The use of Mobile Technologies (mHealth) Tools in Reproductive Health and Family Planning, and Measuring Impact

Dr. Mario Festin
Department of Reproductive Health and Research, WHO, Switzerland

Prof. James Phillips
Mailman School of Public Health, Columbia University, USA

Ms. Deborah Constant
University of Cape Town, South Africa

Dr. Garrett Mehl
Department of Reproductive Health and Research, WHO, Switzerland
Using Mobile Phone Technology for the Medical Eligibility Criteria in FP
The need for evidence-based guidance

- To base family planning practices on the best available published evidence
- To address misconceptions regarding who can safely use contraception
- To reduce medical barriers
- To improve access and quality of care in family planning
WHO guidelines and tools

Medical Eligibility Criteria

Selected Practice Recommendations

The Medical Eligibility Criteria Wheel

Family Planning 2011 UPDATED

Decision-Making Tool

Reproductive Choices and Family Planning for People with HIV (updated soon!!!)

Guide to family planning for community health care providers and their clients
Medical eligibility criteria for contraceptive use (MEC)

Purpose: **Who can safely use contraceptive methods?**

- Fourth edition offers ≈ 1800 recommendations for 19 methods
- Available in English, French, Spanish, Arabic, Chinese, Turkish, Romanian, Portuguese, Laotian, Vietnamese, Mongolian
# MEC Categories

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>WITH CLINICAL JUDGEMENT</th>
<th>WITH LIMITED CLINICAL JUDGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use method in any circumstances</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Generally use the method</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Use of method not usually recommended unless other more appropriate methods are not available or not acceptable</td>
<td>No (Do not use the method)</td>
</tr>
<tr>
<td>4</td>
<td>Method not to be used</td>
<td></td>
</tr>
</tbody>
</table>

**1** A condition for which there is no restriction for the use of the contraceptive method

**2** A condition where the advantages of using the method generally outweigh the theoretical or proven risks

**3** A condition where the theoretical or proven risks usually outweigh the advantages of using the method

**4** A condition which represents an unacceptable health risk if the contraceptive method is used
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>COC</th>
<th>CIC</th>
<th>P/R</th>
<th>POP</th>
<th>DMPA NET-EN</th>
<th>LNG/ETG Implants</th>
<th>Cu-IUD</th>
<th>LNG-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BREAST DISEASE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Undiagnosed mass</td>
<td>2*</td>
<td>2*</td>
<td>2*</td>
<td>2*</td>
<td>2*</td>
<td>2*</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b) Benign breast disease</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>c) Family history of cancer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>d) Breast cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) current</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>(ii) past and no evidence</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>of current disease for 5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ENDOMETRIAL CANCER</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>OVARIAN CANCER</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>UTERINE FIBROIDS</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>a) Without distortion of the</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>uterine cavity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) With distortion of the</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>uterine cavity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I = Initiation, C = Continuation, BF = Breastfeeding, NA = not applicable

MEC Wheel

- Offers accessible MEC guidance for most commonly encountered medical conditions
- Conditions that are either '1' or '2' on back of wheel.
- Locate condition of interest, then turn wheel to identify eligibility category.

Available in many languages: English, French, Spanish, Chinese, Arabic, Mongolian, Azeri, Latvian, Lithuanian, Russian, Sri Lankan, Myanmar, Armenian, Nepali, Indonesian, Turkish, Burmese, Ukrainian, Khmer
Mobile MEC/ MEC mobile

- Being developed for the Java, Android, and Apple OS platforms
- In phone apps
- Downloadable from WHO website

Soon, the iMEC for iphones and iPad
Will be an inphone application, no need to send an SMS or text message
MEC mobile opening screen
MEC mobile: medical condition categories
MEC mobile : submenu for medical conditions
MEC mobile: recommended categories

- Cancers:
- Breast cancer (current)
- Combined pills/injectable
  - 4
- Progestogen-only pills:
  - 4
- DMPA & NET-EN
Field testing

- Mobility
  - Feedback on access, downloading, navigating, finding answers, appearance, closure, and deletion

- Content
  - Given cases, to determine the recommended category, using the MEC mobile.

