



Science in Action: Saving 4 million lives a year

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Science in Action Acknowledgments



Editorial team

Mary Kinney, Joy E Lawn, Kate Kerber

Core team

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Wider team

Over 60 scientists mainly in Africa have contributed and reviewed

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Outline for presentation



1. Interventions to reduce maternal, neonatal, and child mortality
2. Lives Saved Tool (*LiST*)
3. How many lives can be saved with achievable coverage in different health system contexts?
4. How many lives could be saved if essential MNCH interventions were at 90% coverage?
5. What are the steps from evidence to action?

Based on 5 questions

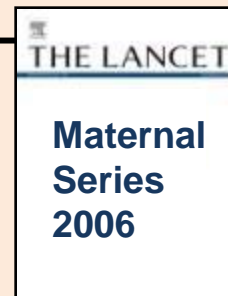
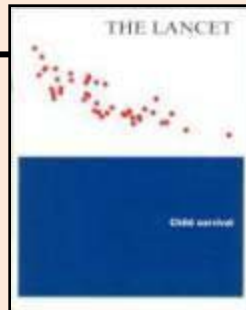
Question 1.

What are the evidence-based interventions to reduce maternal, newborn and child deaths?



Proven interventions

	Lancet Child Survival series (2003)	Lancet Newborn Series (2005)	Lancet Maternal Survival Series (2006)	Lancet Nutrition Series (2008)
Evidence base	Comprehensive reviews	Community based interventions review	Literature & Program review Few RCTs	Literature & Program review RCTs & observational studies
Focus	Under 5 child survival	Newborn deaths	Maternal deaths & morbidity	Child & maternal outcomes
Included	23 interventions reviewed	16 newborn interventions	120 interventions considered	45 interventions



What to do with all of these proven interventions?

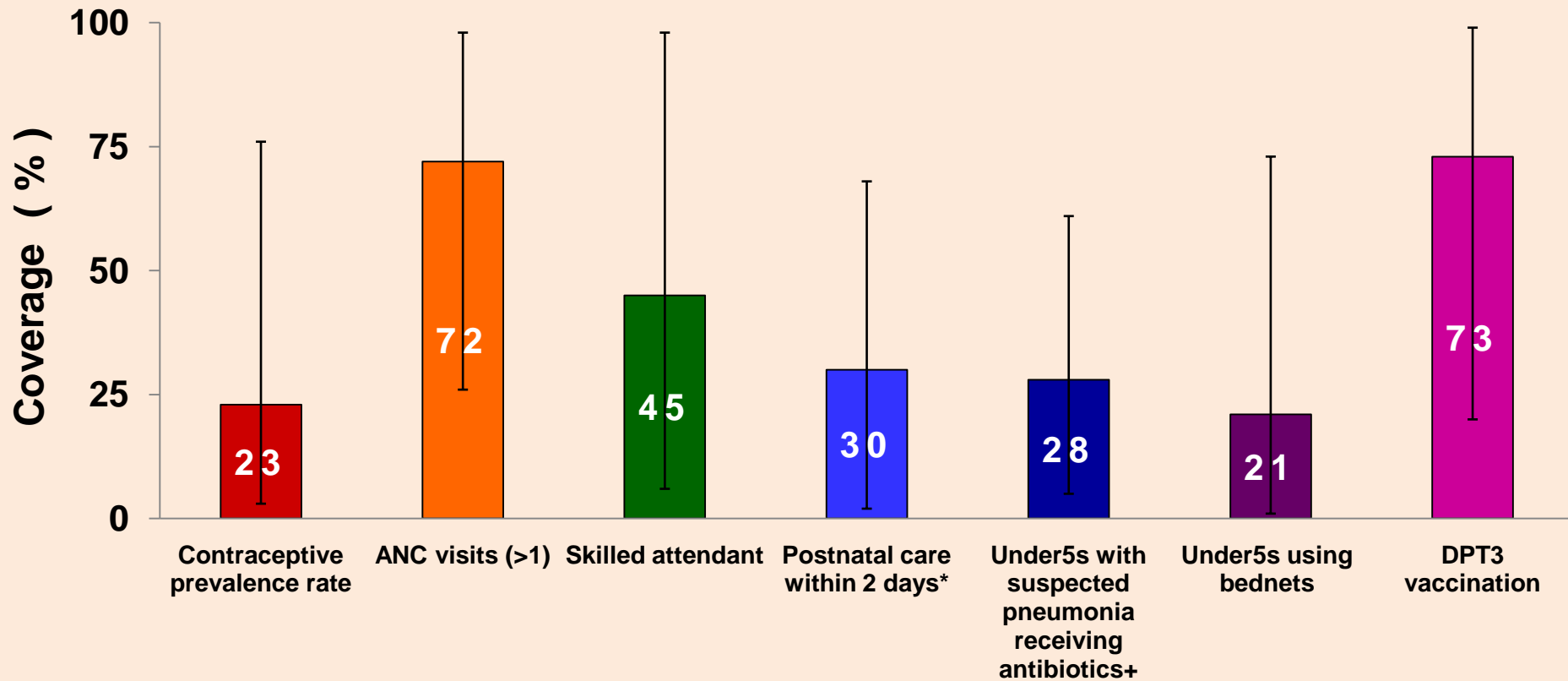
1. Currently variable implementation
2. Major funding in “vertical” approaches
3. Governments and health systems are being pulled in multiple directions

