The challenge of reducing maternal and perinatal mortality and morbidity worldwide

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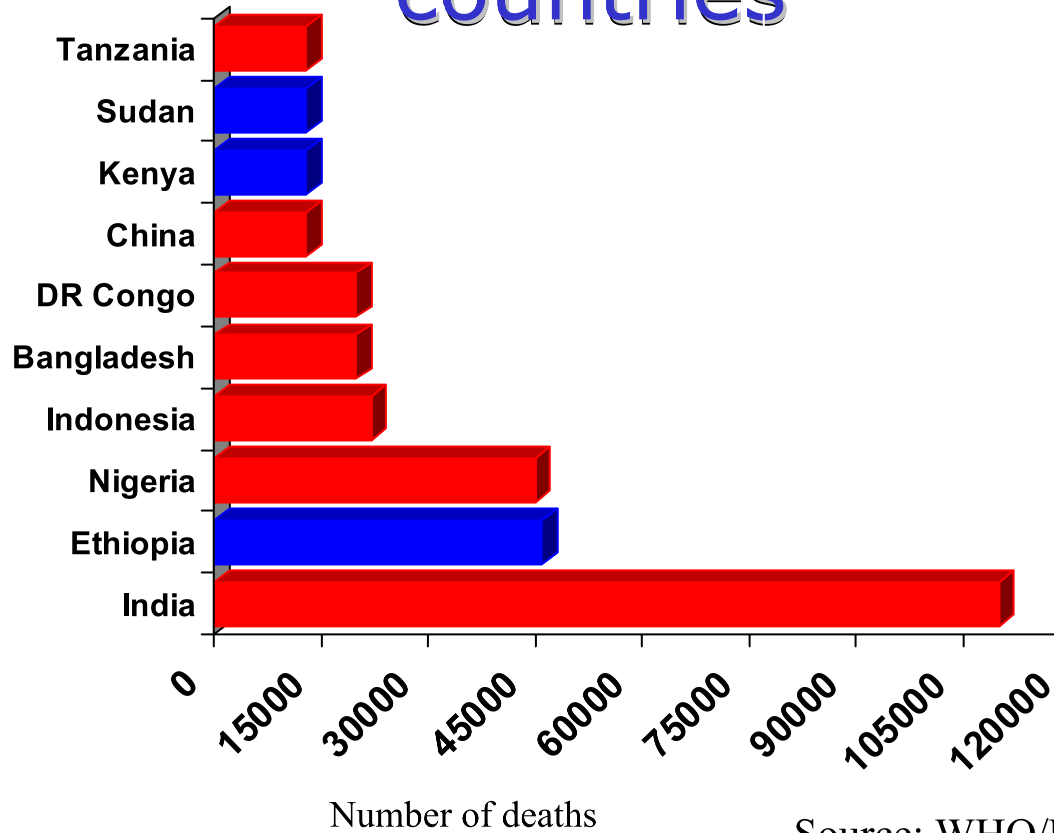
The global burden of maternal mortality

Maternal mortality estimates 1995

Region	MMRatio (maternal deaths per 100,000 live births)	Number of maternal deaths	Lifetime risk of maternal death, 1 in:
World total	400	515,000	75
More developed countries	21	2,800	2,500
Less developed countries	440	512,000	60
Least developed countries	1,000	230,000	16