- WHO legal office licensing reviews
Next Steps

- Java version
  - For downloading from website
- Android version
  - For downloading from website
  - From Android store
- iMEC
  - For iPhone and iPad
  - From Apple iTunes store
m-ASSIST

Using mobiles in medical abortion to remind, support, inform and assess completion

D. Constant and K. de Tolly

2011 International Conference on Family Planning
Dakar, Senegal
29 November – 2 December 2011
Overview: Project m-Assist

• Title: The use of a package of information, self assessment, and support as an alternative to follow-up visits after medical abortion and to strengthen FP messages

• Ethics: Approval obtained from WHO and UCT

• Design: 3 phases  NCA, Pilot, RCT

• Intervention:
  • SMSs coaching through MA
  • Self-assessment of abortion completion via mobile
  • FP info via mobile

• Timeframe: February 2011 - ongoing

• Setting: NGO and public sector clinics, Cape Town, South Africa
Phase 1: Needs & context analysis

• Objectives: To explore
  - Client’s experience of MA (Home use of Misoprostol)
  - Acceptability of intervention (e.g. privacy and phone usage)
  - Burden or not of follow-up visit.

• Methods:
  - Client interviews (N = 20)
  - 10 at NGO, 10 at public sector
  - Conducted at MA follow-up clinic visit
Needs & context analysis
main findings

• During abortion process
  - 90% have worries or concerns
  - 50% worry about bleeding, side effects or “being seen”
  - 25% call or visit clinic for reassurance

• Cellphone usage
  - 100% do calls and SMSs
  - 50% use Facebook
  - 17% use MXit
  - 80% says others don’t read their SMSs

• MA follow-up clinic visit (biased sample)
  - 25% say visit is difficult to attend
Phase 2: Pilot study

• Objectives
  - To test the intervention (technology, usage)
  - To assess acceptability of the intervention from the client perspective
  - To adjust the intervention based on client feedback

• Methods (N = 31)
  - Eligible clients recruited and interviewed at 1st clinic visit
  - Registered onto study computer system to receive intervention
  - Investigator Log tracked delivery of SMSs and client access and usage of SA
  - 2nd Interview at MA follow-up clinic visit
Phase 3: Full study: Work in progress

• Objectives:
  To evaluate the impact of the intervention on
  - Client anxiety during the abortion procedure.
  - Client satisfaction with the medical abortion process.
  - Potential for Resource saving: clients and providers
  - Uptake of family planning methods
  - Knowledge on prevention of unwanted pregnancy
  
  Intervention Arm ONLY
  - Do clients access and complete the self-assessment
  - Do clients find the package useful/helpful

• Methods:
  - 2 arm RCT: 230 in each arm: N = 460
  - Standard of care Vs Intervention
  - Interview schedule and Intervention: Same as the PILOT
**Intervention: SMSs**

- **Aims/content:**
  - ‘Coach’ clients through MA
  - Alert clients to signs of ongoing pregnancy or incomplete abortions
  - Reminders about doing the SA
  - FP points of interest / encouragement
  - Appointment reminders
- SMSs over 3 weeks
- More SMSs at start (while taking medication)

---

Hey more info on the pills: if you get cramps, use heat or take painkillers. It can be pretty sore - don't be scared. You may feel sick, vomit, or get a runny tummy. It's not a problem.
Intervention: self-assessment

- Women answer questions to assess if abortion is: successful; incomplete; unsuccessful
- 2 techs:
  - USSD
  - Instant-message chat

Hi! You can check if things went OK. Did you bleed? Select Reply/Answer and send the number of your answer:
1 Yes
2 No
Intervention: self-assessment

- Women answer questions to assess if abortion is: complete; incomplete; unsuccessful
- 2 techs:
  - USSD
  - Instant-message chat
- Women asked via SMS to do self-assessment on day 11

How pregnant were you when you took the pills at the clinic?
Select Reply/Answer and send the number of your answer:
1. Four to six weeks
2. Seven to nine weeks
Intervention: FP info

- Aim: to improve knowledge of FP, and uptake post-MA
- 3 techs:
  - MXit
  - Mobisite (m.ichoosewhen.org.za)

Welcome! We hope this info will help you take control... of when and if to have a baby.

