



Wired Mothers

Mobile phones as a health communication tool to improve maternal and neonatal health in Zanzibar

DIPS

6th October 2012

Principal Investigator Stine Lund, MD, PhD stud
Institute of International Health, University of Copenhagen



MATERNAL AND NEONATAL HEALTH

Maternal deaths

273 500

Neonatal deaths

3.072.000

Stillbirths

2.650.000



Sources: *Lozano et al. Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: an updated systematic analysis. Lancet 2011

** Lui et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. Lancet 2012



MATERNAL AND NEONATAL HEALTH IN ZANZIBAR

99% attend one time ANC

51% institutional delivery

MMR [2006]: 528 / 100,000

NMR: 28 / 1,000

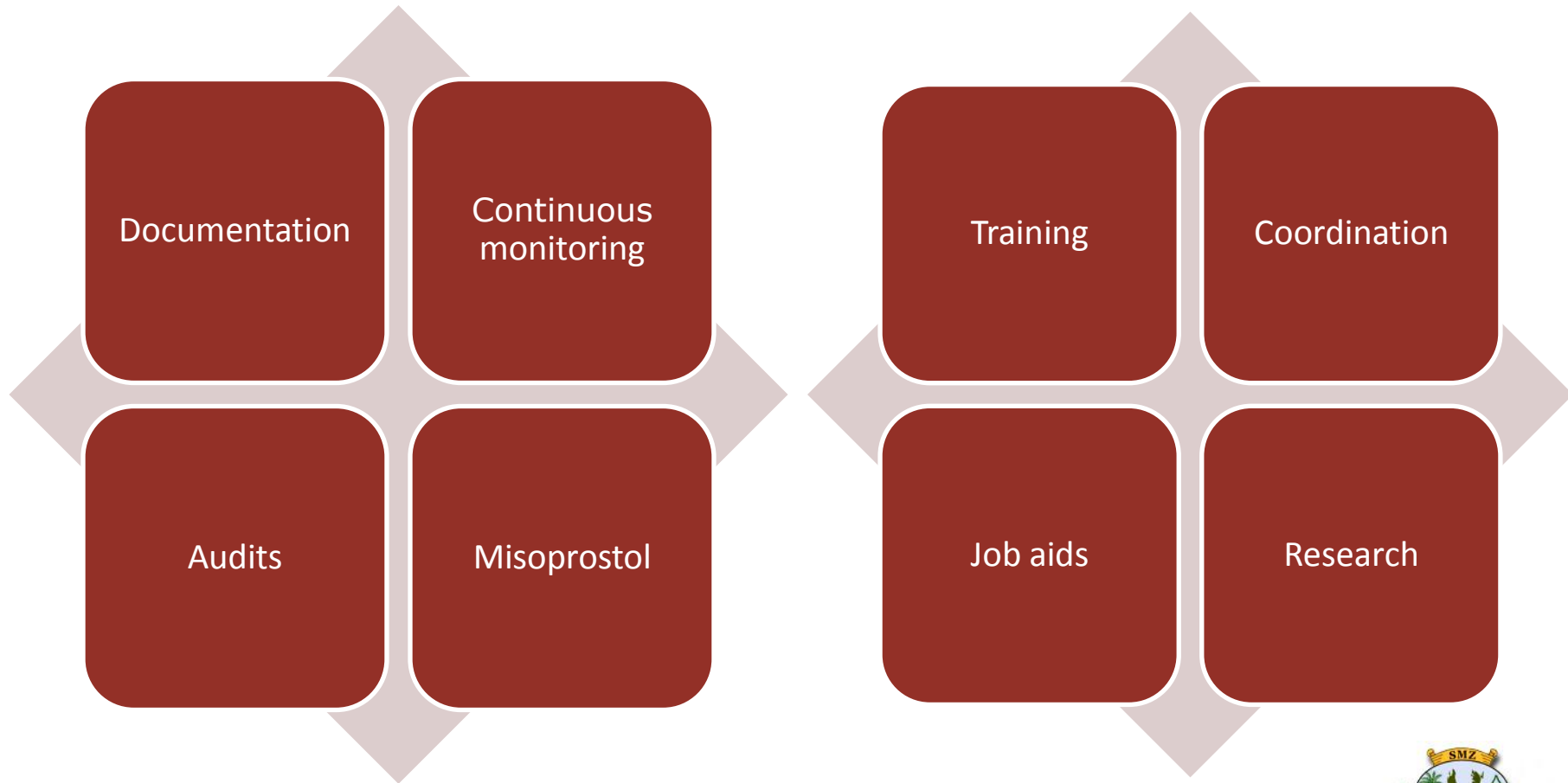
Stillbirths ????



