

**Table A: [As supplied by authors] Summary of intervention effectiveness on neonatal and maternal outcomes.**

No.	Intervention	Neonatal outcome(s)	Risk reduction on neonatal outcome(s)	Maternal outcome(s)	Risk reduction on maternal outcome(s)**	Reference(s)
<b>Primary-level health facility or Outreach care</b>						
1	Tetanus toxoid	Deaths from tetanus	90%			1-4
2	Screening for pre-eclampsia	Pre-term deaths	15%*	Deaths from hypertensive disorders during pregnancy	48%*	5-6, 30
3	Screening & treatment of asymptomatic bacteruria	Pre-term deaths	10%	Deaths from sepsis and cases of infertility	10%	6-8
4	Screening & treatment of syphilis	Deaths from severe infection & congenital abnormality	Depends on prevalence level. Low: <1%, moderate: 1-2%, high: 4-5%.			6, 9-11,30
5	Normal delivery by skilled attendant	Deaths from severe infection & tetanus	15% (severe infection) 60% (tetanus)	Deaths from sepsis	40%*	4,6, 12-14,30
6	Active management of the third stage of labour			Deaths from PPH & cases of anaemia	62%*	15
7	Initial management of post-partum haemorrhage			Deaths from PPH & cases of anaemia	75%*	15
8	Neonatal resuscitation	Deaths from asphyxia	38%			6, 16-18,30
<b>Referral care interventions at secondary or tertiary health care level</b>						
9	Treatment of severe pre-eclampsia/eclampsia	Deaths from asphyxia		Deaths from hypertensive disorders during pregnancy	59%	19-20
10	Antibiotics for pre-term premature rupture of membranes (pPROM)	Deaths from severe infection	6%			6, 21-23,30
11	Antenatal steroids for pre-term births	Pre-term deaths	38%			6, 24,30

No.	Intervention	Neonatal outcome(s)	Risk reduction on neonatal outcome(s)	Maternal outcome(s)	Risk reduction on maternal outcome(s)**	Reference(s)
12	Management of obstructed labour, breech & fetal distress (OL)	Deaths from asphyxia	40%	Deaths from obstructed labour & Cases of urinary incontinence and obstetric fistula	95%*	6, 25-28,30
13	Referral care for severe post-partum haemorrhage (PPH)			Deaths from PPH & cases of anaemia	75%*	15
14	Management of maternal sepsis			Deaths from sepsis & cases of infertility	90%*	29
15	Management of very low birth weight babies (vLBW)	Pre-term deaths	25%			6, 30
16	Management of severe neonatal infections	Deaths from severe infection	50%			6, 30
17	Management of severe neonatal asphyxia	Deaths from asphyxia	3%			6, 30
18	Management of neonatal jaundice	Deaths from jaundice as part of other causes of death	4%			6, 30
<b>Community newborn care</b>						
19	Support for breastfeeding mothers	Deaths from severe infection & diarrhoea	Region-specific see Table below			6, 31-37
20	Support for low birth weight babies	Pre-term deaths	40%			6, 30, 38-43
21	Community-based case management for neonatal pneumonia	Deaths from severe infection	40%			6, 30, 44-48

\*Based on expert panel assessment of available evidence

\*\*Impact is assumed to be the same for reduction in mortality and morbidity outcomes unless otherwise specified