Package interventions and strengthen existing programmatic platforms to reach high coverage.

A paradigm shift to MNCH continuum of care



Variable coverage along the continuum of care

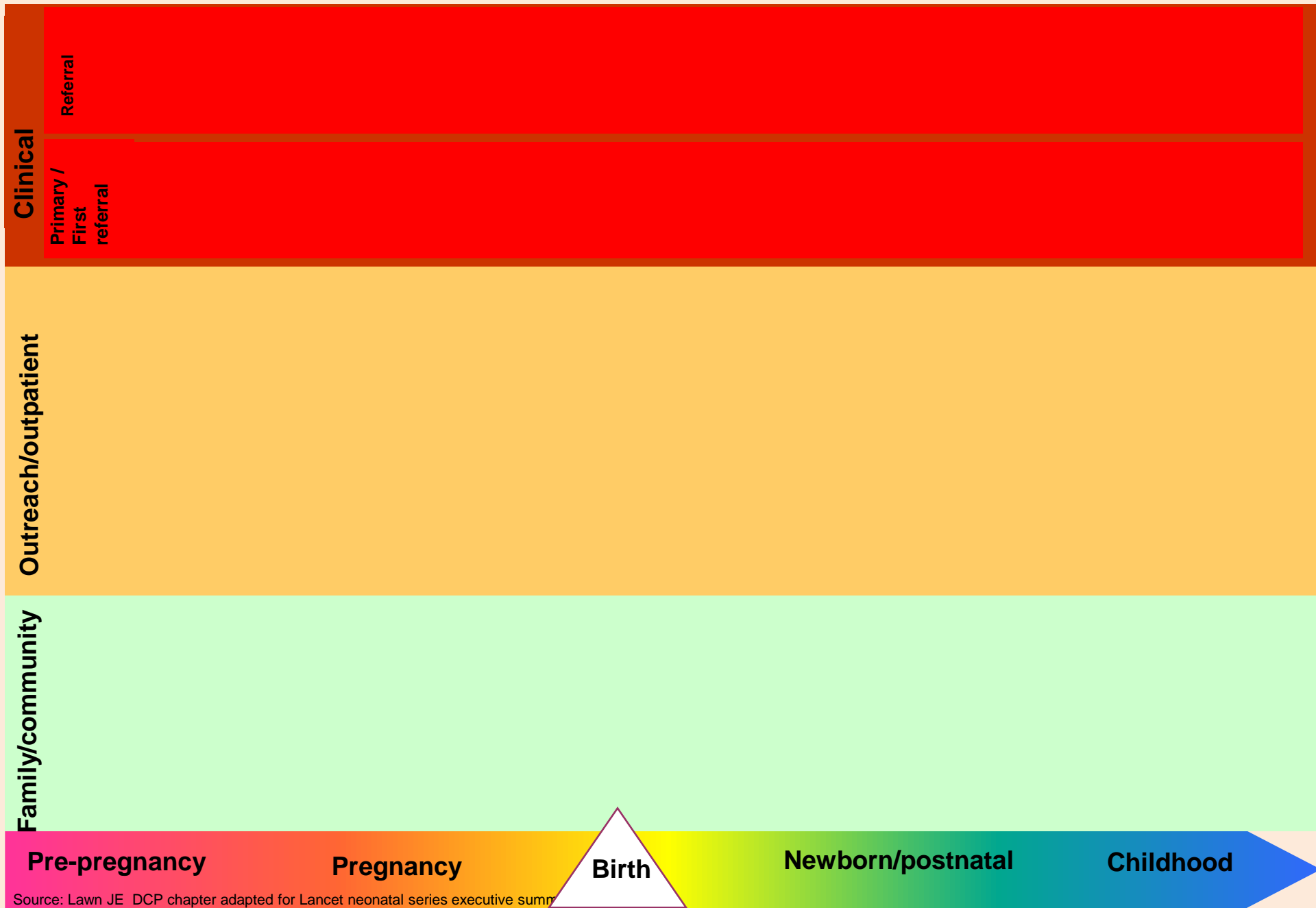


Ref: Science in Action – Saving the lives of Africa’s mothers, newborns and children. ASADI 2009. Eds Kinney MV, Lawn JE, Kerber KJ