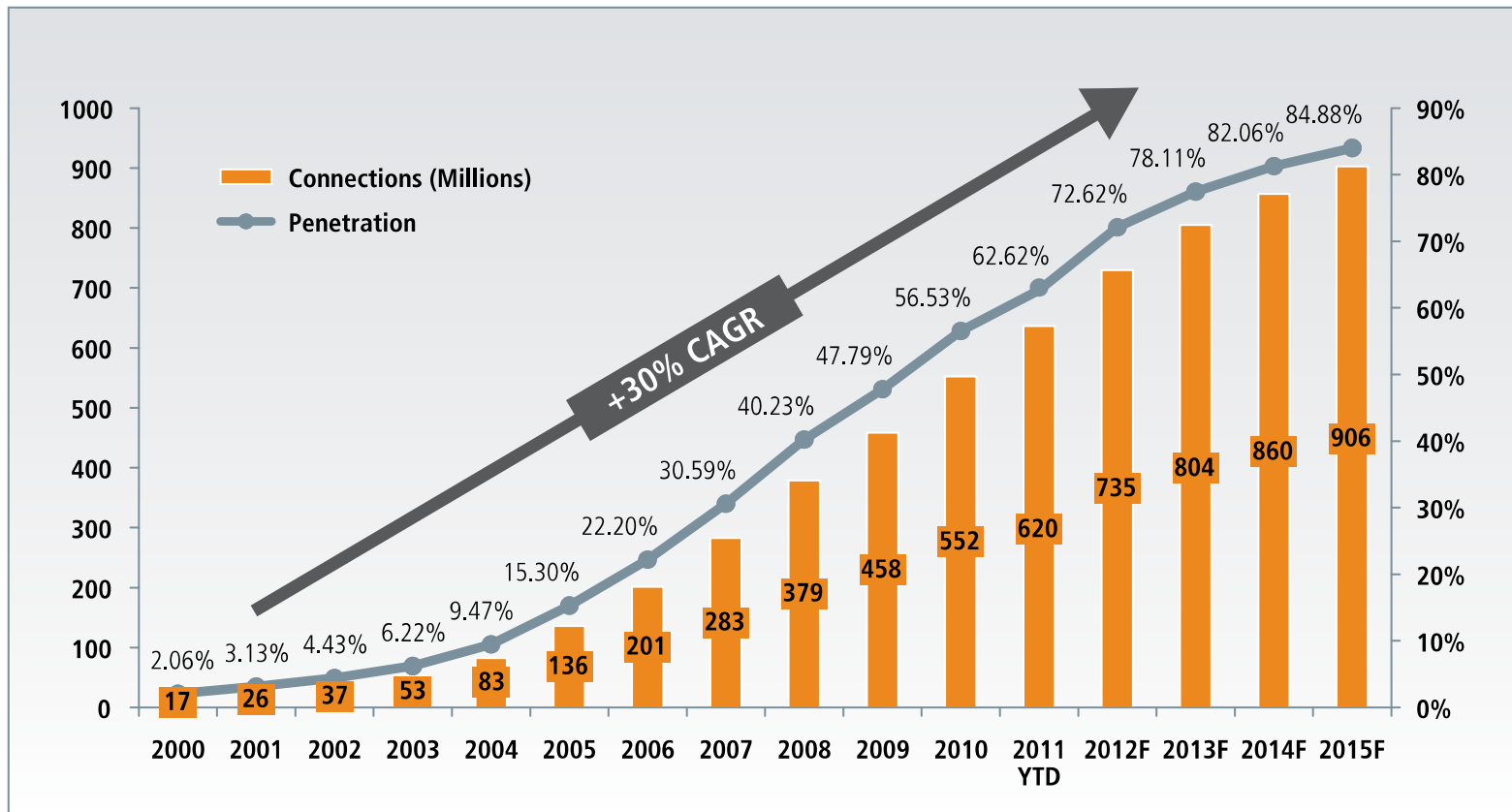
Sources: Tanzania Demographic and Health Service 2010
Zanzibar Ministry of Health. Annual Health Bulletin 2010
Lund et al. Facility Based Maternal Mortality in Zanzibar 2005-2007



STRATEGIC INITIATIVE



AFRICAS MOBILE REVOLUTION



Sources: GSMA African Mobile Observatory 2011



mHEALTH



Health Info
Systems

Health
Education



Diagnosis and
Treatment

Access to
Services



mHEALTH

Data and Image Transfer Using Mobile Phones

Images sent by mobile internet

Feedback to sender by text message

Strengthen Microscopy-Based
Diagnostics such as malaria, tb,
bacterial vaginosis, stool parasites and
eggs



