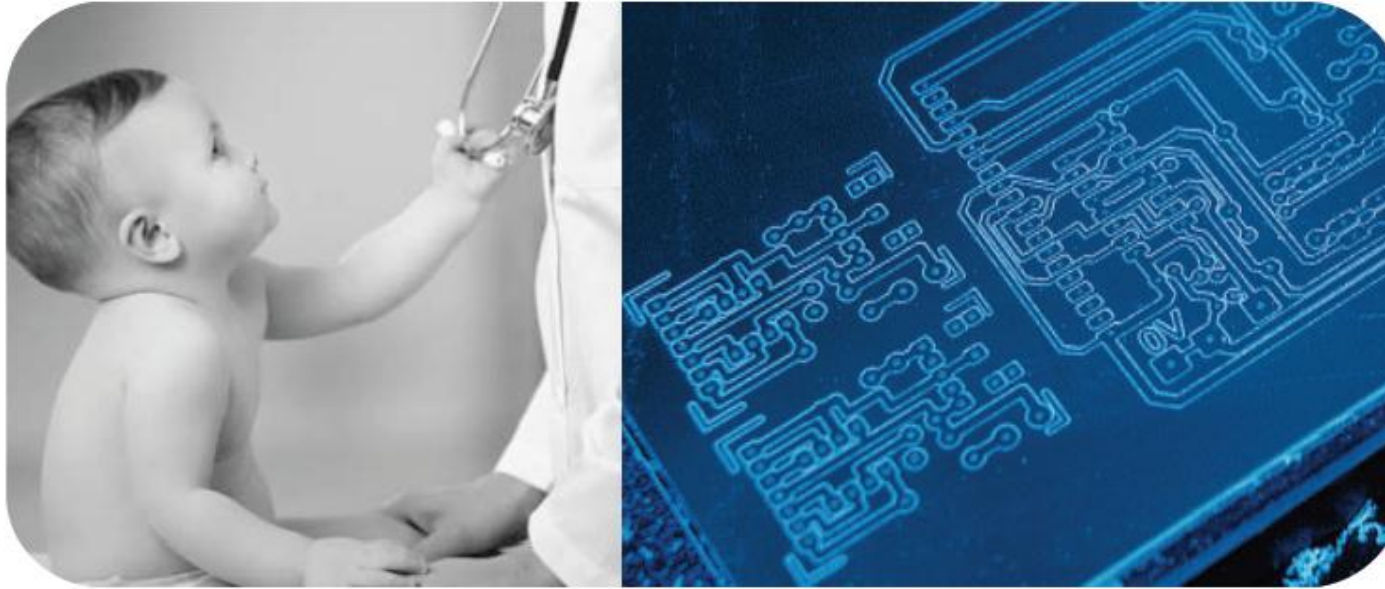


Healthcare Innovation & Technology Lab



Delivering mHealth: Consolidating critical findings for integrating mHealth into maternal and newborn health services



Improving Healthcare through Technology

October 25, 2011

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Presenter Disclosures

TIGEST TAMRAT

- (1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

**NO RELATIONSHIP TO
DISCLOSE**

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Introduction



Objectives

1. Define mHealth and its applications in resource-limited health systems for maternal and newborn care.

2. Describe the modalities of mHealth programs that seek to improve maternal and newborn health outcomes.

3. Analyze the roles and contributions of stakeholders in integrating mHealth services for maternal and newborn health.

4. Discuss challenges and best practices for sustaining mHealth interventions for maternal and newborn healthcare delivery



What is mHealth?

- mHealth: the integration of mobile telecommunication and multimedia into increasingly mobile and wireless health care delivery systems.
- According to the International Telecommunications Union, mobile coverage has increased to reach 90% of the world's total population and 80% of the global population living in rural areas.
- Mobile phones are thriving in resource-limited health systems despite the scarcity of other technologies and infrastructure.