Main Menu
- Quick facts
- Injections
- The Pill
- IUDs
- Condoms
- Natural methods
- Permanent methods
- Emergency contraception
- For HIV+
- Get help
Intervention: FP info

- Aim: to improve knowledge of FP, and uptake post-MA
- 3 techs:
  - MXit
  - Mobisite (m.ichoosewhen.org.za)
  - Info and encouragement in SMSs

Hi more on avoiding pregnancy :-) . The IUD is a small device placed inside the womb. It may increase monthly bleeding and cramps at 1st. It's called 'forgettable contraception' cos it lasts for 5 - 12 years! U just have it removed if u don't want it anymore. Ask the clinic about it.
Pilot study RESULTS

• Mobile airtime, privacy and Mxit usage
  - 77% sometimes have airtime, but not always
  - 70% say their phone is very private
  - 70% think it unlikely that others will see SMSs on their phone
  - 26% go on Mxit

• At follow-up interview: Feedback on SMSs
  - ~80% were happy with the number, timing, content and language of the SMSs
  - 100% said the SMSs helped them through the abortion
  - 100% would recommend the SMSs to a friend having an abortion
  - 25% said SMSs were too long
  - 16% had concerns around privacy
  - 8% found some content confusing
Pilot study RESULTS: Self Assessment

Computer Log (N=31)
- Logs show client’s date, time of usage; and their path through the questionnaire
- 21 (67%) accessed the SA
- 20 (61%) tried to do the SA 1-3 times
- 10 (29%) finished the self-assessment 😞

7 clients did not return for follow up clinic interview
- Of the LTF group: 5 (70%) had not accessed SA (Log)

At follow-up clinic interview: (N=24)
- 21 (80%) Clients said they tried the SA
- 18 (85%) thought it was easy to answer the questions
- 13 (70%) reported reaching the end of the questions
- Of those who said they completed SA, 5 (38%) had not reached end point (Log)
Lessons learnt

• Women don’t use instant-message chat on their phones as much as we thought
• Phone privacy is not a big issue
• Self-assessment questionnaire via mobile is hard to use and requires training
• Providers appreciate SMSs – less calls
• Meaningful, detailed feedback on the SA and FP info requires more time and attention
• Strong appreciation for SMSs
  • “The sms's were very supportive I felt like someone was there for me”
  • “I felt supported and comforted it made me worry much less”
  • “keep on sending them”
Thank you

• Cell Life
  • Katherine de Tolly
    katherine@cell-life.org.za

• World Health Organization

• Study participants

• Women’s Health Research Unit, University of Cape Town
  - Deborah Constant
    deborah.constant@uct.ac.za
  - Sarah Crede
  - Jane Harries
  - Ntombomzi Mcanjana
  - Tembeka Fikizolo
  - Beverley Arendse
Mobile Technology for Community Health (MoTeCH) in Ghana

Dr. Frank Nyonator
Acting Director General
Ghana Health Service
The MoTeCH Project

- MoTeCH is a collaborative project with the Ghana Health Service, Columbia University (evaluation), and the Grameen Foundation (implementation)
- Funding is provided by the Bill and Melinda Gates Foundation
Objective: Develop mobile-phone-based health information technology and test the proposition that improved health information improves health outcomes.