Sources: Tuijn et al. Data and Image Transfer Using Mobile Phones to Strengthen Microscopy-Based Diagnostic Services in Low and Middle Income Country Laboratories. PLOS December 2011



mHEALTH

Very few studies of sufficient quality

Limited evidence of actual and wide-scale impacts/outcomes

Even less from developing countries



Sources: Noordam et al. Improvement of maternal health services through mHealth, 2011

Tamrat et al. An Analysis of mHealth in Maternal and Newborn Health Programs and Their Outcomes Around the World. Matern Child Health J 2011



WIRED MOTHERS OBJECTIVES

To link pregnant women to the health care system through mobile phones

To improve attendance to antenatal and postnatal care

To improve attendance to skilled delivery attendance

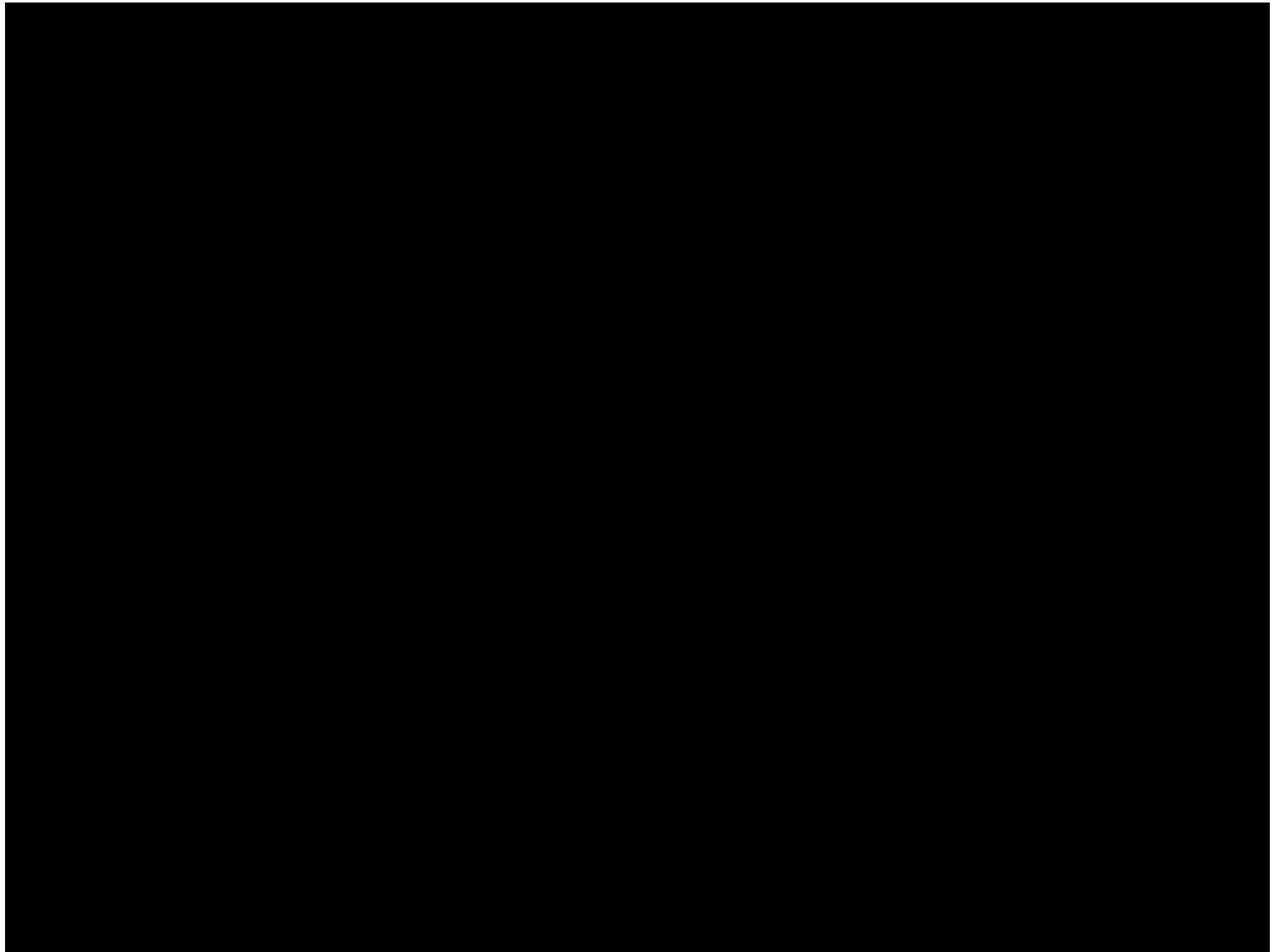
To improve access to emergency obstetric care

Wired Mothers

Welcome to the Wire Mothers Systems

Reports.