Source: WHO/UNICEF/UNFPA, 2001

Priority:
61% of all maternal deaths occur in 10 countries



Source: WHO/UNICEF/UNFPA, 2001

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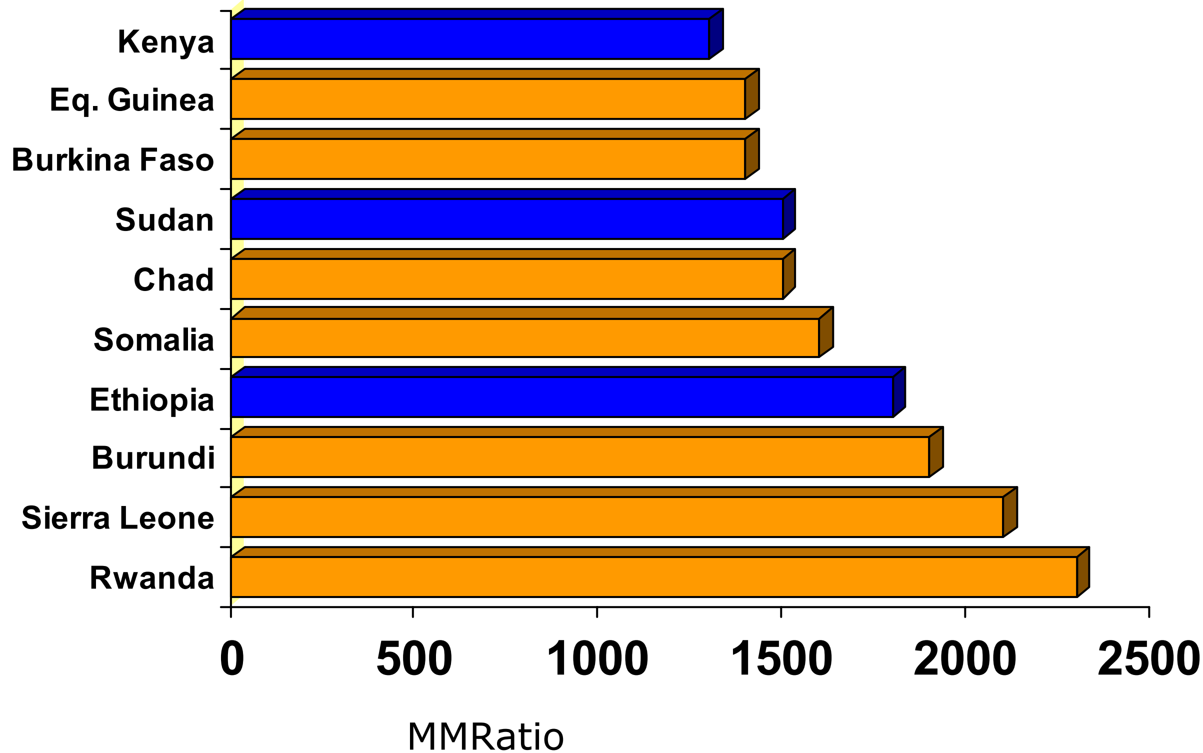
Priority: Countries with highest MMRatios



Source: WHO/UNICEF/UNFPA, 2001

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Difficulty in monitoring trends

Country	1990 Deaths	1990 MMRatio	1995 Deaths	1995 MMRatio
India	147,000 *	570	110,000 ***	440
Ethiopia	33,000 *	1400	46,000 *	1800
Indonesia	31,000 *	650	22,000 **	470
Bangladesh	33,000 *	850	20,000 *	600
Dem Rep of Congo	16,000 *	870	20,000 *	940
China	22,000 ***	95	13,000 ***	60

Legend: *** RAMOS
** Sisterhood
* Model

Source: WHO/UNICEF/UNFPA, 2001

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Hospital-based estimates

Maternal mortality in selected populations from developing countries				
No. women	Year	Population characteristics	MMRatio	1995 WHO/UNICEF/UNFPA estimates
41,248	2000	9 hospitals + 53 population-based antenatal clinics	41 per 100,000	Latin America & the Caribbean: 190 South America: 200; Central America: 110
149,276	2001	34 hospitals in Latin America	46-61 per 100,000	
456,889	1985-1997	Hospital-based database in Latin America	48 per 100,000	
19,485	1994-1996	Population-based urban sample in 6 countries, West Africa	310.8 per 100,000 (234-404)	Western Africa: 1100

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1995 estimates vs Hospital-based data

- Datasets from large trials give MMRatio estimates one-fourth of those calculated for 1995
- The other three-fourths could correspond to
  - underreporting and bias in hospital reporting,
  - overadjusting,
  - other medical causes, accidents, violence...
- Institutional delivery care would primarily be effective on these one-fourth of the estimates

Monitoring and Evaluation
Epidemiological issues

- Rare condition, similar to emergencies or accidents
- Total number unknown, hence not useful for evaluation of interventions
- Most causes are also related to perinatal morbidity and mortality.

Monitoring and Evaluation
Demographic issues

- Some women contact with services, other do not contact at all
- Remote populations
- Intracountry-specific situations
- Heterogeneity of developing countries

Prevention of maternal mortality

Causes of maternal death

Attributable risk

- How many deaths can be averted if the condition is eliminated?

or

- What proportion of the total risk is due to the condition?

Attributable risk for leading direct causes of maternal mortality

Condition	Prevalence of condition	Odds Ratio (OR) or Relative Risk (RR) for maternal death	Attributable Risk (AR)
Eclampsia	0.07-0.19%	47	3.1-8%
Antepartum haemorrhage	1.2%	14.8	14.2%
Postpartum haemorrhage	2-5.3%	3.5	4.8-11.7%
Uterine rupture	0.11%	90	8.9%
Sepsis	0.09%	98.7	8.0%
Prolonged and obstructed labour (primiparous)	15.4%	2.6 (1.4-5.0)	19.8% (5-38.1)
Unsafe abortion	5.5%*	4 (2.6-6)	14% (8-22)

* Considering that 25% of all induced abortions are unsafe

Maternal morbidity

Maximum obstetric morbidity with stable prevalence across populations

Preeclampsia/eclampsia	4.4%
Early pregnancy bleeding	3.5%
Severe APH	1.2%
Severe PPH	5.3%
Retained placenta	2.3%
Uterine rupture	0.1%
Severe perineal tears	1.5%
Puerperal endometritis	4.1%