Seeking to increase the quantity and quality of antenatal and neonatal care while building a long-term software platform

Focus:
- 1) Information delivered to “pregnant parents” and
- 2) Information relevant to the delivery of health services by “Community Health Officers” (CHOs) – part of the “Community-based Health Planning and Services” (CHPS) Initiative
### Background: Objectives of MoTeCH

<table>
<thead>
<tr>
<th>The Problem</th>
<th>Need to mobilize supply &amp; demand</th>
<th>Current Operations</th>
<th>Desired Program Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>...clients are passive in seeking care.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>...the clinical program is passive in providing care.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>...the program actively seeks clients (outreach).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Background:</em> Objectives of MoTeCH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Need to mobilize supply & demand
  - ...clients are passive in seeking care.
  - ...the clinical program is passive in providing care.
  - ...the program actively seeks clients (outreach).

- Current Operations

- Desired Program Outcome

---

**MoTeCH**

Mobile Technology for Community Health in Ghana
Phone access among women in MoTeCH pilot district

- Personal Phone: 23%
- Spouse has Phone: 34%
- Access w/n household: 15%
- Access w/n community: 12%
- No access: 16%
### The Continuum of Care

<table>
<thead>
<tr>
<th>Pre-pregnancy</th>
<th>Pregnancy</th>
<th>Delivery</th>
<th>Newborn/Postnatal Care</th>
<th>Childhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family planning, prevention of STI, equal opportunity for girls</td>
<td>Early detection of pregnancy, and a focus on ANC</td>
<td>SBA, Improve linkages between home and facility, Clean childbirth practices, and essential newborn care</td>
<td>healthy behaviors (Baby – EBF, immunization, warming, etc.; Mother – Family planning)</td>
<td>Management and care of LBW, care of Sepsis for NBs, nutrition, malaria, immunizations</td>
</tr>
</tbody>
</table>
Project Components

**System for community health workers**
- Develop simplified paper registers for clinical information
- Enter patient encounters using simple mobile phones
- Generate monthly reports
- Alerts and reminders for clients that need care

**System for “Pregnant Parents”**
- Regular educational messages sent based on estimated due date
- Choose to receive SMS (text) or voice messages, in Kassim, Nankam, or English
- Frequency and time of day chosen when registering
- Informative and actionable
MoTeCH Components: Simplified Registers

- Registers capture child health, maternal health, illness/injury, family planning, and community outreach health service
- Previously nurses’ registers were ad hoc, with content varying between facilities
- Provide standardized platform for recording health data
- Simplified Registers have received very positive feedback from nurses thus far. They make documentation and reporting work much easier
Health workers enter health service data into simple forms on inexpensive ($40) mobile phones by health workers.

Using this data, MoTeCH can generate a majority of nurses’ monthly reports.

Aim: to reduce the amount of time nurses spend on reporting, to allow them more time to provide health services.

Presently, MoTeCH reports are compared to manually-aggregated reports for accuracy.
MoTeCH generates alerts and reminders for health workers and clients according to care schedules set by the Ghana Health Service.

- Clients receive reminders when they or their child are due for specific types of care (prenatal care, child immunizations).
- Nurses will receive reminders of their clients that have defaulted for particular types of care, so they can follow-up during home visiting.
- Clients and nurses also receive alerts for crucial postnatal visits.
Mobile Midwife

- Health information messaging service for pregnant parents
- Messages delivered weekly in language and method of choice (SMS or voice)
- Messages specific to the client’s gestational age
- Clients can flash MoTeCH & be called back with their message
- Extended to include the first year of the child’s life
MoTeCH Software Platform

- Versatile platform – not specific to maternal/child care
- Based on OpenMRS – adds “Rules Engine” and components to process inbound/outbound text and voice messages
- OpenSource development model (other organizations can use, adapt, and contribute)
- Next project: ARV compliance in India for HIV/AIDS patients
- Integration of “Diagnostics Engine”
Evaluation approaches

- Evaluation research conducted in collaboration with the Navrongo Health Research Centre
- Goal: Assess changes in health seeking behavior and coverage of essential maternal and child health indicators
- Research methods used:
  - Qualitative Appraisal with MoTeCH clients, health workers, and sub-district/district supervisors
  - Operations research studies to assess the impact of MoTeCH on health worker routines and information quality
  - Future: Randomized control trial (RCT) to determine the effect of MoTeCH on client health service
Early Lessons Learned: Clients