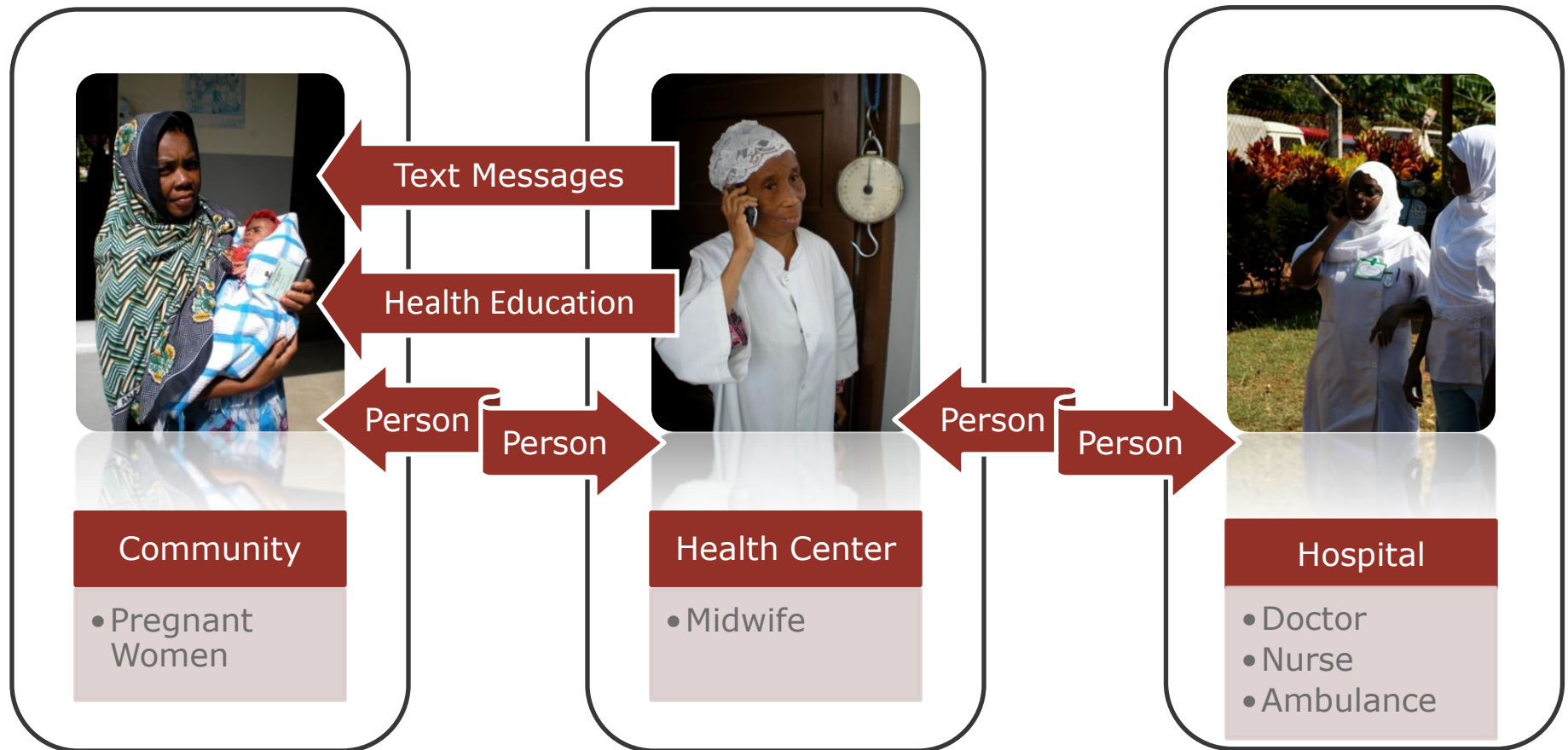
No	Full name	Telephone	Pregnancy Status	Delivered/Aborted Date	Date 7 to be Filed
00-0001	Wahne Hassan Ali	0772602028	Delivered	09-06-2009	07-07-2009 (21-07-2009)
00-0002	Muhammad Omar	0779402018	Delivered	12-07-2009	20-08-2009 (24-08-2009)
00-0003	Tariq Ibrahim Hamdi	0772880207	Delivered	20-07-2009	20-08-2009 (08-09-2009)
00-0004	Sahla Ibrahim Ali		Delivered	05-06-2009	03-07-2009 (13-07-2009)
00-0005	Nasima Ibrahim		Delivered	20-07-2009	07-08-2009 (20-08-2009)
00-0006	Muhammad Yusuf	0777450303	Delivered	10-08-2009	07-09-2009 (21-09-2009)
00-0007	Muhammad Ibrahim		Delivered	10-07-2009	04-08-2009 (26-08-2009)
00-0008	Muhammad Ibrahim	0772280279	Delivered	20-07-2009	27-08-2009 (26-08-2009)
00-0009	Amal Ibrahim Ibrahim		Delivered	12-08-2009	20-07-2009 (24-07-2009)
00-0010	Sara Ali Ibrahim	0772040204	Delivered	04-08-2009	03-09-2009 (25-09-2009)
00-0011	Bahar Ibrahim Ibrahim	0777030300	Delivered	05-08-2009	03-07-2009 (27-07-2009)
00-0012	Kuray Ibrahim	0772030300	Delivered	12-08-2009	12-09-2009 (25-09-2009)
00-0013	Muhammad Ibrahim	0770400304	Delivered	03-08-2009	03-09-2009 (23-09-2009)
00-0014	Khalid Ibrahim	0777520306	Delivered	20-07-2009	20-08-2009 (08-09-2009)
00-0015	Tariq Ibrahim Ibrahim	0774200302	Delivered	06-08-2009	03-09-2009 (27-09-2009)
00-0016	Muhammad Ibrahim	0774200300	Delivered	03-08-2009	20-08-2009 (14-09-2009)
00-0017	Muhammad Ibrahim	0772030300	Delivered	03-08-2009	03-09-2009 (27-09-2009)
00-0018	Muhammad Ibrahim		Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0019	Muhammad Ibrahim	0777030300	Delivered	03-08-2009	03-09-2009 (27-09-2009)
00-0020	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0021	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0022	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0023	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0024	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0025	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0026	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0027	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0028	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0029	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0030	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0031	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0032	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0033	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0034	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0035	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0036	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0037	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0038	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0039	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)
00-0040	Sahla Ibrahim	0777030300	Delivered	27-07-2009	24-08-2009 (20-09-2009)



