Using evidence for policies to reduce maternal mortality

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Agenda

- Role of evidence in maternal health
- Emerging policy-relevant evidence:
  - Role of poverty
  - Appropriate health workers
  - Utilization patterns and incentives
- Future directions

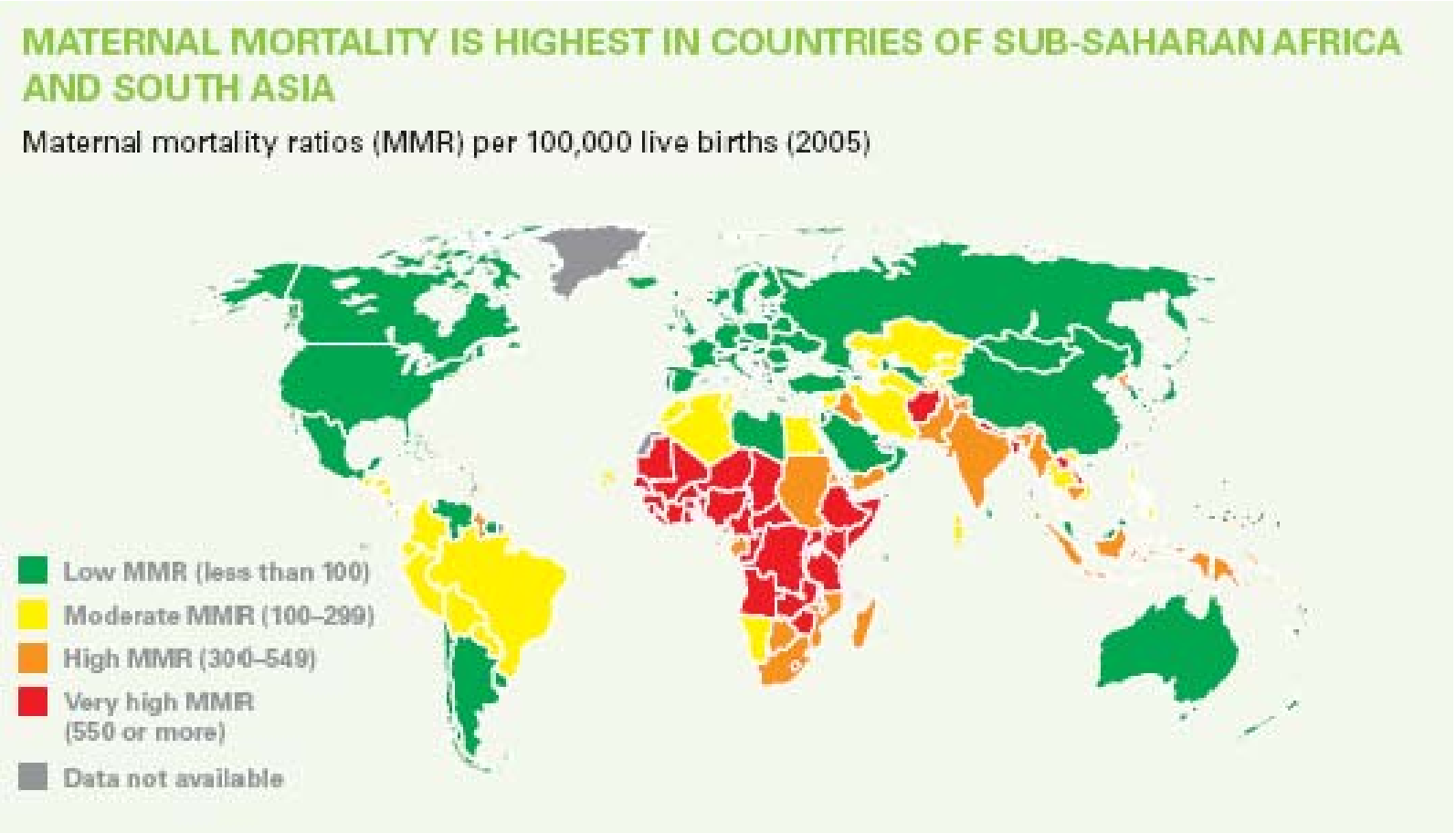
Maternal mortality overview

- Maternal mortality ratio (deaths in pregnancy or within 42 days of delivery per 100,000 live births) is the health indicator with the greatest gap between the developed and developing world:

