawa
126,000 youth signed up

MomConnect
500,000 women

MAMA Bangladesh
2 million people reached

Alive & Thrive
11 million reached

*Scale unclear for SMS/IVR for FP and JustTested
Analysis: What kind of SRH problem are the surveyed mHealth programs trying to solve?

Knowledge & Awareness

- EMPower II
- Project Khulumana
- Women Connect!
- Project Khulumana

ARMADILLO

- 6001
- mCenas!

DoctorChat Mobile

- Alive & Thrive
- Soul City
- No-Yawa

Education as a Vaccine (EVA)

Behavior Change

Increase FP Demand

Understanding Health Behavior
**Analysis:** Who are the current programs targeting?

**Parents**
- MAMA Program
- Wazazi Nipendeni (Parents Love Me)

**Adolescents**
- EMPowerII
- No-Yawa
- Alive & Thrive
- mCENAS!
- m4RH
- Project Khuluma

**Community Health Workers**
- m4RH
- Chakruok Radio

**Women**
- Low Literate Women
- MIRA Channel

**Married Adolescent Girls**
- Chakruok Radio

**Married**
- Education as a Vaccine

**Pregnant**
- MomConnect Millennium Villages Project

**Childbearing Age**
- Wired Mothers
- iCycleBeads
- ARMADILLO
- SMS/IVR
- CycleTel

**Sex Workers**
- Text Me! Flash Me! Call Me!
Analysis: What cost models are being used?

- **Strategies for cost recovery**
  - User pay-for-service
  - SMS cost reduction
  - Strategic partnerships

- **Four-scenario analysis**
  - Varying per-SMS cost reductions and per-user program revenue
  - Breakeven and uncertainty analysis

- **Findings**
  - Breakeven only possible when: (1) all SMS costs transferred to users and (2) lowest per-SMS cost negotiated with telecom partners
  - Models require more consideration to balance sustainability, scale and impact

Mangone et al. Sustainable Cost Models for mHealth at Scale: Modeling Program from M4RH Tanzania. 2016
Analysis: Revenue and cost data for specific programs

- **m4RH**
  - Cost/user/year in TZ: $1.62 ($203,475 for 125,000 users in TZ in 2014), cost info cited as a barrier to sustainability
  - Breakeven would be possible under the scenario where users/recipient paid for all text messages and lowest negotiated rates with mobile service providers ($0.96 per user per year)

- **CycleTel**
  - No data on cost of pilot
  - Suggest that if users charged 30 rupees a month and will significant investment from donors, sustainable in 5 years
  - In survey 86% in interviews said they would be willing to pay 33 Rs. per month for service (15-400 RS range)
  - Sending 1 SMS in India cost less than 1 Rs.

- **MAMA Bangladesh**
  - Relies on multiple revenue streams, including donor funding, corporate partnerships, mobile operator discounts and user fees
  - Aponjon service, which costs two taka (a few US cents) per message, aims to provide the messages free to at least 20 percent of the poorest subscribers
### Analysis: Who are the active donors in this space?

<table>
<thead>
<tr>
<th>Donor Type</th>
<th>Detail</th>
<th># of Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Agency (Donor Country)</td>
<td>USAID, Embassy of the Netherlands, PEPFAR, and the CDC Foundation, Canadian International Development Agency (CIDA), Danida Health Sector Program Support, Department for International Development (UK)</td>
<td>14</td>
</tr>
<tr>
<td>Nonprofit/Charity</td>
<td>Bill and Melinda Gates Foundation, Program for Accessible Health Communication and Education (PACE), VodaCom Foundation, SHM Foundation, ELMA Philanthropies, Discovery Foundation, PMI, Campaign for Tobacco-Free Kids</td>
<td>6</td>
</tr>
<tr>
<td>Private Sector</td>
<td>Johnson &amp; Johnson, BabyCenter, Cycle Technologies, Aga Khan Health Service</td>
<td>5</td>
</tr>
<tr>
<td>United Nations</td>
<td>The United Nations Foundation, the mHealth Alliance</td>
<td>2</td>
</tr>
<tr>
<td>Government Agency (Implementing Country)</td>
<td>South African National Department of Health</td>
<td>1</td>
</tr>
</tbody>
</table>
### Analysis: Who are the active implementers in this space?