- Serious lack of basic maternal/newborn health information available in the field
- Most households have a mobile, but mother lacks access
- SMS is not widely used in rural areas
- Many people cannot read/understand English
- Women without personal phones have difficulty using others’ phones to access their messages
- Cultural myths and traditional beliefs strongly effect prenatal and birth choices; messages should target beliefs that are detrimental to health
# Registered mothers

- #3 Server attempts to ring Mother's phone
  - #5 Phone is alive and rings
    - #7 Call answered
      - #9 Call accepted
        - #11 Receiving Mom gets an alert or reminder

# Lines still congested after 2 days of trying

# Phone battery dead or phone not functional after 2 days of trying

# No answer

# Call answered

# Call rejected

# Call accepted

# Mother initiates procedure but fails to navigate the IVR

Only 14% of all attempts get through…

# ANC patient declines opportunity to participate
#1 Registered mothers

#3 Server attempts to ring Mother's phone

#5 Phone is alive and rings

#7 Call answered

#9 Call accepted

“Clunky phone”

#11 Receiving Mom gets an alert or reminder

#2 Lines still congested after 2 days of trying

#4 Phone battery dead or phone not functional after 2 days of trying

#6 No answer

#8 Call rejected

#10 Mother initiates procedure but fails to navigate the IVR

#ANC patient declines opportunity to participate

Extend call attempts, alerts to volunteers

Phones on loan/clunky phones/volunteers for charging

Improve training & start volunteer support
Early Lessons Learned: Health Workers

- Workers are inundated with data collection and reporting requirements.
- Adding data entry via mobile phones negatively affects time use, need for a larger time savings.
- Input and buy-in from various levels of the local health system is critical.
- More economical in the long run to provide java enabled handsets to nurses.
Hourly profile of time-use by activity category

Proportion (%)

0 0.2 0.4 0.6 0.8 1

700 800 900 1000 1100 1200 1300 1400 1500 1600 1700

Documentation & Reporting
Training & meetings
Patient Care
Unproductive
Thank you!

Thank you for your time!

To learn more, please visit our website at

www.ghsmtoech.org
Strengthening the Value of Evidence in mHealth to Ensure Health Impact, and Drive Scale and Sustainability of Programs

Dr. Garrett L. Mehl
Department of Reproductive Health and Research
World Health Organization, Switzerland
Presentation Outline

• Role of mHealth evidence for health policy
• State of mHealth evidence generation
• Value of different forms of evidence
• Findings from stakeholder meetings: Montreux HSR, NIH mHealth Study Design, Bellagio WHO Evaluation meeting
• Research Considerations for mHealth and Family Planning
• Development of Evaluation Tools
Mobile technologies allow information to be available wherever and whenever it may be needed.

When & where client wants info: When seeing a patient, to confirm, and document

As a reminder, before forgetting

To incentivize

To improve timeliness

To improve access
Government Choices

• Low government spending on health in low-income countries (>50% African countries = <$14/capita)

• Considerable out-of-pocket-expenditure = financial risk for families

• Government decisions (and recommendations) on investments in new areas must be evidence-based to maximize health impact of limited resources and minimize risk
WHO Assists Governments

- Supports generation of evidence appropriate for **decision-making**
- Review and synthesize evidence through expert review groups
- Distill the evidence into **guidelines** and best practice
- Assist governments in incorporating such evidence-informed recommendations into **national plans and actions**
Evidence-based Guidelines

• The quality of the evidence determines the strength of recommendation to governments
• Use of the best available evidence to make the most appropriate recommendations
• Emphasis on RCTs and systematic reviews
• Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework to evaluate the quality of the evidence ==> basis of recommendations
## Traditional GRADE Framework