Country group	MMR	Lifetime risk of dying
Industrialized	8	1 in 8,000
Least developed	870	1 in 24

WHO, UNICEF, UNFPA and The World Bank, 2005

Maternal health global situation



UNICEF: Progress for Children, December 2007

Causes of maternal death

	Developed countries	Africa	Asia	Latin America and the Caribbean
Number of datasets	5	8	11	10
Number of maternal deaths	2823	4508	16 089	11 777
Haemorrhage	13·4% (4·7–34·6)	33·9% (13·3–43·6)	30·8% (5·9–48·5)	20·8% (1·1–46·9)
Hypertensive disorders	16·1% (6·7–24·3)	9·1% (3·9–21·9)	9·1% (2·0–34·3)	25·7% (7·9–52·4)
Sepsis/infections	2·1% (0·0–5·9)	9·7% (6·3–12·6)	11·6% (0·0–13·0)	7·7% (0·0–15·1)
Abortion	8·2% (0·0–48·6)	3·9% (0·0–23·8)	5·7% (0·0–13·0)	12·0% (0·0–32·9)
Obstructed labour	0·0%* (0·0–0·0)	4·1% (0·0–10·3)	9·4% (0·0–12·0)	13·4% (0·0–38·9)
Anaemia	0·0%* (0·0–0·0)	3·7% (0·0–13·2)	12·8% (0·0–17·3)	0·1% (0·0–3·9)
HIV/AIDS	0·0%* (0·0–0·0)	6·2% (0·0–13·3)	0·0%* (0·0–0·0)	0·0%* (0·0–0·0)
Ectopic pregnancy	4·9% (0·4–7·4)	0·5% (0·0–3·3)	0·1% (0·0–3·9)	0·5% (0·0–4·5)
Embolism	14·9% (0·0–21·2)	2·0% (0·0–5·6)	0·4% (0·0–51·0)	0·6% (0·0–8·4)
Other direct causes	21·3% (0·0–33·9)	4·9% (0·0–10·3)	1·6% (0·0–25·9)	3·8% (0·0–27·9)
Other indirect causes	14·4% (0·0–51·2)	16·7% (9·1–29·3)	12·5% (0·0–29·2)	3·9% (0·0–25·3)
Unclassified deaths	4·8% (0·0–22·9)	5·4% (0·0–21·8)	6·1% (0·0–16·2)	11·7% (0·0–20·4)

Data are pooled percentages (range), unless stated otherwise. *Zero indicates that the condition is not reported as a cause of death. Deaths from that cause could have occurred but listed under other or unclassified deaths.

Table 1: **Joint distribution of causes of maternal deaths**

Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PFA. WHO analysis of causes of maternal death: a systematic review. *The Lancet 2006;367(9516):1066-1074.*

Epidemiology of maternal deaths points to interventions

- Most maternal deaths occur around the time of delivery
- Most deaths are in women classified as low-risk in pregnancy
- Deaths cannot be predicted in advance; require rapid recognition and response to complications during and immediately after labor/delivery

Failure of maternal health efforts

Appendix 9. Comparison of 1990 and 2005 maternal mortality by UNICEF regions

	1990*		2005			
Region	MMR	Maternal deaths	MMR	Maternal deaths	% change in MMR between 1990 and 2005	Annual % change in MMR between 1990 and 2005
Sub-Saharan Africa	940	206,000	920	265 000	-1.5	-0.1
Eastern and Southern Africa	790	85,000	760	103 000	-3.9	-0.3
Western and Central Africa	1 100	121 000	1 100	162 000	-0.7	0.0
Middle East and North Africa	270	26 000	210	21 000	-21.1	-1.6
South Asia	650	238 000	500	187 000	-22.0	-1.7
East Asia and Pacific	220	80 000	150	45 000	-30.3	-2.4
Latin America and Caribbean	180	21 000	130	15 000	-26.0	-2.0
Central and Eastern Europe and the Commonwealth of Independent States	63	4 400	46	2 600	-27.5	-2.1
Industrialized countries	8	960	8	830	-8.3	-0.6
Developing countries	480	574 000	450	534 000	-6.3	-0.4
Least developed countries	900	201 000	870	247 000	-2.5	-0.2
World	**430**	**576 000**	**400**	**536 000**	**-5.4**	**-0.4**

*The 1990 estimates have been revised using the same methodology used for 2005, which makes them comparable.