Potential uses of mHealth

Health information systems

Treatment adherence

Disease surveillance

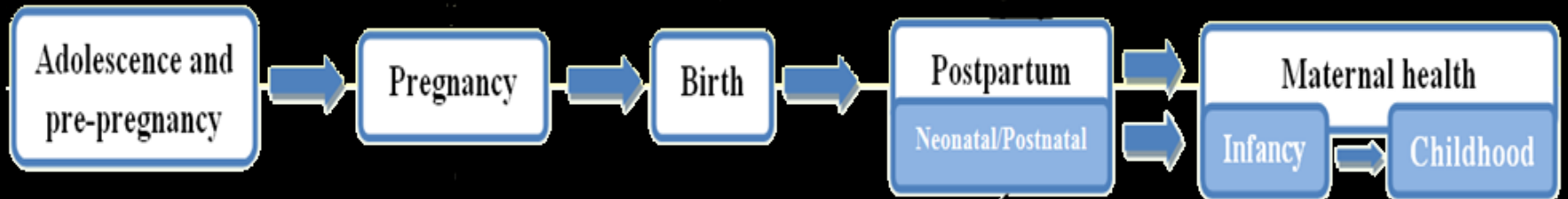
Emergency medical response

Health promotion

Point-of-care support



Continuum of care for maternal, child and newborn health



Opportunities for mHealth interventions to improve neonatal and prenatal health

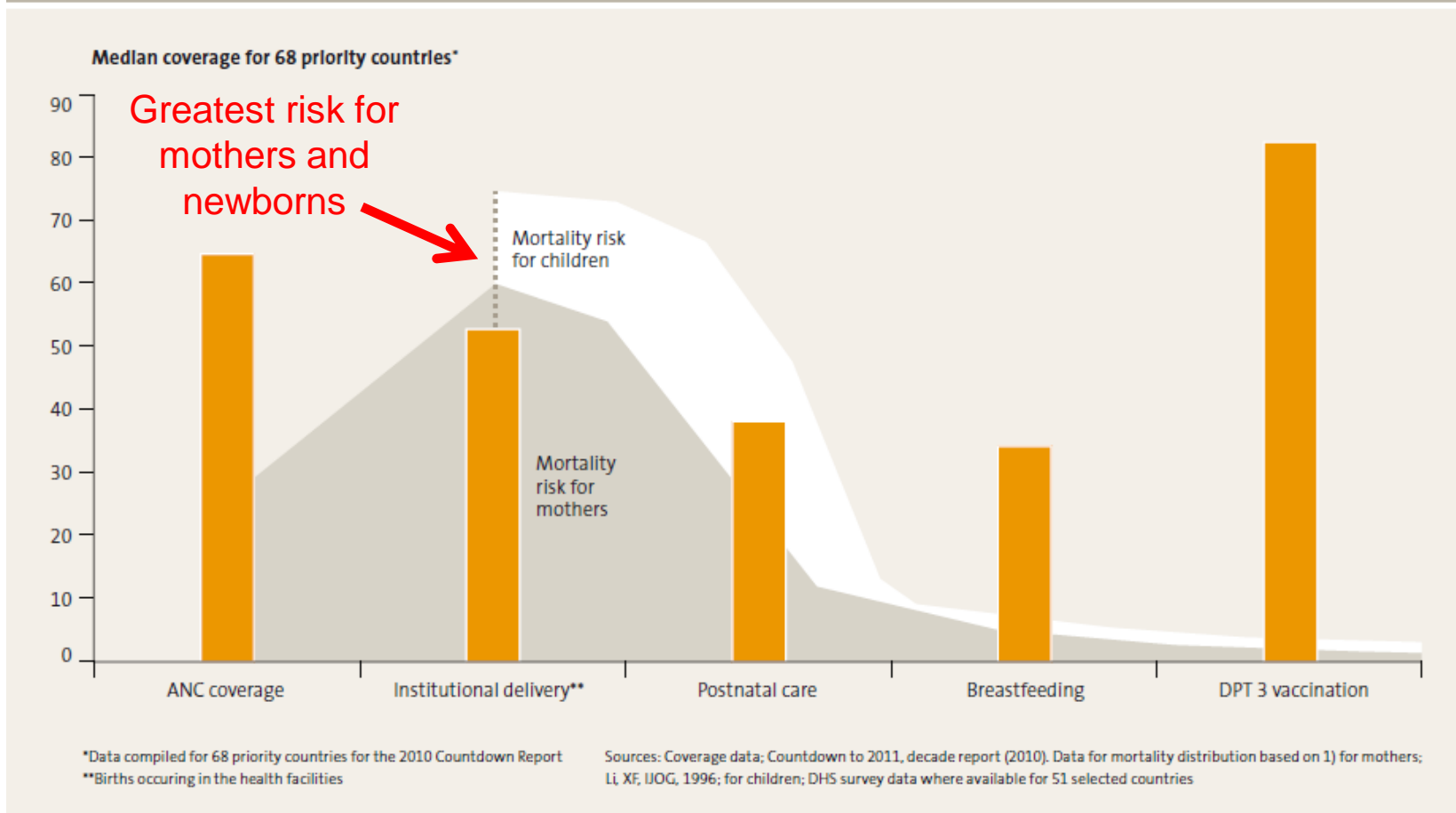
Study objective:

To identify patterns in the implementation of mHealth and consolidate findings on the outcomes, barriers, and strategies of integrating mHealth to improve prenatal and neonatal health outcomes.



Mortality Risk for Mothers, Newborns and Children

FIGURE 2: Mortality risk for mothers and children over the continuum of care



Why integrate mHealth into prenatal and neonatal healthcare?