Jina - a wired mother



WIRED MOTHERS



METHODOLOGY

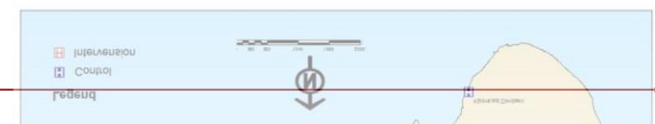
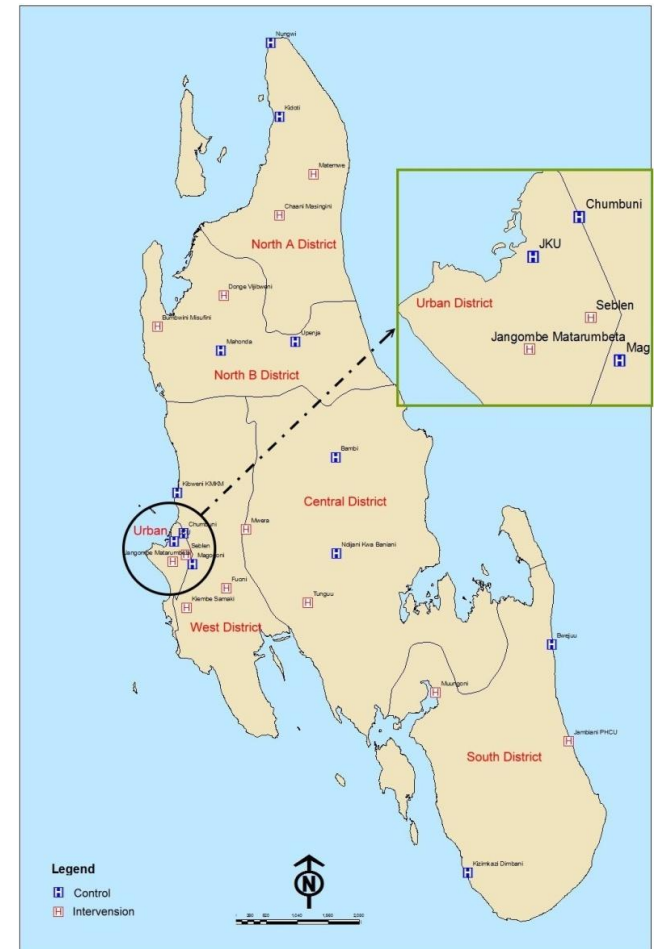
Cluster randomised-controlled trial