WHO, UNICEF, UNFPA and The World Bank, 2005

Implications for policy

- Global maternal health efforts must focus on Africa and South Asia
- Previous maternal mortality efforts were not evidence-based
- Current consensus is to shift away from community and prevention (e.g., through antenatal care) to health system and emergency obstetric care

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Maternal mortality is highest among the poor

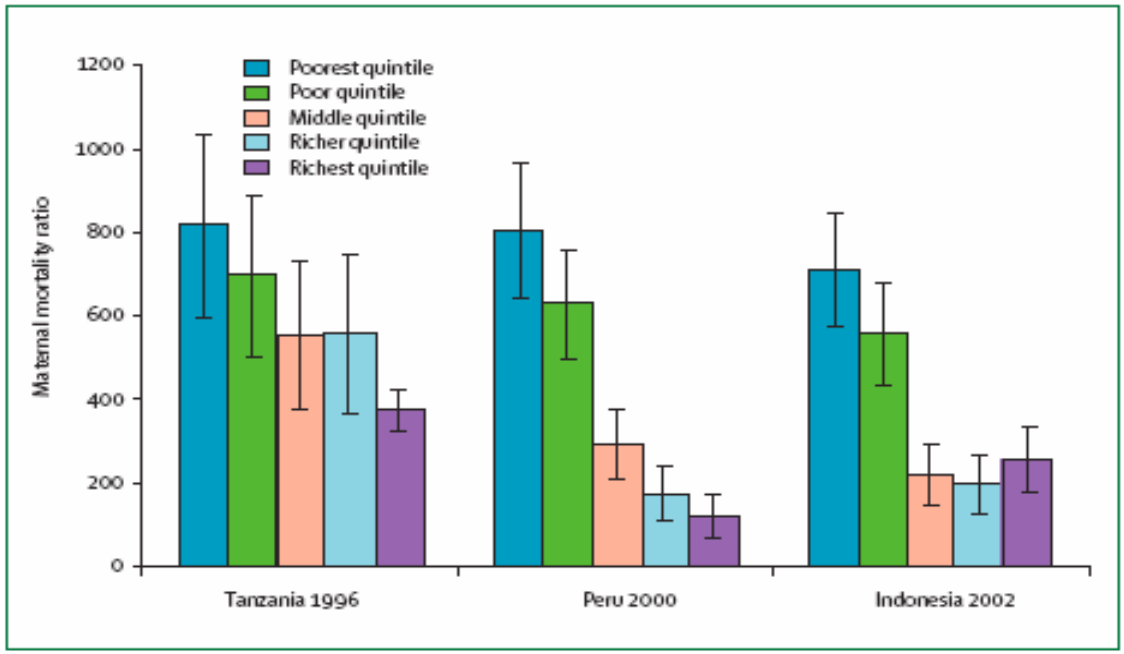

Figure 8: Maternal mortality ratios by poverty quintile
Data from reference 71. Black lines show 95% CI.

Ronsmans C, Graham WJ, The Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where, and why. *The Lancet 2006;368:1189-22.*