<table>
<thead>
<tr>
<th>Quality of evidence</th>
<th>Study Design</th>
<th>Lower if</th>
<th>Higher if</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further research is very unlikely to change our confidence in the estimate of effect (4)</td>
<td>Randomised trials</td>
<td>Study limitations:²</td>
<td>Strong evidence of association with absence of confounders:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1 Serious limitations</td>
<td>+1 RR&gt;2 (0.5) in 2+ studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2 Very serious limitations</td>
<td>+2 RR&gt;5 (0.2) 2+ studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inconsistency:</td>
<td>Dose-response gradient:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1 Important inconsistency of results</td>
<td>+1 Evidence of dose-response</td>
</tr>
<tr>
<td>Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate (3)</td>
<td></td>
<td>Indirectness:²</td>
<td>Direction of confounders:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1 Some uncertainty</td>
<td>+1 All confounders would have reduced the effect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2 Major uncertainty</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imprecision:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1 Imprecision</td>
<td></td>
</tr>
<tr>
<td>Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate (2)</td>
<td>Observational studies</td>
<td>Publication Bias:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1 High probability of publication bias</td>
<td></td>
</tr>
<tr>
<td>Any estimate of effect is very uncertain (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
State of Evidence Generation in mHealth

• WHO Global survey on the use of metrics and evaluation strategies among mHealth projects

• Understand and support research needs of mHealth projects, to strengthen evidence generation, potential for impact at scale
Percentage of Projects by Health Focus

- Reproductive Health: 45%
- HIV/AIDS or TB: 45%
- Child Health: 45%
- Non-Communicable Disease & Nutrition: 35%
- Other Communicable Diseases: 20%
- Vector-Borne Diseases: 15%
- Empowerment or Violence-prevention: 30%
- Water & Sanitation: 20%
- Service Delivery Performance: 30%
- Addictions (tobacco or illegal drugs): 10%

**Percentage of Projects by Health Focus (%)**
Project Implementation Stage and Duration

- Not started: 10%
- < 1 year: 30%
- 1-2 years: 36%
- 2-3 years: 18%
- 3+ years: 6%

- Scaled Implementation: 18%
- Needs Assess: 9%
- Usability Assess: 9%
- Pilot not for scaling: 7%
Evaluation rigor of projects that planned for scale-up vs. projects that did not

No Plans for Scale
- Mean = 2.00

Planned for Scale
- Mean = 3.55

T-test for equality of means:
- t = 2.55, p < 0.05
- (variances assumed not equal)
Stakeholders Have Different Priorities

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Typical Issue</th>
<th>Key Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDA</td>
<td>Regulators</td>
<td>Market authorisation</td>
</tr>
<tr>
<td>WHO</td>
<td>Medical Profession</td>
<td>Creation of clinical guidelines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishment of best practice</td>
</tr>
<tr>
<td>MOH and Insurers</td>
<td>Payers</td>
<td>Reimbursement</td>
</tr>
<tr>
<td>Health workers</td>
<td>Providers</td>
<td>Adoption of new interventions</td>
</tr>
<tr>
<td>Family members</td>
<td>Patients / End-User</td>
<td>Utilisation of Mobile Health</td>
</tr>
</tbody>
</table>

Adapted from ATKearney

Garrett Mehl: mehlg@who.int
Primary evidence map by technology type and purpose of intervention (global)

Size of bubbles proportional to # of articles

Garrett Mehl: mehlg@who.int

Adapted from ATKearney
Different Kinds of Studies Contribute Different Value as Evidence

- Expert Opinion
- Service Evaluations, One-off case studies, and Pilots
- Uncontrolled and Multiple Time Series Trials
- Multi-center cohort and case control studies
- Non-randomized Controlled Trials
- Randomized Controlled Trials

Effort Required to Create Evidence

Strength as Evidence

Garrett Mehl: mehlg@who.int

Adapted from ATKearney
Value of Outcomes-types for decision-making

- Clinical Outcome: 14%
- Compliance: 7%
- Attendance: 5%
- Utilization: 3%
- Cost/efficacy: 3%
- Improved Access: 2%
- Technical: 38%
- Satisfaction: 16%
- Accuracy: 8%
- Other: 4%