**Table A continued: [As supplied by authors] Region specific effectiveness of breastfeeding promotion<sup>1</sup>**

Region	% mortality reduction attributable the intervention (through reduction of diarrhea and ARI mortality) Year 1		% reduction attributable the intervention (through reduction of all cause mortality) Year 2	
	% Total deaths	% female deaths	% Total deaths	% female deaths
	<b>50 % coverage</b>			
AfrD	12%	13%	19%	19%
AfrE	13%	14%	19%	19%
AmrB	10%	10%	20%	20%
AmrD	10%	12%	17%	17%
EmrB	15%	14%	37%	37%
EmrD	14%	11%	22%	22%
SearB	6%	7%	14%	14%
SearD	9%	9%	9%	9%
WprB	11%	15%	18%	18%
	<b>80% coverage</b>			
AfrD	12%	13%	21%	21%
AfrE	13%	15%	21%	21%
AmrB	11%	10%	11%	11%
AmrD	10%	12%	18%	18%
EmrB	17%	16%	39%	39%
EmrD	15%	13%	18%	18%
SearB	7%	8%	19%	19%
SearD	10%	10%	9%	9%
WprB	12%	18%	8%	8%
	<b>95% coverage</b>			
AfrD	12%	13%	21%	21%
AfrE	14%	15%	21%	21%
AmrB	11%	10%	7%	7%
AmrD	11%	12%	17%	17%
EmrB	17%	16%	39%	39%
EmrD	15%	13%	18%	18%
SearB	7%	7%	11%	11%

<sup>1</sup>Adam T and Lauer JA. Modeling of breastfeeding-attributable reductions in neonatal mortality, diarrhea, and pneumonia by region (unpublished). World Health Organization, 2004.

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**Table B-i: [As supplied by authors] Coverage of antenatal care, tetanus toxoid and institutional delivery for Afr-E and Sear-D in 2000**

Intervention (number)	Afr-E	Sear-D	Source
Antenatal care (ANC)	76%	50%	1-2
Tetanus toxoid	51%	77%	3
Institutional delivery (ID)	44%	28%	3

**Table B-ii: [As supplied by authors] Estimated coverage for remaining interventions in 2000**

Intervention	Estimated coverage*
<b>Antenatal care (ANC)</b>	
Screening & treatment of asymptomatic bacteriuria	ANC coverage x 0.2
Other ANC interventions	ANC coverage x 0.5
<b>Institutional delivery (ID)</b>	
Neonatal resuscitation	ID coverage x 0.2
Antibiotics for pPROM	ID coverage x 0.5
Referral care of neonatal sepsis	ID coverage x 0.7
Other skilled attendant & referral care interventions	ID coverage x 0.5

\* Based on expert panel estimates for effective coverage of these interventions in the base year (2000).

### References for Table B

1 UNICEF Global Database - Antenatal care: <http://www.childinfo.org/eddb/antenatal/database1.htm>

2 The State of the World's Children 2004: <http://www.unicef.org/files/Table8.pdf>

3 Weighted average for the WHO sub-region from the Demographic and Health Surveys (DHS): <http://www.measure>



**Table C: [As supplied by authors] Epidemiological sub-regions as applied in WHO-CHOICE**

WHO region	Mortality stratum	WHO Member States
Afr	D	Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Sao Tome And Principe, Senegal, Seychelles, Sierra Leone, Togo
Afr	E	Botswana, Burundi, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic Of The Congo, Eritrea, Ethiopia, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Amr	A	Canada, United States Of America, Cuba
Amr	B	Antigua And Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts And Nevis, Saint Lucia, Saint Vincent And The Grenadines, Tobago, Uruguay, Venezuela
Amr	D	Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru
Emr	B	Bahrain, Cyprus, Iran (Islamic Republic Of), Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, United Arab Emirates
Emr	D	Afghanistan, Djibouti, Egypt, Iraq, Morocco, Pakistan, Somalia, Sudan, Yemen
Eur	A	Andorra, Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
Eur	B	Albania, Armenia, Azerbaijan, Bosnia And Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Slovakia, Tajikistan, Republic Of Macedonia, Turkey, Turkmenistan, Uzbekistan, Yugoslavia
Eur	C	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine
Sear	B	Indonesia, Sri Lanka, Thailand
Sear	D	Bangladesh, Bhutan, Democratic People's Republic Of Korea, India, Maldives, Myanmar, Nepal
Wpr	A	Australia, Japan, Brunei Darussalam, New Zealand, Singapore
Wpr	B	Cambodia, China, Lao People's Democratic Republic, Malaysia, Mongolia, Philippines, Republic Of Korea, Viet Nam, Cook Islands, Micronesia (Federated States Of), Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu

**Table D: [As supplied by authors] Data sources for causes of death and incidence, prevalence, remission and case-fatality of associated sequelae included in the effectiveness model**