- 75% and 70% of maternal and newborn mortality could be averted, respectively, through comprehensive and evidence-based interventions.
- Progress and funding constraints in achieving the MDG targets for child and maternal health have stimulated harnessing mHealth for these public health priorities.
- Mortality and morbidity outcomes are highly sensitive to delays, which can be mitigated through communication bridging tools.



Sources: Mechael, P. et al. 2009. *MoTech: mHealth Ethnography Report*.
Moahi, K. 2009. ICT and Health Information in Botswana: towards the Millennium Development Goals
Rao, S. 2009. Achieving the millennium development goals: Role of ICTs innovation in India.
Mechael, P. 2009. The Case for mHealth in Developing Countries.
Akter, S. et al. 2010. mHealth An Ultimate Platform to Serve the Unserved.



Methodology



Methodology

Databases (6)

- Google, Google Scholar, PubMed, Web of Science, Science Direct and Proquest

Search Terms

- maternal,' mobile,' 'technolog*,' 'informatics,' 'health,' 'eHealth,' 'mHealth,' 'ICT,' 'tele*,' 'newborn,' 'neonatal,' 'antenatal,' and 'prenatal'

Inclusion/exclusion criteria

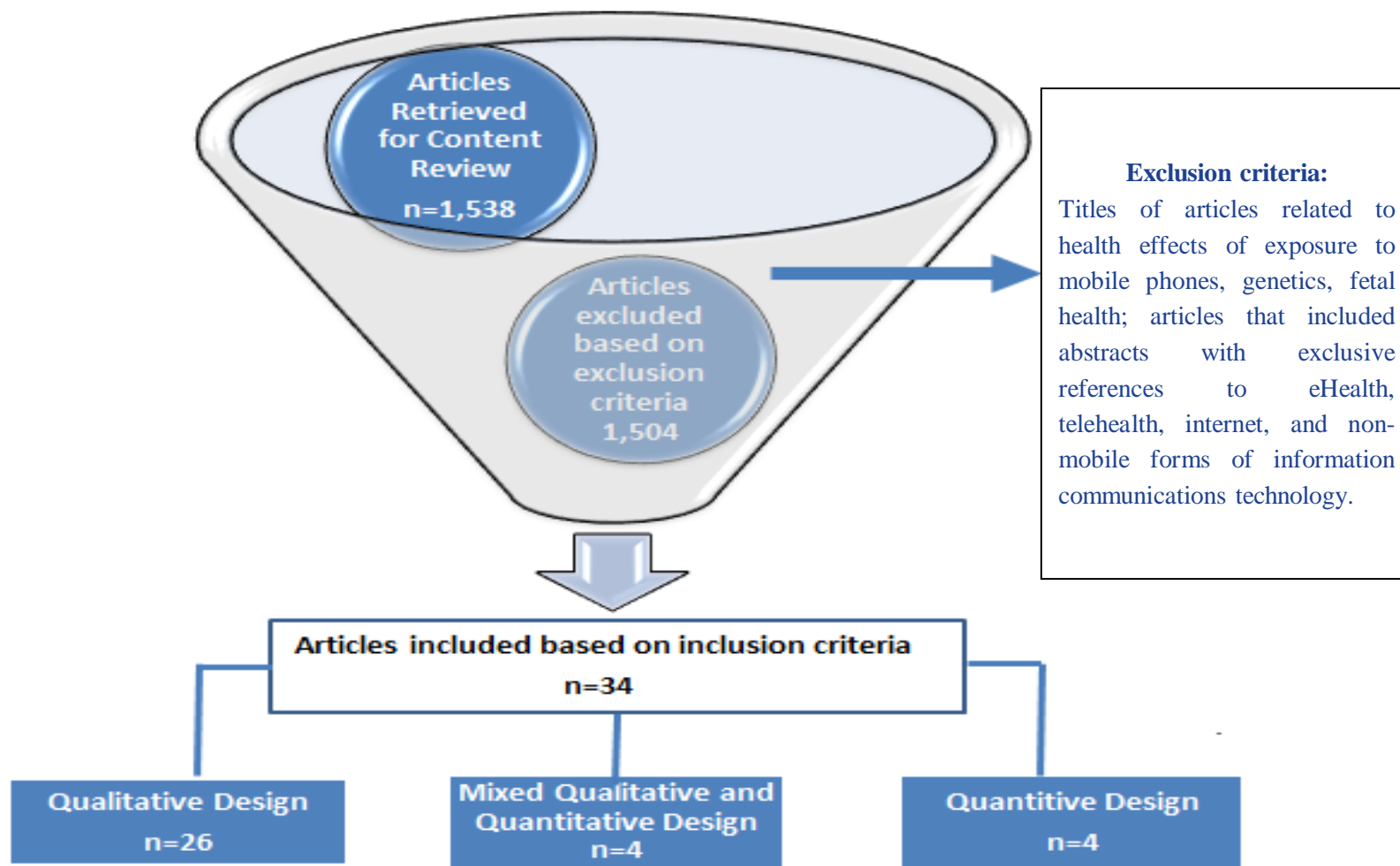
- Limited to English-language peer-reviewed articles, presentations, and institutional reports published between 2000 and 2010