<table>
<thead>
<tr>
<th>Implementer Type</th>
<th>Examples</th>
<th># of Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local NGO or Foundation</td>
<td>D.Net Bangladesh, Praekelt Foundation, Cell-Life, Mewat Mahila Vikas Society, 4-H Ghana, Partners for Development, PACE Uganda, Right to Care Overberg, Kidzpositive, Jемbi Health Systems, Soul City, HealthEnabled</td>
<td>12</td>
</tr>
<tr>
<td>Academic/Research Institution</td>
<td>University of Copenhagen, UC Davis, UNC Chapel Hill, Georgetown University, University of Cape Town, Wits Reproductive Health &amp; HIV Institute (WRHI), University of Pretoria, Johns Hopkins Center for Communication Programs</td>
<td>7</td>
</tr>
<tr>
<td>Private Sector</td>
<td>TTC Mobile, Well Told Story, ZMQ Development, Thoughtworks Inc, HCL Ltd, Boring Brands, Vodacom Tanzania</td>
<td>9</td>
</tr>
<tr>
<td>Health System/Providers</td>
<td>Kalafong Hospital, Steve Biko Academic Hospital, Groote Schur Hospital, Indian Society of Healthcare Professionals</td>
<td>2</td>
</tr>
</tbody>
</table>

*Table examples include 90%+ of implementers but is not exhaustive*
Analysis: What is the role of social media in mHealth interventions?

- Social Media not well incorporated into cases currently examined

- Of 20 case studies
  - Chakruok Interactive Radio Program (Kenya) actively utilized Facebook in the intervention
  - No-Yawa (Ghana) incorporates Facebook and Twitter
  - CycleTel (India) has a Facebook page but it is utilized for marketing, not for the intervention
  - Wazazi Nipendeni (Parents, Love Me) (Tanzania) utilized mass media
  - No-Yawa (Ghana) assessed the social media platforms that are used by the target audience to inform program learning (97% had internet on their phone, most used platforms were Facebook and WhatsApp)
**Analysis**: Where are the major gaps in research and knowledge?

- **Rigorous, peer-reviewed research**
  - Partnerships between researchers and program directors
  - Advocacy for more longitudinal research

- **Models for sustainability**
  - Limited information on costing
  - Monitoring and evaluating

- **Program use of people younger than 15**
  - Programs primarily targeted at 17-25

- **Metrics and analytics**
  - Attribution to behavior change mechanisms in mHealth
  - Longitudinal studies on lasting programs
  - Data integrity
Analysis: Way forward

- Addressing systemic issues
  - Ecosystem of initiatives
  - Socio-cultural norms

- Program integration
  - Connecting stakeholders (CHWs, clinicians, etc.)
  - mHealth as a resource to enable knowledge and action

- Evolution of program costing
  - Study sustainable programs
  - Impact of social media & other free resources

- Proliferation of smartphones
  - Interviews illustrated an increasing focus on eHealth solutions
  - SMS as one component of an integrated program

- Evolution of technology
  - Rapidly evolving landscape of features and applications
Analysis: Questions for further discussion

- Should the Foundation be playing a convening role in this space?
- Can the Foundation use in-house expertise to design robust benchmarking and M&E tools?
- Should the Foundation leverage credibility as a non-partisan arbiter to create strategic partnerships?
Analysis: Strength and level of evidence in case studies

- **Positive finding**
  - MIRA Channel: Increase in uptake of folic acid during pregnancy, ANC visits (55pp), facility deliveries (49pp), and immunization rates (41pp)*
  - EMPower II: 28.2% increase in ART use, 35.1% decrease in ART default (n unknown)*
  - mCenas!: Increases in use of oral, emergency, and combined contraceptives by women and men, and male condom usage by men*
  - Wired Mothers: Increase in skilled delivery attendance (60% intervention vs. 47% control)
  - Alive & Thrive: Cluster RCT* that found SS differences in early initiation of breastfeeding, exclusive breastfeeding at 3 and 6 months, gave only colostrum for first 3 days, gave water before 6 months