Obstetric Interventions

✓ Postpartum blood transfusion	0.6-1.1%
✓ Additional uterotonics for PPH	10-15%
✓ Episiotomy	30-82.6%
✓ Caesarean section:	2-24%

Conditions associated with pregnancy

Condition	Setting	Prevalence
Syphilis[1,2]	CUB SAA THA ARG	1.4%
	South Africa	4.9%
Parasitic infections[3]	Urban Guatemala	44%
HIV infection[2]	South Africa	24.5%
Anaemia in pregnancy[4,5]	Gambia	57.5%
	Latin America	6.3%
	CUB SAA THA ARG	7.6-8.7%
Severe anaemia postpart.[6] (<90 g/l)		

1. Lumbiganon, P. The epidemiology of Syphilis in pregnancy. 2001.
2. South Africa National Department of Health. National HIV and syphilis sero prevalence survey of women attending public antenatal clinics in South Africa. (Internet information on 17 May 2001 at web site http://196.36.153.56/doh/docs/reports/2000/hivreport.html).
3. Villar J.The Effect on fetal Growth of protozoan and helminthic infection during pregnancy. *Obstetrics and gynecology* 2001;**74**:915.
4. Walraven G.The burden of reproductive-organ disease in rural women in The Gambia, West Africa. *Lancet* 2001;**357**:1161-7.
5. Conde-Agudelo A. Maternal mortality and morbidity associated with interpregnancy interval: cross sectional study. *BMJ* 2000;**321**:1255-9.
6. Villar J. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet* 2001;**357**:1551-64.

Maternal morbidity

Pregnancy-related pathology among non-pregnant women (rural Gambia)

Overall burden of reproductive-organ disease* among all women	70.3% (66.8-73.6)
Damaged anal sphincter (all women)	3% (1.8-4.8)
Prolapse among all women	42.4% (36.3-48.8)
Infertility	9.8% (8.2-11.6)
Vesicovaginal fistula among all women	0.1% (0-0.8)

* menstrual disorders, infertility, difficulty controlling urine, dyspareunia, abnormal vaginal discharge, genital irritation, bad vaginal odour, ulcers.

Source: Walraven et al. Lancet, 2001;357:1161-7

Incidence of CS among nulliparous

Incidence Intrapartum Caesarean Delivery (%)

Head Circumference Quartiles	shortest			tallest
largest	53.2% n=269 rr=4.8	39.6% n=298 rr=3.6	32.6% n=267 rr=2.9	29.1% n=323 rr=2.6
	46.1% n=284 rr=4.2	25.6% n=347 rr=2.3	26.2% n=263 rr=2.4	20.8% n=303 rr=1.9
	26.6% n=304 rr=2.4	20.7% n=309 rr=1.9	18.0% n=278 rr=1.6	15.4% n=260 rr=1.4
smallest	23.9% n=347 rr=2.2	19.6% n=326 rr=1.8	16.7% n=228 rr=1.5	11.1% n=208 rr=1.0

Maternal Height Quartiles

Evidence-based care to reduce maternal mortality and morbidity

Philosophy

"What matters in health care is identifying and using interventions that have been shown by strong research evidence to achieve the best outcomes within available resources for everyone."

Fletcher R, Lancet 1999

UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction

DEPARTMENT OF REPRODUCTIVE HEALTH AND RESEARCH

The WHO Reproductive Health Library

No. 4

World Health Organization
Geneva, 2001

DEPARTAMENTO DE SALUD REPRODUCTIVA E INVESTIGACIONES CONEXAS

Biblioteca de Salud Reproductiva de la OMS

Nº 4

Organización Mundial de la Salud
Ginebra, 2001

Effective interventions to reduce maternal mortality/severe morbidity

Effective intervention		**Condition prevented/treated**
✓ Parenteral antibiotics	➡	Sepsis
✓ Parenteral uterotonics	➡	PPH
✓ Anticonvulsants	➡	Convulsions
✓ Removal of placenta and retained products	➡	PPH, abortion complications
✓ Assisted vaginal delivery and caesarean section	➡	Obstructed labour

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Intervention		Prevents / addresses
✓ Blood transfusion	→	PPH/severe anaemia
✓ Iron/folate	→	Postpartum anaemia
✓ Iodine	→	Cretinism
✓ Antiretrovirals	→	MTCT of HIV
✓ Malaria prophylaxis	→	LBW
✓ Support in labour	→	Clinical procedures, increases breastfeeding
✓ External cephalic version at term	→	Breech deliveries

- ✓ Screening and treatment of asymptomatic bacteriuria

Pyelonephritis,
Preterm birth

- ✓ Corticosteroids before preterm birth

Neonatal deaths

The problem of quality in maternal care
[evidence from Latin America and sub-Saharan Africa]

- Poor maternal health is not only a consequence of lack of services but also the limited quality of care of existing services
- Poor quality is due to lack of resources, inadequate humane treatment, insufficient information exchange and lack of technical competence