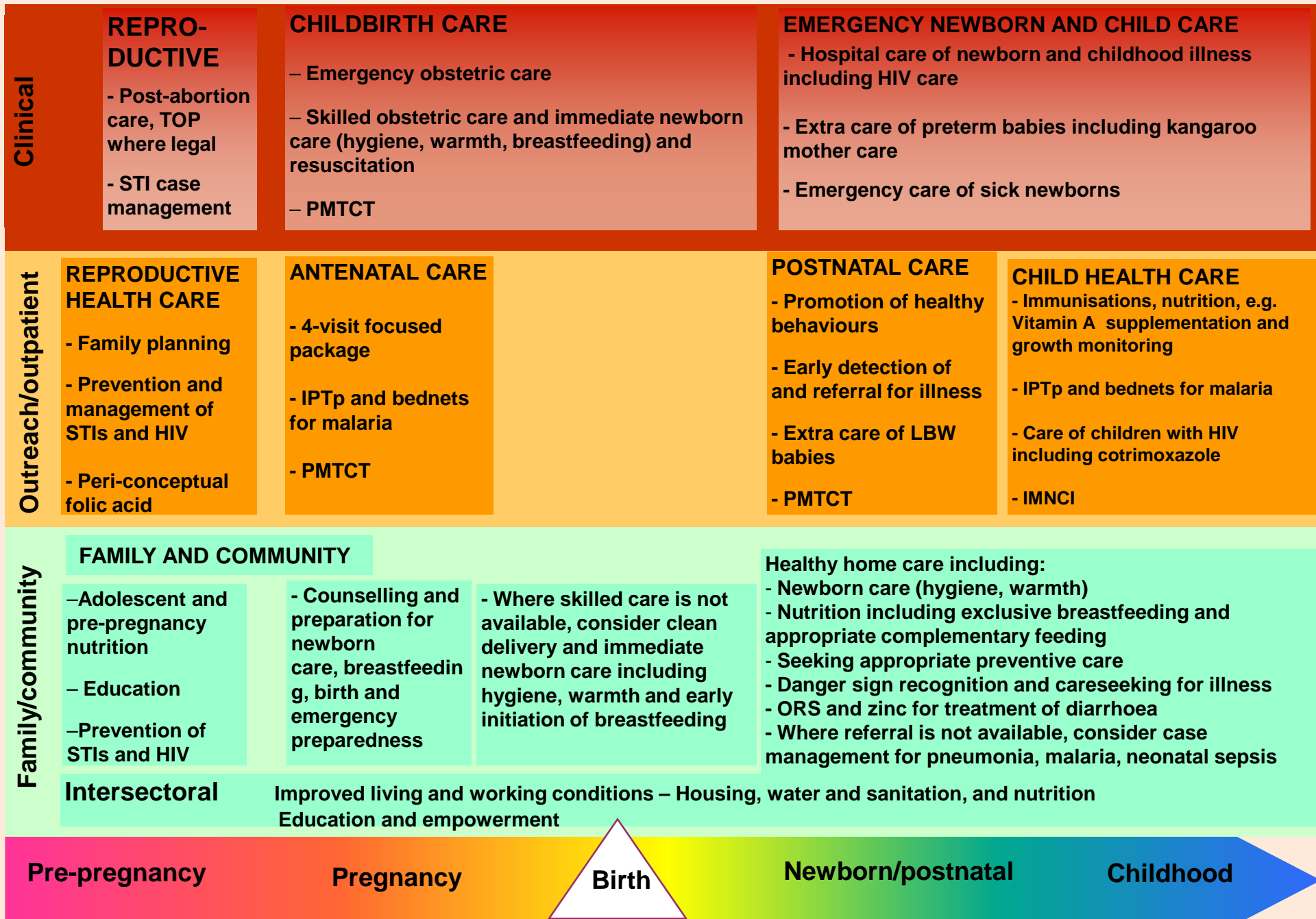
Data sources: Current coverage data based on UNICEF data bases and other sources

The bars signify the range between countries with the lowest and highest coverage

Delivery of interventions



Integrated maternal, newborn, and child health packages





Current situation....