- **Negative finding**
  - BMGF Work Order for UW START: Mobile Tech for ASRH
  - Analysis: Strength and level of evidence in case studies
    - Text me! Flash me! Call me!
      - 122% MoM increase in FSW seeking STI treatment (82 vs 182); 47% follow-up rate after referral to testing services among MSM (n=1169)*
    - MAMA Bangladesh: No control; outcomes compared to 2011/2014 DHS data
      - Higher reported 4+ antenatal visits attended, PNC visits attended, exclusive breastfeeding, institutional births
    - EMPOWER II: No control group
      - 28.2% increase in ART use, 35.1% decrease in ART default (n unknown)*
    - Wired Mothers: Increase in skilled delivery attendance (60% intervention vs. 47% control)
      - Urban as found to be statistically significant, rural was not
    - Alive & Thrive: Cluster RCT* that found SS differences in early initiation of breastfeeding, exclusive breastfeeding at 3 and 6 months, gave only colostrum for first 3 days, gave water before 6 months

- **Weaker evidence**
  - Abt Associates RCT showed no impact on behavior
  - L’Engle: 18% response indicating change in contraceptive use, but no baseline data

- **Strong evidence**
  - 28.2% increase in ART use, 35.1% decrease in ART default (n unknown)*
  - Urban as found to be statistically significant, rural was not

---

*Was unable to find peer-reviewed evidence confirming results.
Impact evaluation in progress: Project Khuluma, NightWatch: Mobile
No evaluation: CycleTel, JustTested, SMS and IVR for FP, Tobacco Kills, MonConnect, iCycleBeads

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BMGF Work Order for UW START: Mobile Tech for ASRH
mHealth Framework: deep dive
Deep dive: System Properties

Description
- Cultural Norms
- Infrastructure/Teledensity
- ICT Literacy
- Policy
- Political Economy
- Governance

- Interventions must accommodate unique localities
- Mobile phone penetration (teledensity) is critical and growing
- Cultural and social stigma can stifle progress
- ICTs present an increasingly influential opportunity for youth

Academic*
- Interventions must accommodate unique localities
- Mobile phone penetration (teledensity) is critical and growing
- Cultural and social stigma can stifle progress
- ICTs present an increasingly influential opportunity for youth

Case/Interview**
- Country ownership and leadership engagement is critical to sustainability
- Strong public-private partnerships are key to program success
- Coordination of partner efforts can compound effectiveness

*Valenzuela et al. (2007)
Pillibury & Mayer (2005)
Mushamirri et al. (2015)
Alkinifaderin-Agarau (2012)
L’Engle (2013)
Jamison et al. (2013)
Gonsalves et al. (2015)

**mHealth Compendium v3, 4, 5
All interviews
Deep dive: Individual Requirements

- **Description**
  - Gender/Age
  - Device Ownership
  - Privacy Concerns
  - Incentives and Cost Concerns
  - On-Demand and Convenience of Program
  - Different user segments have drastically different ASRH needs
  - Use participatory design and localize information
  - Evidence suggests high acceptability, but minimal evidence around sustained long-term behavior change
  - Personal and Partner’s Attitude to Contraception
  - Marital & Child-Bearing Status
  - ICT Literacy

- **Academic***
  *Akinfaderin-Agarau et al. (2012)*
  *Gonsalves et al. (2015)*
  *L’Engle (2013)*
  *Pfeiffer et al. (2014)*
  *Halewood et al. (2008)*
  *Sommer et al. (2015)*
  *Edouard (2012)*

- **Case/Interview**
  - Privacy is a dual edged sword
  - Incentives encourage more individual engagement
  - Base messaging content on individual characteristics

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*All interviews
CommCare
m4RH
Malaria Community Surveillance for Elimination*
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L'Eingle (2013)
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Sommer et al. (2015)
Edouard (2012)

**Perlman (2013) Pillsbury (2005)**

**mHealth Compendium v3, 4, 5**
All interviews CommCare mSRH Malaria Community Surveillance for Elimination
Deep dive: Technical Requirements

Description

• Technical Platform
• Integration
• Application Features
• Network/Coverage
• Market Constraints
• Interconnectivity