Information extracted

- Target population, geographic location of the intervention, maternal and/or newborn health need addressed, health indicators assessed, financing scheme for implementation, and limitations and strategies for the sustainable integration of the mobile technology



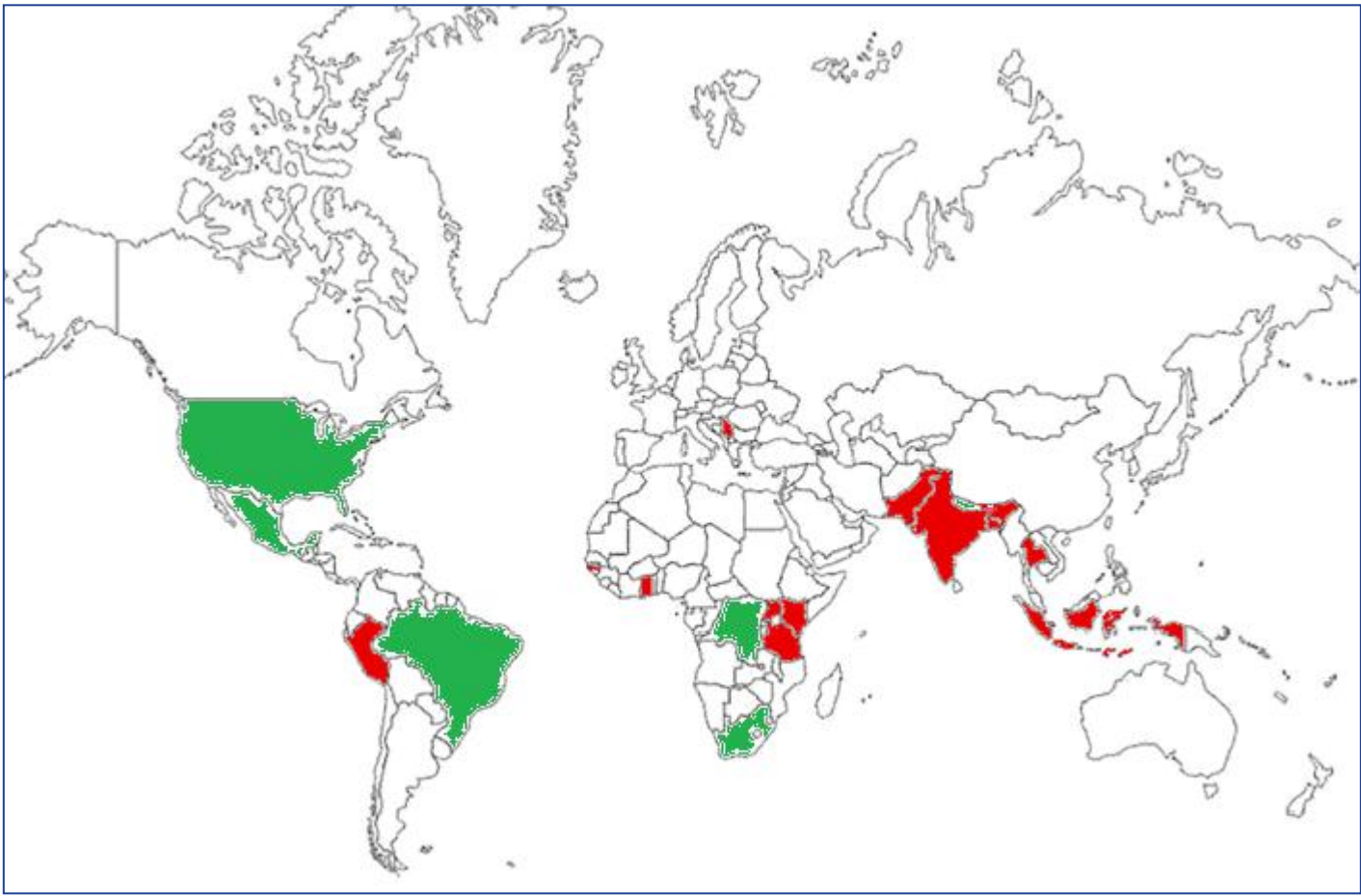
Retrieved Articles



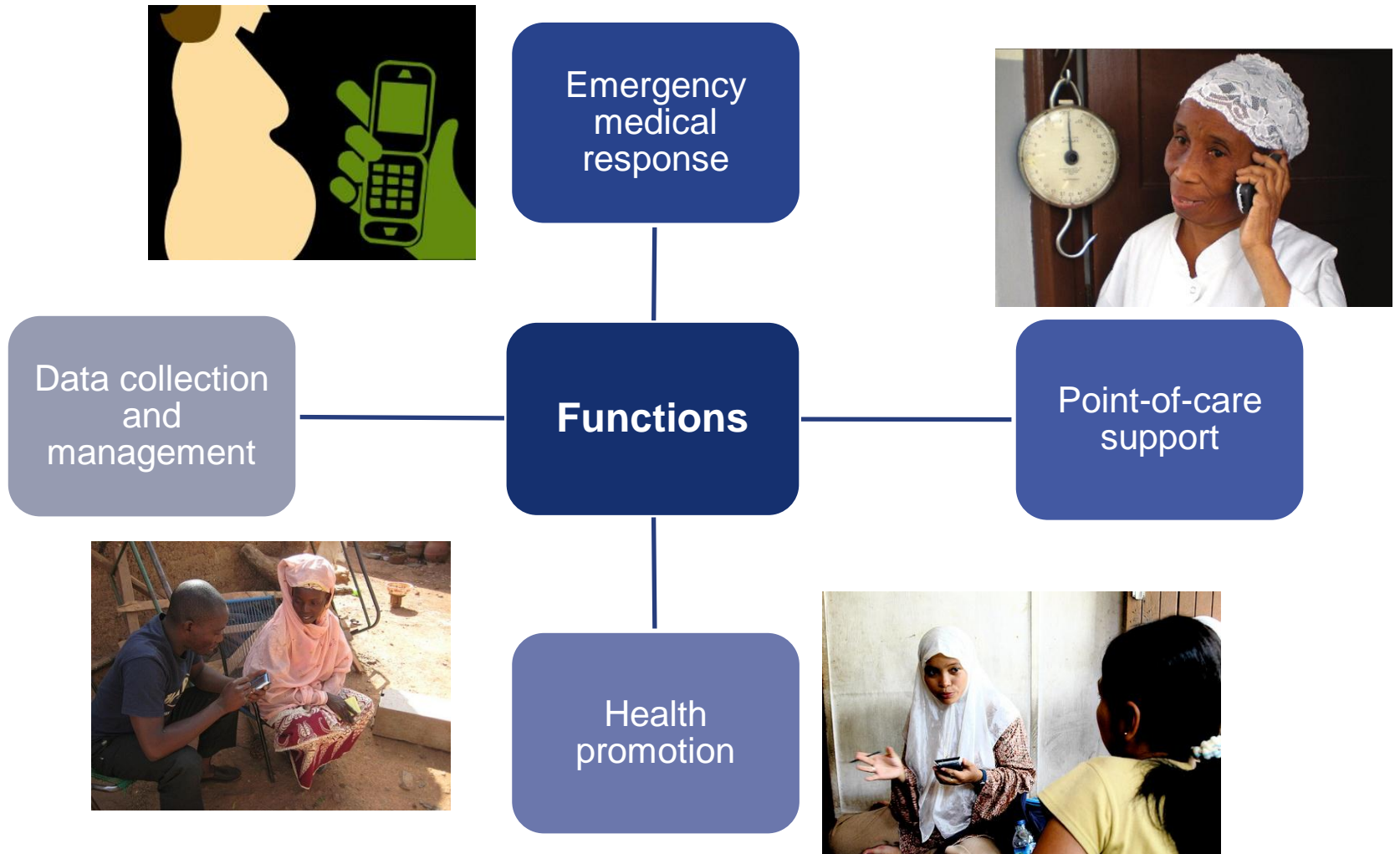
Results



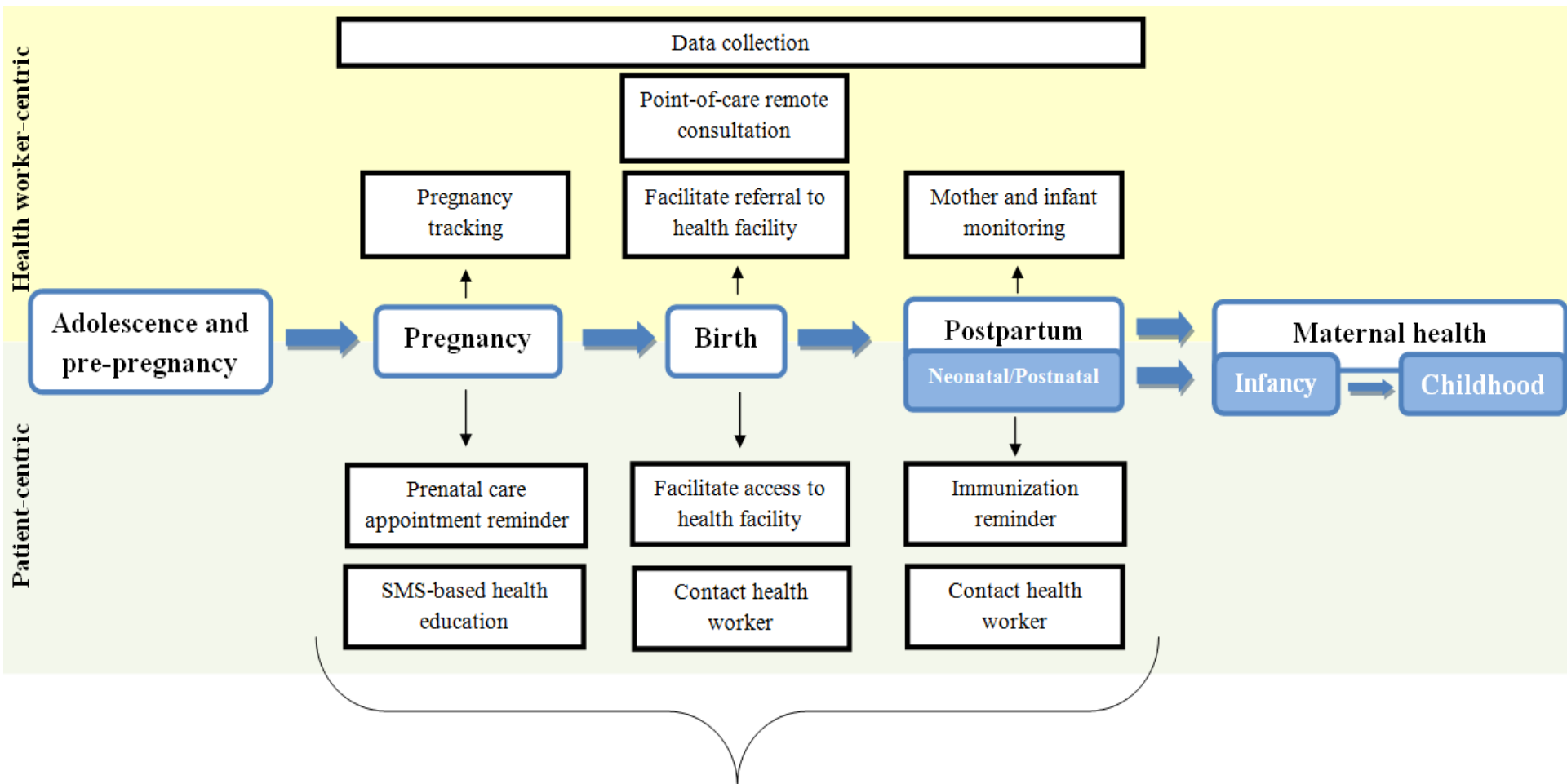
Coverage of mHealth Programs for Maternal and Newborn Care



Common Functions of mHealth in Prenatal and Neonatal Programs



Application of mHealth along the “Continuum of Care”



Barriers and Strategies for Implementation

Policy frameworks



Socio-cultural context



Barriers and strategies