Equity of access between and within countries

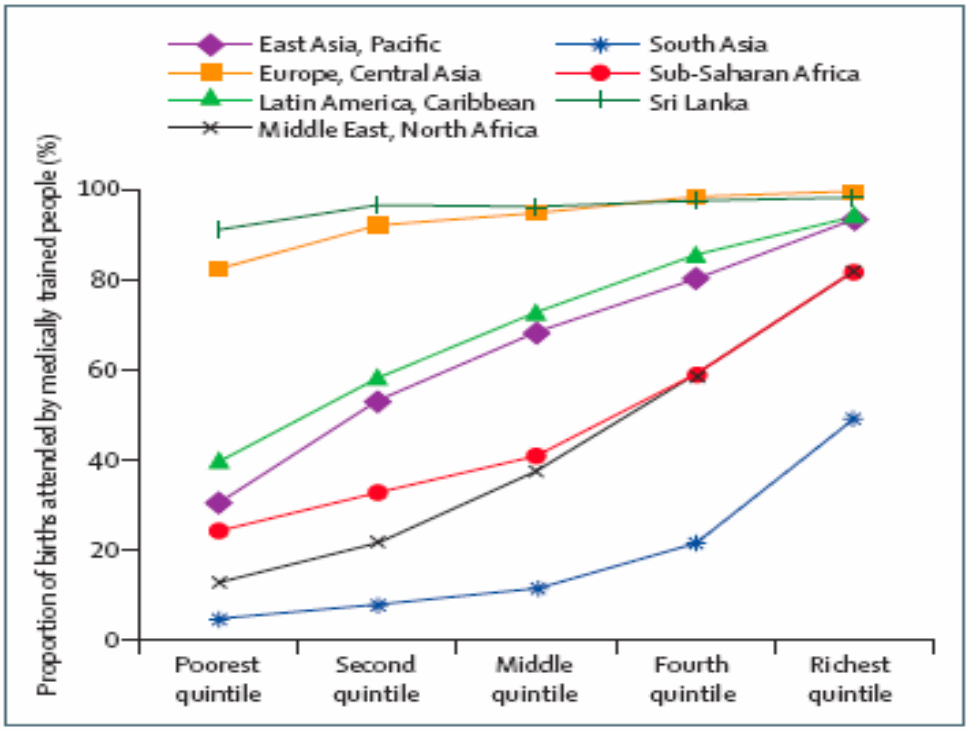

Figure 3: **From massive deprivation to marginal exclusion: proportion of births attended by medically trained people* by wealth quintile and region**
Data from references 14–16. *Doctor, nurse, or nurse midwife.

Koblinsky M, Matthews Z, Hussein J, Mavalankar D, Mridha MK, Anwar I, et al. Going to scale with professional skilled care. *The Lancet 2006;368.*

Example: equity of utilization of health centers in rural Tanzania

Wealth Index (%)				
Fifth quintile	52.5	41.6	72.6	51.3
Fourth quintile	33.9	37.6	22.1	38.1
Third quintile	13.1	20.0	5.3	10.6
Second quintile	0.5	0.8	0.0	0.0
First quintile	0.0	0	0.0	0.0

Kruk et al, 2008 preliminary data

Potential policy implications

- Child health experience has demonstrated that in general the better-off tend to benefit most from new health programs—even those aimed at diseases of the poor
- Strategies to reach poor women with maternal health interventions will be required
- Need to disaggregate data by wealth