• Network issues can impact program effectiveness
• Health systems integration can enable individual requirements
• Mobile phone markets can impact program effectiveness
• Technical features designed to engage users are critical

Academic*

• Network issues can impact program effectiveness
• Health systems integration can enable individual requirements
• Mobile phone markets can impact program effectiveness
• Technical features designed to engage users are critical

Case/Interview**

• Iterative design and roll-out process must integrate design with feedback
• Design for scale and build for sustainability as a part of a integrated partner ecosystem
• Use open standards, open data, open source, and open innovation to minimize costs

*Mushamirir et al. (2015)
Valenzuela et al. (2007)
Edouard & Edouard (2012)
Perlman et al. (2013)
Al-Shorbaji & Geissbuhler (2012)
Cole-Lewis & Kershaw (2010)
Holewood et al. (2012)
Jamison et al. (2013)
Akinfaderin-Agarau (2012)
Gillam et al. (2012)

**Relative Principles for Design Development
Dimagi interview
Principles for Digital Development

- **Design with the User**
  - Develop context appropriate solutions informed by user needs
  - Include all user groups in planning, development, implementation and assessment
  - Develop projects in an incremental and iterative manner
  - Design solutions that learn from and enhance existing workflows and plan for organizational adaptation
  - Ensure solutions are sensitive to, and useful for, the most marginalized populations: women, children, those with instabilities, and those affected by conflict and disaster

- **Understand the Existing Ecosystem**
  - Participate in networks and communities of like-minded practitioners
  - Align to existing technological, legal, and regulatory policies

- **Design for Scale**
  - Design for scale from the start, and assess and mitigate dependencies that might limit ability to scale
  - Employ a “systems” approach to design, considering implications of design beyond an immediate project
  - Be replicable and customizable in other countries and contexts
  - Demonstrate impact before scaling a solution
  - Analyze all technology choices through the lens of national and regional scale
  - Factor in partnerships from the beginning and start early negotiations

- **Build for Sustainability**
  - Plan for sustainability from the start, including planning for long-term financial health e.g., assessing total cost of ownership
  - Utilize and invest in local communities and developers by default and help catalyze their growth
  - Engage with local governments to ensure integration into national strategy and identify high-level government advocates

- **Be Data Driven**
  - Design projects so that impact can be measured at discrete milestones with a focus on outcomes rather than outputs
  - Evaluate innovative solutions and areas where there are gaps in data and evidence
  - Use real-time information to monitor and inform management decisions at all levels
  - When possible, leverage data as a by-product of user actions and transactions for assessments

- **Use Open Standards, Open Data, Open Source, and Open Innovation**
  - Adopt and expand existing open standards
  - Open data and functionalities and expose them in documented APIs (Application Programming Interfaces) where use by a larger community is possible
  - Invest in software as a public good
  - Develop software to be open source by default with the code made available in public repositories and supported through developer communities

- **Reuse and Improve**
  - Use, modify and extend existing tools, platforms, and frameworks when possible
  - Develop in modular ways favoring approaches that are interoperable over those that are monolithic by design

- **Address Privacy & Security**
  - Assess and mitigate risks to the security of users and their data
  - Consider the context and needs for privacy of personally identifiable information when designing solutions and mitigate accordingly
  - Ensure equity and fairness in co-creation, and protect the best interests of the end end-users

- **Be Collaborative**
  - Engage diverse expertise across disciplines and industries at all stages
  - Work across sector silos to create coordinated and more holistic approaches
  - Document work, results, processes and best practices and share them widely
  - Publish materials under a Creative Commons license by default, with strong rationale if another licensing approach is taken
Deep dive: Program Design

**Description**
- Content
- Dose
- Language
- Stakeholders

**Academic**
- Program design can be used to tap into social constructs
- Program design has to be engaging in order to sustain interest and usage
- To be sustainable, program needs peer acceptance and support of other programs

**Case/Interview**
- Messaging is specific and grounded in local reality
- Has to be supported by personal connection
- Storytelling works for ASRH
- Intervention dose is important

*Edouard & Edouard (2012)  
Sommer et al. (2015)  
Halewood et al. (2012)  
Pfeiffer et al. (2014)  
Pearlman (2013)  