Financial issues



Emergency Medical Response

Uganda

- Trained Traditional Birth Attendants (TBAs) on the signs and protocols for pregnancy complications and equipped TBAs with walkie-talkies linked to health units, along with basic clinical obstetric instruments.

Bangladesh

- 55% of the families who had phones used them during pregnancy emergencies.
- Among the families who used phones during emergencies, 72% contacted a healthcare provider, 57% sought medical advice, 33% arranged transport, and 21% asked for financial support.

The Gambia

- Provided mobile phones to TBAs and outreach workers trained in the recognition of pregnancy complications and referral of women exhibiting signs of obstetric complications.

India

- Offered pregnant women a health telephone helpline, complimentary ambulance system, and drivers equipped with mobile phones in the effort to reduce delays in seeking obstetric care.

Kenya

- Ministry of Health implemented a mHealth program to promote institutional deliveries and referrals.
- Program is in the pilot stage and did not offer project assessment reports.

Sources: Musoke, M. 2002. Maternal Health Care in Rural Uganda: Leveraging Traditional and Modern Knowledge.

Labrique, A. 2010. Maternal and Neonatal Health: Opportunities and Challenges for mHealth in resource-limited settings

Cole-Ceasay et al. 2010. Strengthening the emergency healthcare system for mothers and children.

Mecheal, P. et al. 2009. MoTech: mHealth Ethnography Report.