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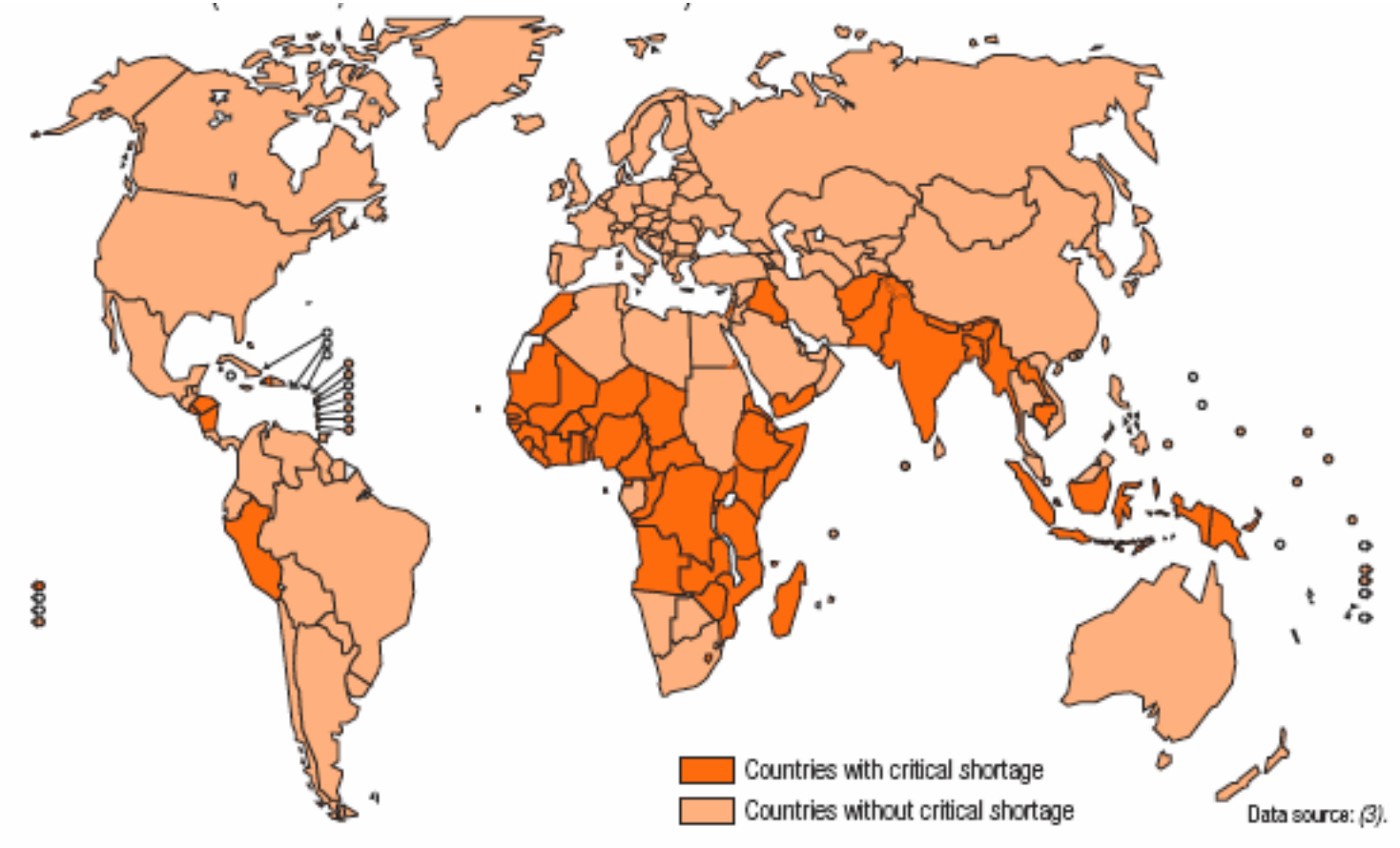
Health workers: acute shortages in Africa and South Asia



WHO. World Health Report 2006: Working together for health.

Human resource shortages

- Even as skilled birth attendants gain more prominence in policy, there are severe shortages of nurses, midwives and doctors
- Obstetricians are in particularly short supply
- For example, Mozambique with 20 million population has 435 physicians and 26 obstetricians

Source: Mozambique DHS 2003, Jamisse et al 2005

Quality of care and safety of non-physicians

- 2071 consecutive Caesarian sections done by *técnicos de cirurgia*and obstetricians at Maputo Central hospital: no difference in serious complications (e.g., total wound rupture, still birth, early neonatal death, maternal death); superficial wound separations were higher for *técnicos*
- Review of 10,258 general and obstetric surgeries found case fatality rates of 0.4% for emergency cases and 0.1% for elective cases