24 health facilities, 2550 women

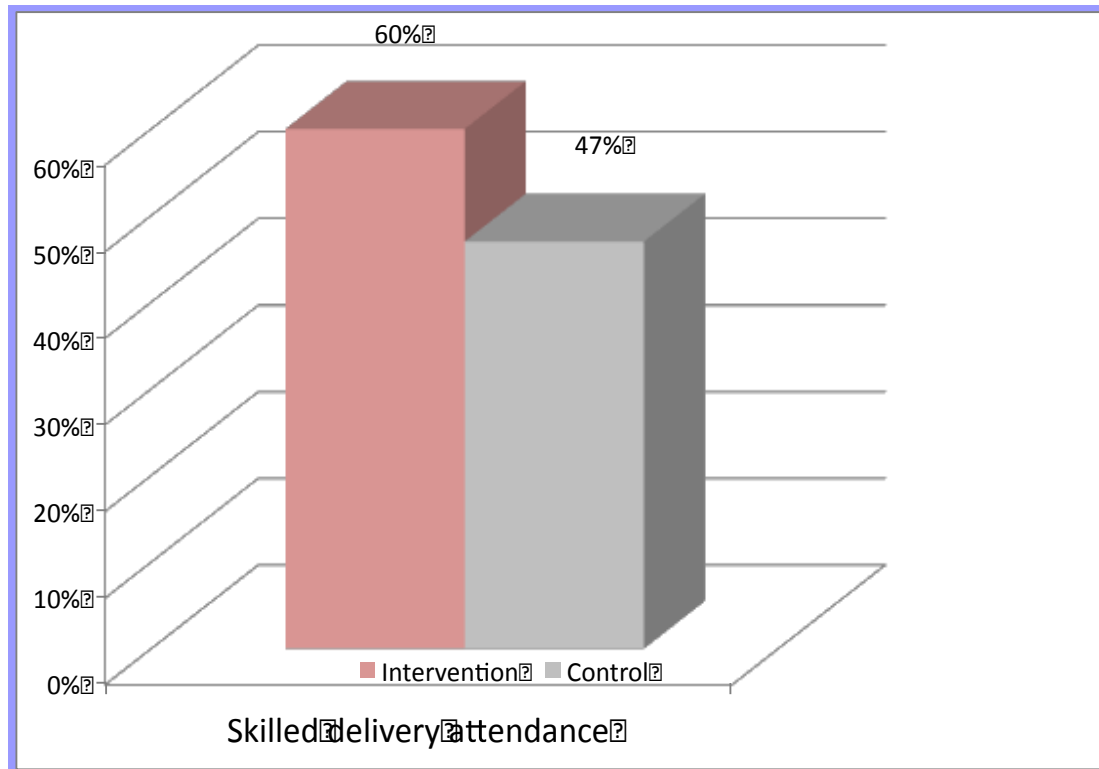
Randomisation at facility level

Participants women attending 1st ANC visit

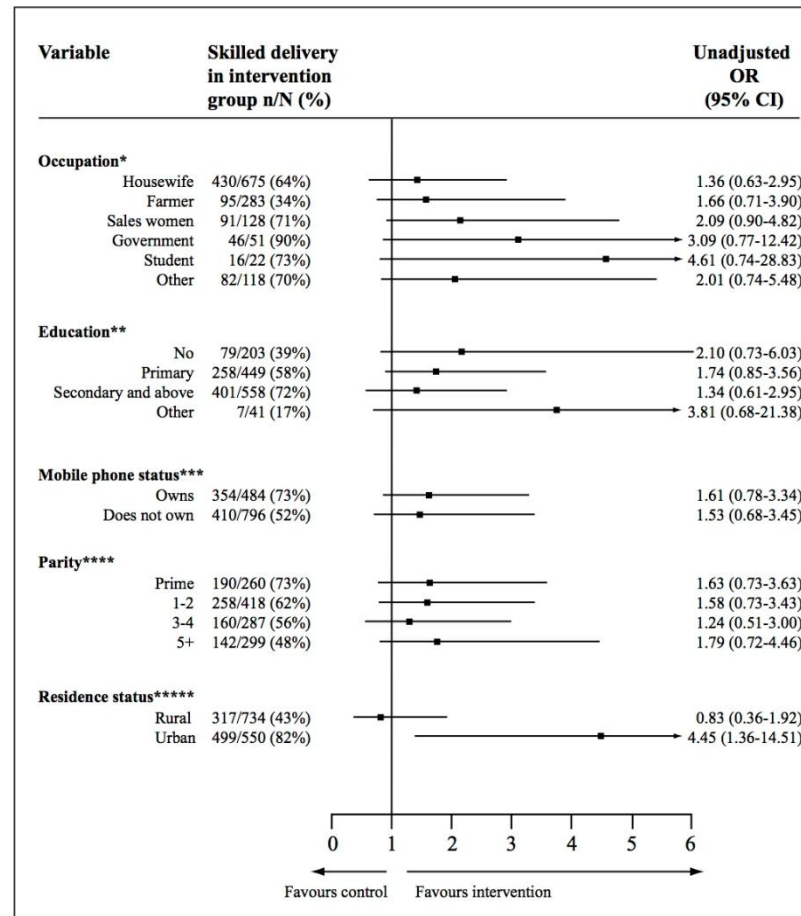
Followed until 42 days after delivery



SKILLED DELIVERY ATTENDANCE



SOCIO-ECONOMIC SUBGROUPS



Source: Lund S et al Mobile phones as a health communication tool to improve skilled attendance at delivery in Zanzibar: a cluster-randomised controlled trial. BJOG 2012; DOI: 10.1111/j.1471-0528.2012.03413.x.