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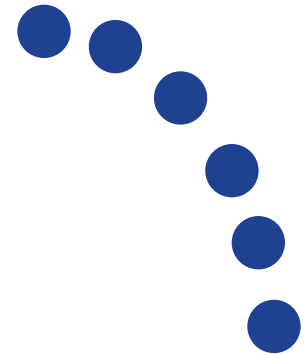
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Point-of-Care Support

Address the low coverage of qualified health personnel and alleviate the professional seclusion of mid and low-level health workers delivering care with minimal guidance.

Indonesia

- Provided midwives with mobile phones and phone credit in order to consult with specialists while providing obstetric care in remote locations.



Pakistan (2 ongoing programs)

- Toll-free voice response mechanisms for health outreach workers with low literacy to reinforce their limited training when delivering health services in remote locations.



Health Promotion

Thailand- “Better Border and Healthcare Program”

- Disseminated information regarding antenatal care appointment visits and the expanded program on immunization (EPI) for women along the Thai-Myanmar border via SMS.

Serbia

- Sent weekly health education messages via SMS to pregnant women on based on the progression of their pregnancy.

Tanzania

- Linked pregnant women with health units via mobile phones to send reminders on antenatal care appointments and facilitate access to skilled attendants for obstetric care.

Thailand-”Satisfaction of Healthy Pregnant Women”

- Researched the emotional health of women who received SMS-based guidance throughout the course of their pregnancy.



Sources: Kaewkungwal, J. et al. 2010. Application of smart phone in “Better Border Healthcare Program”: A module for mother and child care.
Jareethum,, R., et al. 2008. Satisfaction of Healthy Pregnant Women Receiving Short Message Service via Mobile Phone for Prenatal Support:
Lund, S. et al. 2010. Wired Mothers: Use of mobile phones to improve maternal and neonatal health in Zanzibar
Mechael, P. et al. 2009. MoTech: mHealth Ethnography Report.



Data Collection and Management

Peru

- Patient information collected and communicated to databases at health facilities in order to expedite the ability of health professionals, who were physically separated from patients, to monitor progression and prescribe therapy.

Haranya, India

- Outreach workers used handheld computers to collect data on immunization records, prenatal care schedules, and demographic information that fed into centralized electronic health records for access by rural paramedics.



Andhra Pradesh, India

- Frontline health workers used handheld devices that monitor the health development in their catchment area and communicate the data to the nearest rural health centers.

Sources: Vital Wave Consulting. 2009. mHealth for Development: The Opportunity of Mobile Technology for Healthcare in the Developing World. UNICEF. 2005. Maternal and perinatal death inquiry and response: Empowering communities to avert maternal deaths in India. Michael, P. et al. 2009. MoTech: mHealth Ethnography Report..



Barriers and Strategies

Financial Issues

Cost to pregnant women and local health workers

Intricate and multi-layered relationship among stakeholders

Source and availability of funding for program

Under-resourced health ecosystem



Sources: Mechael, P et al. 2010. Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper. Vital Wave Consulting. 2008. mHealth in the Global South: Landscape Analysis.

Chetley, A. 2006. Improving health, connecting people: the role of ICTs in the health sector of developing countries.



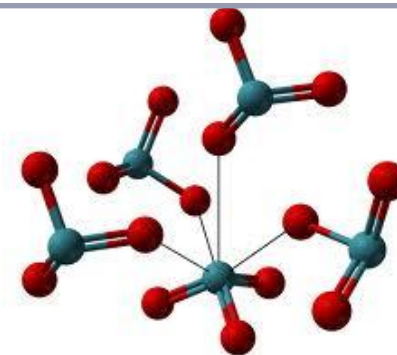
Barriers and Strategies

Policy Frameworks

Dearth of policy and management frameworks within national health strategies

Coordination among different government bureaus

Evaluations that can guide and influence national health strategies



Sources: Mechael, P et al. 2010. Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper.
Curioso, W et al. 2010. Enhancing 'M-Health' With South-To-South Collaborations.



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Barriers and Strategies

Socio-cultural context

Engage local partners to develop culturally appropriate and language-friendly messages

- Use of the local Indonesian Bahasa were more accessible and effective compared to other digital media that solely used English.
- Effective use of culturally-accepted messages that can promote behavioral change.