**Chakruok Radio  
mcENAS  
No-Yewa  
JustTested  
All Interviews

**Costing**
- Marketing
- Simplicity
- Storytelling
- Multimedia
- Monitoring & Evaluation

*Edouard & Edouard (2012)  
Sommer et al. (2015)  
Halewood et al. (2012)  
Pfeiffer et al. (2014)  
Pearlman (2013)  
Lopez (2014)
## Illustrative list of promising SRH mHealth case studies that show behavior change

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Metrics/Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chakruok Interactive Radio Program</td>
<td>Increased uptake of FP services among married girls</td>
</tr>
<tr>
<td>MAMA Bangladesh, South Africa, Nigeria, India</td>
<td>Messages downloaded and used by 161 organizations in 54 countries around the world</td>
</tr>
<tr>
<td>MIRA Channel</td>
<td>Increase in uptake of folic acid during pregnancy, the number of pregnant women visiting frontline health workers or Anganwadi Workers, and deliveries at healthcare facilities</td>
</tr>
<tr>
<td>Wired Mothers</td>
<td>Increase in skilled delivery attendance. 60% of the women in the intervention group, versus 47% in the control group, delivered with skilled attendants</td>
</tr>
<tr>
<td>EmPowerII</td>
<td>Increase in uptake/adherence to ARVs</td>
</tr>
<tr>
<td>No-Yawa</td>
<td>34% users changed family planning behavior (n = 40)</td>
</tr>
<tr>
<td>Alive &amp; Thrive</td>
<td>Changed breastfeeding behavior in mothers</td>
</tr>
<tr>
<td>mCENAS!</td>
<td>Increased ever use (oral pills; emergency) and current use (condoms; oral pills)</td>
</tr>
<tr>
<td>m4RH</td>
<td>13% users reported increased knowledge, and “some” behavior change indicated in users</td>
</tr>
</tbody>
</table>
Illustrative Case Study: No-Yawa: Mobile services to improve reproductive health among youth in Ghana

Program Overview
Location: Ghana
Sponsors: Grameen Foundation, DKT International Ghana, Marie Stopes International Ghana
Users: 126,000
Platforms: Web, SMS and voice messages, hotline, social media, local clinics
Outcome: 34% of users changed their behavior, 90% found messages useful (n=40)

Lessons Learned:
1. User-centered design is critical: balance between content that pushes boundaries without alienating conservative youth
2. Engage youth through ease of access (multiple channels), interactivity and built-in rewards (peer recognition, prizes)
3. Extensive outreach is necessary to engage rural youth
4. Where possible, content for youth and guardians should be integrated simultaneously to encourage dialogue

System Properties
- Low use of modern FP methods among women
- High teen pregnancy rates

Individual Requirements
- 15-24 years
- On-demand information and language compatibility
- Available options and clinical referrals
- Story messages to communicate knowledge

Technical Requirements
- Multi-platform integration to accommodate user demands: web, social media, voice, SMS, hotline and local clinics
- Compatibility in six local languages
- Voice and SMS messages, hotline, local clinics

Program Design
- Integrating youth behavior change information, youth-targeted contraceptive social marketing and youth-friendly clinic services to create a social movement for improved SRH
- Address unmet need for youth-friendly information, services and products
- Hosts “event, concerts and activities all around the country…”
Program Elements
**Analysis:** How long do these programs remain in contact with their target audience?

We saw 3 general models for program timeline and follow up:

<table>
<thead>
<tr>
<th>Pilot programs</th>
<th>Extended Follow Up</th>
<th>Ongoing Roll Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time:</strong> 2-3 month follow up</td>
<td><strong>Time:</strong> 2-24 months</td>
<td><strong>Time:</strong> continuous (no target dosage)</td>
</tr>
<tr>
<td><strong>Purpose:</strong> Monitoring and evaluation</td>
<td><strong>Purpose:</strong> Research study or public health campaign</td>
<td><strong>Purpose:</strong> Public health campaign, private sector app</td>
</tr>
</tbody>
</table>
| • Workplace-based SMS Awareness Campaign | • 0-12 months:  
  - Chakruok Radio (10 months)  
  - Alive & Thrive (10 months)  
  - MomConnect (duration of pregnancy)  
  - Wazazi Nipendeni (12 months)  
|• CycleTel™  
• NightWatch: Mobile  
• mCenas!  
• JustTested | • 13-24 months:  
  - Wired Mothers (23 months)  
  - EMPower II (24 months)  
  - m4RH (17 months)  
  - Project Khuluma (24 months)  
  - Shujaaz (24 months) | • Workplace-based SMS Awareness Campaign  
• CycleTel™  
• MIRA Channel  
• iCycleBeads™  
• MAMA  
• No-Yawa |
**Analysis:** How often and in what ways do these programs contact their target audience?