SKILLED DELIVERY ATTENDANCE

Table 2. Association between mobile phone intervention and skilled delivery attendance by residence status*

	Skilled delivery (%)	Unskilled delivery (%)	Unadjusted OR** (95% CI)	Adjusted OR*** (95% CI)
All women	1326 (53)	1159 (47)		
Intervention	766 (60)	518 (40)		
Control	560 (47)	641 (53)		
Rural residence	630 (44)	812 (56)		
Intervention	317 (43)	417 (57)	0.83 (0.36–1.92)	0.85 (0.42–1.71)
Control	313 (44)	395 (56)	1	1
Urban residence	696 (67)	347 (33)		
Intervention	449 (82)	101 (18)	4.45 (1.36–14.51)****	5.73 (1.51–21.81)****
Control	247 (50)	246 (50)	1	1

CI, confidence interval; OR, odds ratio.

*Missing cases 65, intervention and control group.

**Adjusted for within-cluster effect and intervention interaction with residence status.

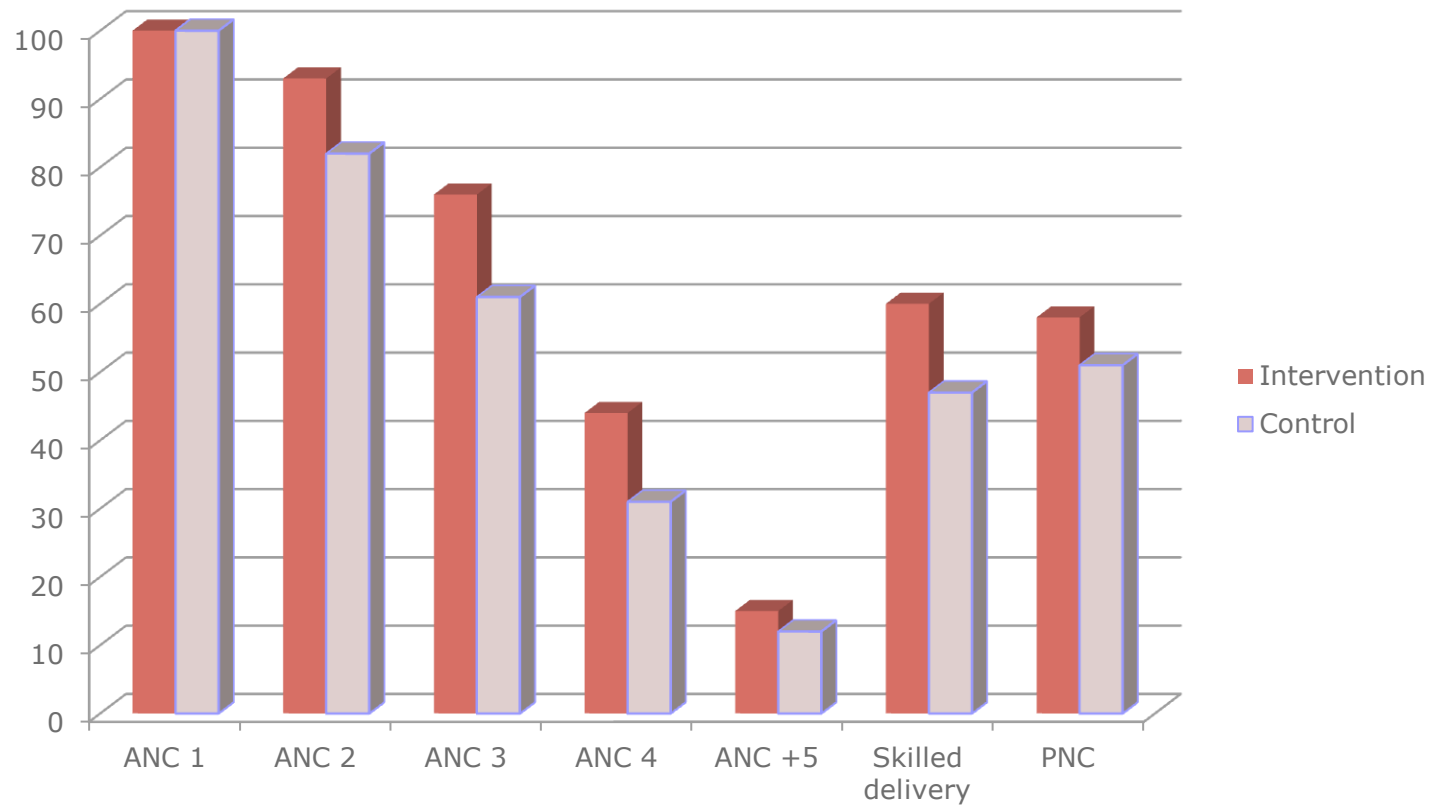
***Adjusted for significant variables associated with skilled delivery attendance, within-cluster effect and intervention interaction with residence status.