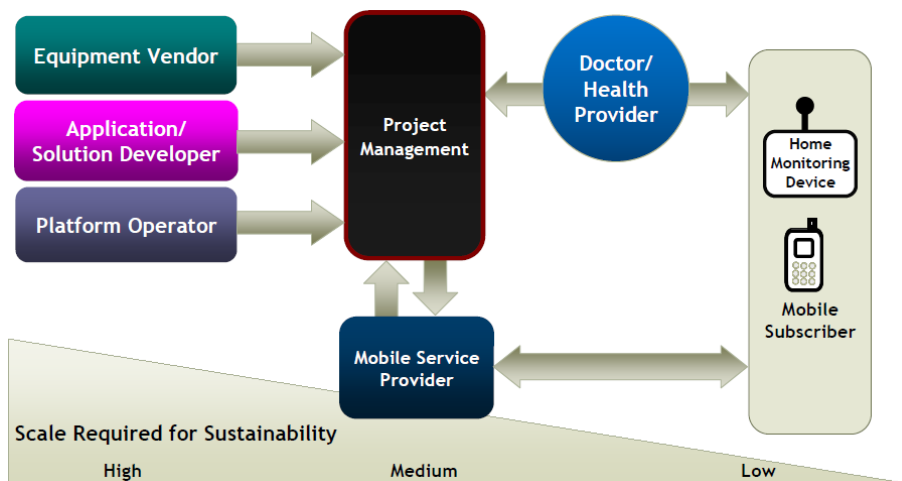
Utilize personnel with the most immediate outreach capacity to pregnant women

- Emergency response and point-of-care support programs incorporated frontline workers and volunteer auxiliaries who were embedded in their communities' health ecosystem.
- Strengthened linkages between community members and health facilities.

Sources: Mechael, P et al. 2010. Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper.
Sloninsky, D. et al. 2008. Towards the Development of an mHealth Strategy: A Literary Review.

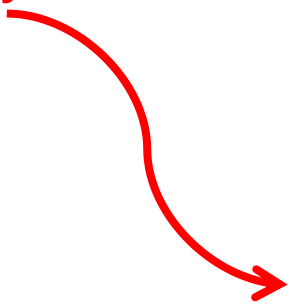


Stakeholders and Scaling

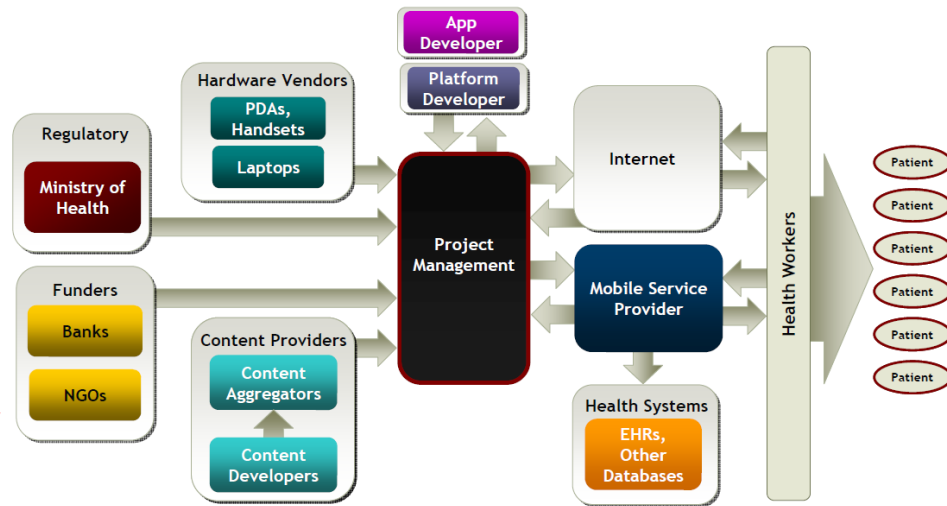


“Mobile applications that attain scale will be the ones that create value for both providers and customers, and thus can sustain themselves.” --Ministry of Foreign Affairs, Norway

One-way



Two-way



Source: Vital Wave Consulting. mHealth in the Global South: Landscape Analysis.

Godal et al. Thematic Report : The Global Campaign for the Health Millennium Development Goal s 2011—Innovating for Every Child, Every Mother.



Conclusion



Limitations of the Study

Scarcity of articles with a quantitative design challenged the ability to statistically corroborate the impact of mHealth.

Dearth of outcomes data that explicitly correlated with maternal and newborn health indicators.

Although mHealth programs for prenatal and neonatal health exist, many are in piloting stage and have yet to produce evaluations that satisfy the inclusion criteria of this review.



Conclusion

- **mHealth programs are excelling in some key areas:**
 - Expediting emergency referrals and facilitating communication between health workers for obstetric and neonatal care.
 - Enhancing preventive care services by promoting antenatal care and sharing critical prenatal information.
- **Funding and policy challenges to scaling up initiatives:**
 - The expense of phone and mobile service may be prohibitive for end-users
 - Many of the health ecosystems in developing countries are under-resourced and do not have the funding or logistical inputs to provide the comprehensive services needed for these programs' success.
 - Limited coordination among stakeholders – service providers, health agencies or workers, government bureaus, donors and end-users.
- **Need for increased research and evaluation** of maternal, newborn and child health programs that are using mHealth strategies to identify and expand on best practices and overcome funding and policy challenges.