Cause of death	Associated sequelae	Source
<b>Neonatal outcomes</b>		
Tetanus	Not included	GBD 2000, Version 3
Infection	Not included	GBD 2000, Version 3
Asphyxia	Not included	GBD 2000, Version 3
Diarrhea	Not included	GBD 2000, Version 3
Congenital	Not included	GBD 2000, Version 3
Preterm	Not included	GBD 2000, Version 3
<b>Maternal outcomes</b>		
Post-partum haemorrhage	Severe post-partum anaemia	GBD 2000, Version 3
Maternal sepsis	Infertility due to sepsis	GBD 2000, Version 3
Hypertensive disorders during pregnancy	Not included	GBD 2000, Version 3
Obstructed Labour	Urinary incontinence	GBD 2000, Version 3
	Obstetric fistula	GBD 2000, Version 3

**Table E: [As supplied by authors] Main assumption on resources used for patient costs**

No.	Intervention	Description	Number of visits/ bed days <sup>1</sup>	Regimen as applicable
<b>Primary-level care including outreach</b>				
	<i>Selected antenatal interventions</i>	<i>Combination of Interventions 1-4, including history &amp; physical examination, plus referral in case of any complication.(Referral costs included in referral care interventions)</i>	3 outpatient/outreach visits	See below
1	Tetanus toxoid	Two tetanus toxoid immunizations	2 visits	Two tetanus toxoid immunizations
2	Screening for pre-eclampsia	Blood pressure measurement for all pregnant women and urine examination for proteinuria and pre-referral care of pre-eclampsia and eclampsia	3 visits	
3	Screening & treatment of asymptomatic bacteruria	Screening of urine of all pregnant women at antenatal visits and treatment of identified cases with amoxicillin.	1 visit	amoxicillin 500 mg TID orally for 3 days.
4	Screening & treatment of syphilis	Screening of all pregnant women by RPR test and treatment of identified cases of syphilis with benzathine penicillin.	1 visit	benzathine penicillin 2.4 million units (MU) injection
	<i>Skilled maternal and immediate newborn care package</i>	<i>Combination of Interventions 5 to 8. Includes general examination and recognition of delivery complications like obstructed labour, pre-eclampsia and immediate referral as appropriate.</i>	See below	See below
5	Normal delivery by skilled attendant	Includes safe delivery, cord care, identification of complications, first aid and referral of complicated cases		
6	Active management of the third stage of labour	Administration of a prophylactic oxytocic, cord clamping and delivery of the placenta by controlled cord traction		Inj Oxytocin 10 IU IM
7	Initial management of post-partum haemorrhage	Management of postpartum haemorrhage (PPH) with additional	3 inpatient days (secondary level hospital) for all	IV fluids, oxytocin, manual removal of

No.	Intervention	Description	Number of visits/ bed days <sup>1</sup>	Regimen as applicable
8	Neonatal resuscitation	oxytocin, uterine massage, manual removal of placenta, repair of lacerations and management of shock. Detection of breathing problems and where required resuscitation of the newborn.	referred cases – assumed to be 20% of all cases with PPH.	placenta, suturing of genital lacerations
<b>Referral-level care</b>				
9	Treatment of severe pre-eclampsia/eclampsia*	Inpatient care including airway management, treatment with magnesium sulphate, antihypertensives and birth care when undelivered	3 bed days for eclampsia and severe pre-eclampsia plus referral costs	initial dose of MgSO <sub>4</sub> (20%) 4 g IV or 2 x IM injections 5 g MgSO <sub>4</sub> (50%). Then IM injection 5 g of MgSO <sub>4</sub> (50%) every 4 hours until delivery (assume 1.5 days, i.e., 9 injections). Assume that 75% of severe PIH/eclampsia cases also require antihypertensives using nifedepine 10 mg 8-hourly for 3 days.
10	Antibiotics for pre-term premature rupture of membranes (pPROM)*	Administration of oral antibiotics to women with pre-term prelabour rupture of membranes and care during labour.	1 visit for diagnosis then referral, 3 inpatient days and assume vaginal delivery. Referral costs included.	erythromycin 250 mg QID orally.
11	Steroids for pre-term births*	Administration of antenatal and intrapartum steroids and inpatient care of women with suspected preterm labour	1 visit for diagnosis than referral, 3 inpatient days and assume vaginal delivery. Referral costs included.	betamethasone 12 mg BID injection 24 hours apart to all women in preterm labour.
12	Management of obstructed labour, breech and fetal distress (OL)*	External cephalic version for breech presentation. Management of obstructed labour, persistent breech presentation and fetal distress by operative delivery (vacuum extraction, forceps and vaginal breech delivery, and Caesarean section).	Assume 15% require referral and 5% Caesarean section (CS). All CS take prophylactic antibiotics. 1/3 requiring CS stay for 3 days and remaining 2/3 stay 2 days (primary	ampicillin 2 g injection.