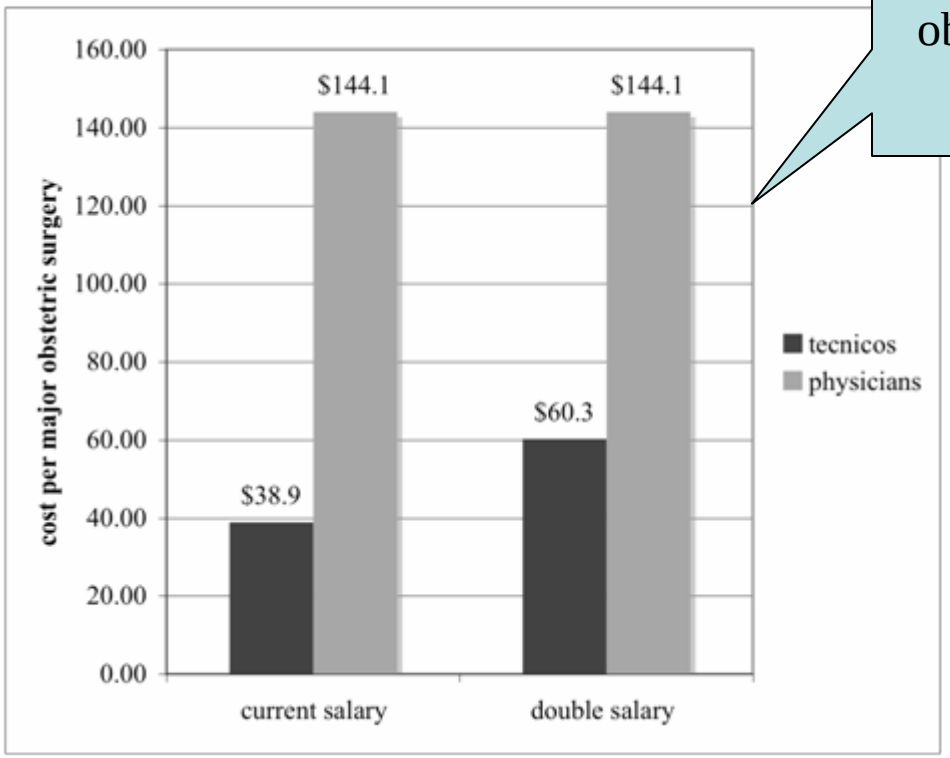
Pereira C, Bugalho A, Bergstrom S, Vaz F, Cotiro M. A comparative study of caesarean deliveries by assistant medical officers and obstetricians in Mozambique. *Br J ObstetGynaecol 1996;103(6):508-12.*
Vaz F, Bergstrom S, da Luz Vaz M, Langa J, Bugalho A. Training medical assistants for surgery. *Bull World Health Organ 1999;77(3):688-690*

Retention of non-physicians and physicians

- In rural hospitals in Mozambique over 90% of Caesarian sections were done by tecnicos de cirurgia
- 88% of *técnicos de cirurgia* from 3 graduating classes surveyed were in rural areas 2-7 years after graduation
- 3% of doctors from same graduating classes were in rural areas 2 years and none at 7 years post graduation

Pereira C, Cumbi A, Malalane R, Vaz F, McCord C, Bacci A, et al. Meeting the need for emergency obstetric care in Mozambique: work performance and histories of medical doctors and assistant medical officers trained for surgery. *Bjog 2007;114(12):1530-3.*

Career cost-effectiveness ratios for *técnicos de cirurgia* and physicians in Mozambique



Cost per major obstetric procedure over 30 years

Kruk ME, Pereira C, Vaz F, Bergstrom S, Galea S. Economic evaluation of surgically trained assistant medical officers in performing major obstetric surgery in Mozambique. *Bjog* 2007;114(10):1253-60.

Potential policy implications

- Physicians alone cannot solve maternal mortality crisis
- Appropriate combination of primary care providers and surgically-trained providers is needed
- Questions about how to organize delivery teams and referral networks in settings with poor communication and transport

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Maternal mortality in Tanzania

- Tanzania has a population of 34 million; the largest country in East Africa
- Majority of population is rural
- MMR is 950 per 100,000 live births; in line with SSA
- Total health spending is approximately USD 12/capita

National Bureau of Statistics of Tanzania, Inc. MI. 2007. Tanzania Service Provision Assessment Survey 2006.

Tanzania's health system

- Despite this, Tanzania has a wide network of government and mission health facilities (dispensaries, health centers, hospitals)
- >90% of population lives within 10km of a health facility
- All levels of health facilities are in theory equipped to perform deliveries
- All maternal health services are exempt from user fees

National Bureau of Statistics of Tanzania, Inc. MI. 2007. Tanzania Service Provision Assessment Survey 2006.

Health service utilization

- Utilization is the interface of supply and demand and an excellent marker for whether health systems are meeting population needs
- In 2004, 47% of women and 33.6% of women in rural areas had a facility delivery
- Yet, in the same year 97% of pregnant women in Tanzania made at least one antenatal care visit
- A great deal is known about household-level factors but less about system factors

National Bureau of Statistics, ORC Macro. 2005. Tanzania Demographic and Health Survey 2004-2005.