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Cases</th>
<th>Examples</th>
</tr>
</thead>
</table>
| High      | Chakruok Interactive Radio Program, Wazazi Nipendeni (Parents, Love Me), NightWatch: Mobile, Alive & Thrive | • SMS and calls incorporated into weekly radio drama linked to Facebook discussions  
• Monthly breastfeeding lessons during microcredit meetings, SMS and voice messaging, small group skit participation  
• Mass media campaigns incorporated |
| Moderate  | Project Khuluma, No-Yawa, Wired Mothers, MIRA Channel, CycleTel™ | • SMS and support groups  
• SMS push notification combined with other platforms (Facebook, quizzes, chatrooms)  
• SMS push notifications tailored to gestational week, voucher for 2-way communication  
• Interactive toolkit including trackers for menstrual-cycle, immunizations, pregnancy |
| Low       | Workplace-based SMS Awareness Campaign, MAMA, EMPower II, mCenas!, Mobile 4 Reproductive Health (m4RH), SMS and IVR to Improve Family Planning Services, Text Me! Flash Me! Call me!, Just Tested, MomConnect, iCycleBeads™ | • SMS push notifications and radio  
• SMS two-way communication  
• SMS two-way communication and voice messages  
• SMS push notifications alone |
**Analysis:** Health focus areas of select mHealth interventions

### HIV, STIs
- EMPower II
- Workplace-based SMS Awareness Program
- Text Me! Flash Me! Call Me!
- JustTested
- Project Khuluma

### Malaria
- Nightwatch: Mobile
- Wazazi Nipendeni (Parents, Love Me)

### MNCH
- MAMA
- MIRA Channel
- Alive & Thrive
- MomConnect

### Family Planning
- Chakruok Radio Interactive Program
  - No-Yawa
  - mCenas!
  - CycleTel
- m4RH
- SMS/IVR for FP
- iCycleBeads

### Smoking
- Tobacco Kills: Say No & Save Lives
Lessons Learned
**Analysis:** What were the major takeaways from the case studies?

- **Synergy with multiple media channels (radio, social media) increases buy in, allows targeting subpopulations**
  - Chakruok Interactive Radio Program, Workplace-based SMS Awareness Campaign, No-Yawa, Mobile 4 Reproductive Health (m4RH), NightWatch: Mobile

- **Interaction and development between implementers, peer educations, and participants is necessary**
  - Workplace-based SMS Awareness Campaign, MAMA, iCycleBeads™, MomConnect, Wazazi Nipendeni (Parents, Love Me)

- **Strategic partnerships leveraging government, nonprofit, technology and mobile operators with local ownership are critical to success**
  - MAMA, Wired Mothers, CycleTel, Mobile 4 Reproductive Health (m4RH)

- **Ensure targeting of messages to demographics; separate targeting to both adolescents and guardians**
  - MAMA, No-Yawa, mCenas!

- **Incorporating benefactors and household decision makers in all stages to encourages empowerment, buy in, encourage spread of information to community**
  - MAMA, MIRA Channel, EMPower II, Alive & Thrive
Analysis: What are the secondary takeaways from the case studies?

- **Design for scale from beginning to encourage uptake and adoption**
  - MAMA

- **Education can be motivation enough to participate if population involved in design and understand value**
  - EMPower II

- **Locally-relevant information important**
  - No-Yawa, Project Khuluma

- **Important to consider literacy levels and incorporate other platforms if necessary (IVR)**
  - Mira Channel, SMS and IVR to Improve Family Planning Services

- **Confidentiality important**
  - Text Me! Flash Me! Call me!