No.	Intervention	Description	Number of visits/ bed days <sup>1</sup>	Regimen as applicable
			hospital). Incidence of shock, hysterectomy and blood transfusion was 0.005. referral costs included	
13	Management of severe post-partum haemorrhage (PPH)*	Inpatient care of post-partum haemorrhage, including blood transfusion, treatment for shock and hysterectomy.		
14	Management of maternal sepsis*	Inpatient care of maternal sepsis including treatment with intravenous/intramuscular antibiotics.	7 inpatient days (primary hospital)-include diagnosis visit and referral costs	ampicillin 2 gm QID injection and gentamicin 160 to 240 mg injection OD plus metronidazole 500 mg Q8H . IV fluids: 4 L of Normal Saline.
	<i>Emergency neonatal care (ENC)</i>	<i>Combination of Interventions 20 to 23.</i>	See below	See below
15	Management of very low birth weight babies*	Inpatient care for very low birth weight babies including special feeding support, additional warmth, close monitoring and treatment with oxygen if necessary	5 inpatient days (secondary hospital) , % of babies admitted vary by region-include diagnosis visit and referral costs	oxygen for 2 days.
16	Management of severe neonatal infections*	Inpatient care for severe neonatal infections including treatment with intravenous antibiotics	7 days (primary hospital) for 8% of babies--include diagnosis visit and referral	ampicillin 75 mg TID injections plus gentamicin 10 mg BID injections and assume weight of 3.5-4 kg
17	Management of severe neonatal asphyxia*	Inpatient care for neonatal encephalopathy including treatment with oxygen	5 inpatient days (secondary hospital) for 1% of babies-include diagnosis visit and referral	
18	Management of neonatal jaundice*	Inpatient care for severe neonatal jaundice including phototherapy	4 inpatient days (secondary hospital) for 1% of babies-include diagnosis visit and referral costs	phototherapy using light bulbs for 2 days, blood transfusion (average 100 cc) for 20.1% of all babies.
<b>Community-based newborn follow up care</b>				
	<i>Community-based newborn package</i>	<i>Combination of interventions 19 and 20. based on home visits, including education</i>	1 antenatal home visit and 2 postnatal visits of 1 hour each	

No.	Intervention	Description	Number of visits/ bed days <sup>1</sup>	Regimen as applicable
		for birth preparedness and improved care-seeking, provided by skilled care providers and community health workers	for all pregnant/deliveries. Additional 2 visits (1 hour each) for LBW babies (incidence vary by region)	
19	Support for breastfeeding mothers	Home visits to promote early and exclusive breastfeeding provided by skilled care providers and community health workers	3 home visits (1 hour each)	
20	Support for low birth weight babies	Home visits for low birth weight babies to promote extra warmth and support for breastfeeding mothers provided by skilled care providers and community health workers	4 postnatal home visits (1 hour each) targeting LBW babies (incidence vary by region)	
21	Community-based case management for neonatal pneumonia	Home visits for diagnosis and management of pneumonia in neonates and treatment with oral antibiotic therapy provided by community health workers.	2 home visits by community health worker	cotrimoxazole 10 mg BID orally for 5 days.

1. <sup>1</sup> unit costs are based on WHO-CHOICE estimates (Adam T, Evans DB, Murray CJL. Econometric estimation of country-specific hospital costs. *Cost Eff Resour Alloc* 2003;1:3.

\* includes transportation costs for referral-level care