Garrett Mehl: mehlg@who.int
Adapted from ATKearney
mHealth claims

<table>
<thead>
<tr>
<th>Claim</th>
<th>Question</th>
<th>How to determine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Different mHealth solutions may carry higher risk of harm if they fail</td>
<td>Very high threshold of evidence determined by regulators</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>How well does the mHealth Solution address needs?</td>
<td>Accuracy, Efficiency, Access, Quality, Utilization, Compliance, Satisfaction Behavioral and Health Outcomes</td>
</tr>
<tr>
<td>Value for Money</td>
<td>Does the mHealth Solution address a need?</td>
<td>Cost effectiveness, Cost-utility, Cost-benefit</td>
</tr>
</tbody>
</table>
Conclusions of an NIH meeting on mHealth Evidence

• “mHealth tools and interventions must be backed up by **rigorous scientific development, evaluation, and evidence generation** to enhance meaningful innovation and best practices, and to **validate tools and methods for health professionals, consumers, payers, governments, and industry.**”

National Institutes of Health, USA: August 16, 2011
Evaluation across mHealth Implementation stages

• “To ensure effective and appropriate use of e/mHealth systems, implementation must be guided by evaluation at all design and scale-up stages.”

WHO Bellagio mHealth Evaluation Call to action, Bellagio, Italy, September, 2011
<table>
<thead>
<tr>
<th>Possible questions, by stakeholder &amp; development stage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Developer / supplier</strong></td>
</tr>
<tr>
<td>Possible to implement?</td>
</tr>
<tr>
<td>Acceptable?</td>
</tr>
<tr>
<td>Scalable?</td>
</tr>
<tr>
<td>Usage rates? How to improve?</td>
</tr>
<tr>
<td><strong>Citizen / Care Provider</strong></td>
</tr>
<tr>
<td>Sensible?</td>
</tr>
<tr>
<td>Usable?</td>
</tr>
<tr>
<td>Feasible?</td>
</tr>
<tr>
<td>Safe?</td>
</tr>
<tr>
<td>Effective?</td>
</tr>
<tr>
<td><strong>Patient</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Formative</td>
</tr>
<tr>
<td>Pt. experience? Improved access to HC? Safe?</td>
</tr>
<tr>
<td><strong>Manager</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Affordable?</td>
</tr>
<tr>
<td>Cost?</td>
</tr>
<tr>
<td>Clinical risk? Managability?</td>
</tr>
<tr>
<td><strong>PH specialist</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Quality of care? Workforce, training needs?</td>
</tr>
<tr>
<td>Health Impacts? Service coverage?</td>
</tr>
<tr>
<td><strong>Policy maker</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Reputational risk?</td>
</tr>
<tr>
<td>Cost-effective?</td>
</tr>
<tr>
<td><strong>Funder</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Summative</td>
</tr>
<tr>
<td>Cost-effective? Case studies?</td>
</tr>
<tr>
<td><strong>Regulator</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Appropriate?</td>
</tr>
<tr>
<td>Safe, effective?</td>
</tr>
<tr>
<td><strong>GL developer</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>High grade E</td>
</tr>
<tr>
<td>Questions about intervention</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Do people like it?</td>
</tr>
<tr>
<td>Does it work?</td>
</tr>
<tr>
<td>Is it reliable?</td>
</tr>
<tr>
<td>Is it fast enough?</td>
</tr>
<tr>
<td>Is data entry reliable?</td>
</tr>
<tr>
<td>Are people likely to use it?</td>
</tr>
<tr>
<td>Which parts cause the effects?</td>
</tr>
<tr>
<td>How can it be maintained?</td>
</tr>
<tr>
<td>How can it be improved?</td>
</tr>
<tr>
<td>Is it scaleable? Is it interoperable?</td>
</tr>
</tbody>
</table>
Identifying mHealth Solutions to Address Health Service and Knowledge Gaps