**** $P < 0.01$.

Source: Lund S et al Mobile phones as a health communication tool to improve skilled attendance at delivery in Zanzibar: a cluster-randomised controlled trial. BJOG 2012; DOI: 10.1111/j.1471-0528.2012.03413.x.



CONTINUITY OF CARE



ANTENATAL CARE

Table 3. Association between mobile phone intervention and primary and secondary outcomes

Variable	Intervention No (%)	Control No (%)	Unadjusted* OR (95% CI)	Adjusted OR** OR (95% CI)
Primary outcome Four or more antenatal care visits	574 (44)	385 (31)	1.54 (0.80-2.96)	2.39 (1.03-5.55)

ANTENATAL CARE

Table 3. Association between mobile phone intervention and primary and secondary outcomes

Variable	Intervention No (%)	Control No (%)	Unadjusted* OR (95% CI)	Adjusted OR** OR (95% CI)
Secondary outcomes				
<u>Tetanus toxoid vaccination of primigravida</u>				
TT1 ¹	223/232 (96)	195/208 (94)	1.38 (0.39-4.87)	1.58 (0.41-6.01)
TT2 ²	155/215 (72)	112/201 (56)	1.67 (0.84-3.33)	1.62 (0.81-3.26)
Intermittent Preventive Treatment in pregnancy				
IPTp1	1191 (91)	1060 (86)	1.78 (0.49-6.52)	1.10 (0.35-3.43)
IPTp2	846 (65)	640 (52)	1.69 (0.82-3.48)	1.97 (0.98-3.94)
Gestational age 36 or more at last ANC visit	366 (28)	248 (20)	1.45 (0.88-2.37)	1.48 (0.89-2.45)
Antepartum referral	127 (10)	57 (5)	1.58 (0.61-4.09)	1.66 (0.68-4.06)

¹ Missing cases 5, 52 not eligible, ²missing cases 13, 68 not eligible, ³missing cases 13. All missing cases intervention and control group

*Adjusted for within cluster effect

** Adjusted for significant variables associated with antenatal care attendance and within cluster effect



VOICE CALLS

39% called their midwife

- Bleedings before and after delivery
- Eclampsia
- Obstructed labor
- Abortion
- Abdominal pain
- In labour
- Medicines
- PV discharge

3% emergency referrals



STILLBIRTHS

Table. Association between mobile phone intervention and delivery outcome

Variable	Intervention No (%)	Control No (%)	Unadjusted* OR (95% CI)	Adjusted OR** OR (95% CI)
Born alive	1277 (98%)	1197 (97%)		
Abortion	14 (1%)	11 (1%)		
Stillbirths	16 (1%)	29 (2%)	0.52 (0.29-0.94)	0.48 (0.27-0.88)

¹ Missing cases 6. All missing cases intervention and control group

*Adjusted for within cluster effect

**Adjusted for significant variables associated with antenatal care attendance and within cluster effect



Source: Lund S et al. Preliminary analyses.



MORTALITY

	Study	Tanzania	Africa
Stillbirth rate	18	17*	28**
Neonatal Mortality rate	15	24***	28***

*TDHS 2010

**Couccens et al. National, regional, and worldwide estimates of stillbirth rates in 2009 with trends since 1995: a systematic analysis. Lancet 2011

*** Lozano et al. Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: an updated systematic analysis. Lancet 2011

Source: Lund S et al. Preliminary analyses.



CONCLUSIONS

Urban women more than 5 times likely to delivery with SBA in intervention group

Increased antenatal care attendance and adherence to procedures

Reduction in stillbirths

Intervention widely accepted amongst health workers and women



POLICY IMPLICATIONS

Mobile phone solutions may contribute to saving women's and newborn lives and towards achievement of MDG 4 and 5

mHealth solutions should be considered by maternal health policy makers in developing countries



THANK YOU