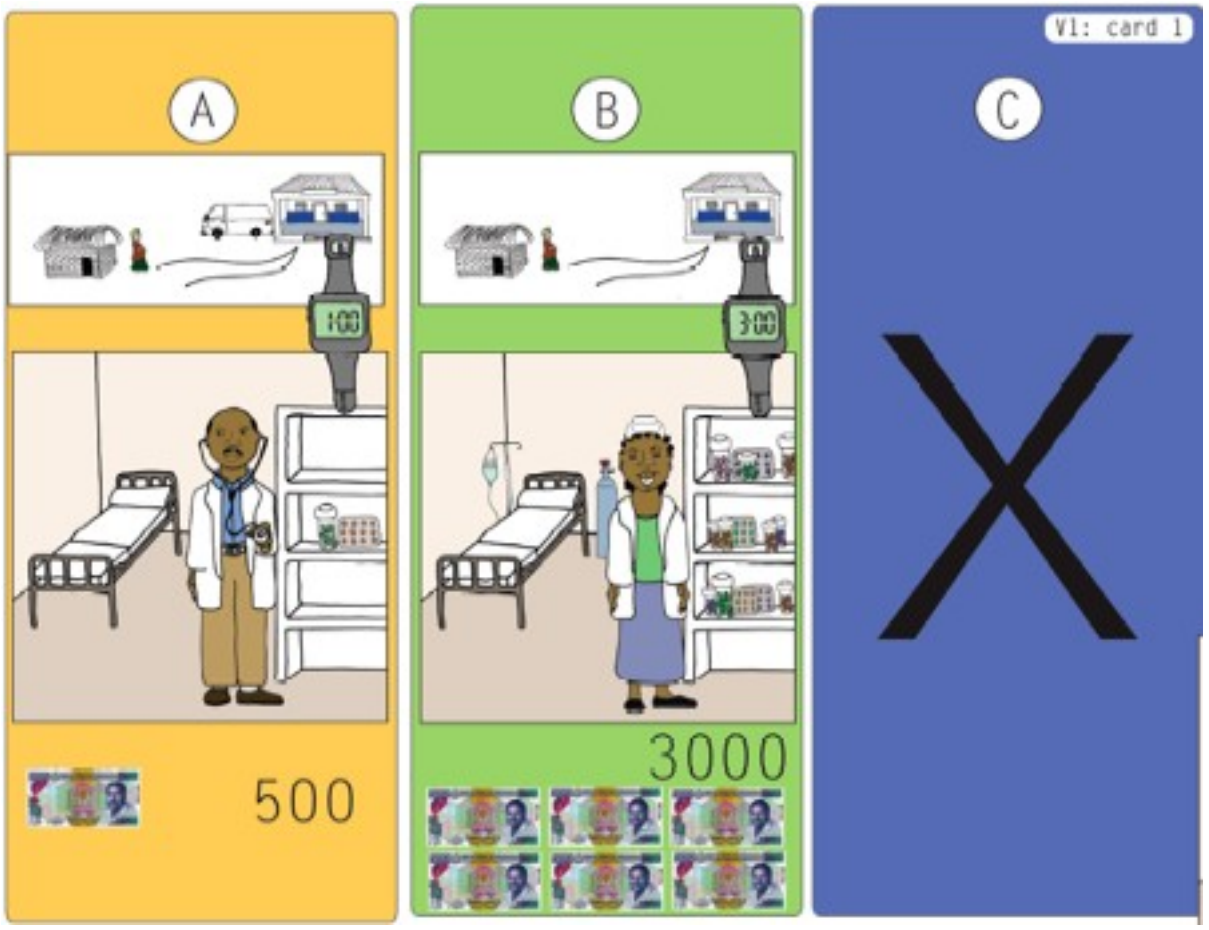
KasuluDistrict, western Tanzania

Using a marketing tool to understand preferences for health care

- Discrete choice experiments come from a family of techniques used to elicit public preferences for goods and services
- Most frequently used in marketing, transport, environmental economics
- Permits estimation of the relative importance of different aspects of health care: structure, process and health and non-health outcomes

Ryan M, Bate A, Eastmond CJ, Ludbrook A. Use of discrete choice experiments to elicit preferences. *Qual Health Care 2001;10 Suppl 1:i55-60.*.

DCE sample choice card



Kruk M, Paczkowski M, Mbaruku G, de Pinho H, Galea S. 2008. Deciding where to deliver: a population-based discrete choice experiment of women's preferences for facility childbirth in rural Tanzania. *In press*.