All Clients

100% Reproductive tract infection
50% Symptomatic
35% Seek treatment
30% Go to health unit
6% Treated correctly
4% Compliant
3% Treatment effective
1% Partner treated

Register All Clients
Information, Self Screen via mobile
Identify closest ado-friendly Facility
Incentive to seek treatment
Quality of Care: Point of Care Diagnostic tool
Reminders, incentives to complete treatment
Confirm authenticity of medicine
Education, incentive

Potential mHealth solutions

WHO Survey
Assistance Requested

“We need a systematic approach to analyzing the data we have collected over the past 3 years. “
Evaluation Tools

- Bellagio WHO mHealth Evaluation Principles
- Draft Evaluation Framework
- Adaptation of PRISM framework
- Multiple SRH mHealth deployments to test tools
- WHO mHealth Evidence Advisory Group
Evidence demonstrating the impact of mHealth on health system performance and population health as well as costs, and benefits is crucial.

Evidence equips decision makers with information for choosing the most effective and economical approaches to systems, strategies, implementation and training in mHealth.
Illustrative FP mHealth questions

• To what extent can provider mHealth tools deliver:
  • Reduced FP supply stock outs? Improved FP decisions and service delivery quality? Improved data reporting? Better client tracking, reduce delays? realize new FP task-shifting modalities in settings with weak health systems?

• To what extent can client mHealth tools:
  • Increase access to FP services? Reduce barriers to contraceptive use? Improve access to FP information? Improve continuation rates? Deliver incentive programs? Impact on FP coverage?

• Illustrative mHealth-specific FP questions
  • Most effective FP message content by population? Ideal periodicity of FP messages? Role of SMS vs. IVR vs. apps for FP? Equity implications of FP mHealth systems? Factors that effect potential for scale and financial sustainability of systems? Best indicators/metrics for monitoring and Evaluation of mHealth FP systems? Role of social? Role of on-demand vs. subscription services?
PRISM (Performance of Routine Information System Management) framework

**INPUTS**

**PROCESSES**

**OUTPUTS**

**OUTCOMES**

**IMPACT**

**RHIS Determinants**

**Technical Factors**
- Complexity of the reporting form, procedures
- HIS design
- Computer software
- IT complexity

**Organizational Factors**
- Governance
- Planning
- Availability of resources
- Training
- Supervision
- Finances
- Information distribution
- Promotion of culture of information

**Behavioral Factors**
- Data demand
- Data quality checking skill
- Problem solving for HIS tasks
- Competence in HIS tasks
- Confidence levels for HIS Tasks
- Motivation

**RHIS Processes**
- Data collection
- Data transmission
- Data processing
- Data analysis
- Data display
- Data quality checking
- Feedback

**Improved RHIS Performance**
- Data quality Information use

**Improved Health System Performance**

**Improved health status**

Adaptation of PRISM (Performance of Routine Information System Management) framework

**Technical Factors**
- Complexity of the reporting form, procedures
- HIS design
- Computer software
- IT complexity

**Organizational Factors**
- Governance
- Planning
- Availability of resources
- Training
- Supervision
- Finances
- Information distribution
- Promotion of culture of information

**Behavioral Factors**
- Data demand
- Data quality checking skill
- Problem solving for HIS tasks
- Competence in HIS tasks
- Confidence levels for HIS Tasks
- Motivation

**RhIS Determinants**

**Inputs**

**Processes**
- Data collection
- Data transmission
- Data processing
- Data analysis
- Data display
- Data quality checking
- Feedback

**Outputs**

**Outcomes**

**Impact**

**Improved RHIS Performance**
- Data quality Information use

**Improved Health System Performance**

**Improved health status**

+ Scale up

Sustainability

RMNCH focus

Mechanism for Evidence Generation and Synthesis

- WHO Advisory Group of Experts (MAGE) on mHealth Evidence
  Objective guidance, tools development, synthesis of evidence
Thank you

Dr. Garrett L. Mehl
World Health Organization, Switzerland
mehlg@who.int