Utilities for health system attributes

Attribute	Utility[a,b]	p-value
Distance		
1/2 hour by foot	12.4	<0.001
1 hour by foot	11.9	<0.001
1 and 1/2 hours by foot	12.8	<0.001
2 hours by foot	2.8	0.018
3 hours by foot	0	ref
Type of provider		
Doctor	29.0	<0.001
Clinical officer	6.9	<0.001
Nurse	0	ref
Provider attitude		
Provider smiles, listens carefully	168.5	<0.001
Provider does not smile, does not listen carefully	0	ref
Availability of drugs and medical equipment		
Drugs and medical equipment always available	160.0	<0.001
Drugs and medical equipment not always available	0	ref
Availability of transport		
Transport available	21.5	<0.001
Transport not available	0	ref
Cost		
250 Shillings	33.3	<0.001
500 Shillings	46.7	<0.001
1000 Shillings	10.8	<0.001
2000 Shillings	20.2	<0.001
3000 Shillings	0	ref

Kruk M, Paczkowski M, Mbaruku G, de Pinho H, Galea S. 2008. Deciding where to deliver: a population-based discrete choice experiment of women's preferences for facility childbirth in rural Tanzania. *In press*.

Dispensary delivery room

Policy simulations

Scenario	Home % (SD)	Dispensary % (SD)	Health Center % (SD)	Hospital % (SD)
1. Baseline[b]	55.8 (2.5)	3.3 (0.7)	28.2 (2.0)	12.7 (1.3)
2. Provide free transport				
To health center	53.8 (2.5)	2.8 (0.6)	36.2 (2.2)	7.2 (0.8)
To hospital	53.2 (2.5)	2.9 (0.7)	21.4 (1.7)	22.5 (1.8)
3. Reduce total delivery costs				
Cost of health center: 250 TZS[c]	53.3 (2.5)	3.2 (0.7)	33.1 (2.2)	10.4 (1.2)
Cost of hospital: 250 TZS	53.8 (2.5)	3.1 (0.7)	19.4 (1.5)	23.7 (1.7)
4. Provide drugs and equipment in dispensaries	50.6 (2.6)	38.8 (2.2)	6.7 (0.7)	3.9 (0.6)
5. Improve provider attitude/performance in dispensaries	27.9 (1.8)	33.9 (2.0)	26.4 (2.0)	11.8 (1.3)
6. Provide drugs and equipment and improve provider attitude/performance in dispensaries	9.9 (1.4)	82.0 (1.7)	5.8 (1.0)	2.3 (0.5)
7. Provide drugs and equipment and improve provider performance in dispensaries, health centers, and hospitals	9.4 (1.3)	65.3 (1.5)	14.4 (0.8)	10.9 (0.8)

Kruk M, Paczkowski M, Mbaruku G, de Pinho H, Galea S. 2008. Deciding where to deliver: a population-based discrete choice experiment of women's preferences for facility childbirth in rural Tanzania. *In press*.

Potential policy implications

- Rather than lacking in education or demonstrating cultural aversion to facility delivery, women may be acting rationally in selecting home delivery given the binding constraints on good quality care
- More bare-bones facilities will not likely increase facility delivery rates
- Quality improvements (specific investments need further elaboration) could increase facility delivery

Kruk M, Paczkowski M, Mbaruku G, de Pinho H, Galea S. 2008. Deciding where to deliver:
a population-based discrete choice experiment of women's preferences for facility childbirth in rural Tanzania.
under review.

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Policy-relevant research questions

- Best interventions to reach poor women
- Most effective organization of obstetric care at first- and second-level
- Methods to increase number and improve rural placement of skilled birth attendants
- Ensuring high quality obstetric care in resource-constrained settings
- Financing reforms to increase utilization and reduce financing burden of care
- **Crucial need for well-designed experiments to test key hypotheses**

Promoting political buy-in for evidence-based interventions

- Researchers need to be more strategic in choice of questions that speak to policy concerns
- Researchers needs to translate results into policy-relevant messages
- Research needs to be more timely and sensitive to political cycles
- Researchers should seek opportunities to present data in policy fora
- Policy processes should require stringent evaluation of new initiatives