- Difficult to maximize all interventions in low-resource settings
- Health systems vary and local context matters
 - Epidemiology
 - Health system performance
 - Funding opportunities and constraints
- Need to use scientific approach to prioritize interventions

Question 2.

**The Lives Saved Tool
(*LiST*) - what
interventions would have
the greatest impact on
mortality and what would
they cost?**





LiST - what does it do?

- Predicts lives saved by various interventions for
 - Causes of death for women, newborns, children
 - Under 5 mortality
 - Maternal mortality
- Data included for 68 priority countries
 - Data for numbers, rates and causes of death
 - Data for coverage of interventions
 - Eg facility birth, immunisation, ORS etc.
 - Global effect sizes of interventions based on systematic reviews and the best available evidence



LiST - Design

- Program planning and prioritization tool for MoH and partners to estimate mortality reduction and cost of interventions
- Freely downloadable, user-friendly interactive software as *LiST* module added to existing planning software (Spectrum)
 - DemProj – module used for 20 years for population modeling
 - AIM - UNAIDS lives saved module for all HIV/AIDS interventions



LiST - How does it work?

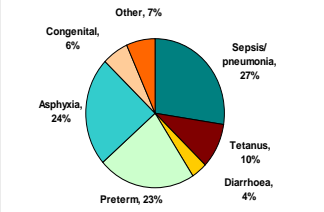
- User sets yearly coverage targets for each intervention starting from the most recent data
- Coverage is linked to a mortality effect on a specific cause of death (mothers, newborns, children)
- Cohort-based model
 - Lives cannot be saved multiple times
 - eg. by both preventive and curative interventions
 - Risk factors are included
 - eg. nutrition, breastfeeding
- Cost for increased intervention coverage can be calculated

Eg *LiST* modeling for neonatal lives saved

For each country

Number of neonatal deaths by cause

CHERG/ UN estimates of cause of death



Impact on NMR

Effectiveness based on systematic reviews

Systematic reviews in process at Int Journal of Epidemiology

Coverage targets change by year

Difference between current coverage and target coverage for each intervention

Numbers of lives saved

Numbers of neonatal lives saved added up after each intervention is applied, avoiding double counting of lives saved

Which interventions are included?

DIRECT

- Peri-conceptual
- Pregnancy
- Childbirth
- Early postnatal
- Child preventive
- Child curative

INDIRECT

- Nutritional
- Water and sanitation
- Contraception

NOT INCLUDED - income, education and crowding, etc

LiST menu for neonatal – Direct effects

EasyLiST - ug 1

Configure years

	On/Off	Start: 2009	Target: 2015
Pregnancy			
Antenatal care	<input type="checkbox"/>	40.0	62.8
Case management during pregnancy	<input type="checkbox"/>	40.0	62.8
Syphilis detection and treatment	<input type="checkbox"/>	20.0	31.4
Calcium supplementation	<input type="checkbox"/>	0.0	22.8
Pregnant women protected via IPT or sleeping under an ITN	<input type="checkbox"/>	0.0	73.8
Tetanus toxoid	<input type="checkbox"/>	78.0	90.0
Balanced energy supplementation (maternal)	<input type="checkbox"/>	0.0	30.0
Multiple micronutrient supplementation (maternal)	<input type="checkbox"/>	0.0	30.0
Case management of malaria (clinic)	<input type="checkbox"/>	0.0	22.8
Case management of malaria (hospital)	<input type="checkbox"/>	0.0	22.8
Child birth			
Basic data (for calculating coverage of delivery interventions)			
Institutional delivery (clinic and hospital)	<input type="checkbox"/>	37.0	53.2
Skilled birth attendance (SBA)	<input type="checkbox"/>	39.0	55.2
At onset of labour or risk of onset			
Antenatal corticosteroids for preterm labor	<input type="checkbox"/>	7.4	26.6
Antibiotics for pPROM	<input type="checkbox"/>	18.5	39.9
Institutional delivery (clinic and hospital)			
Essential care for all women and immediate essential newborn care	<input type="checkbox"/>	18.5	13.3
Basic emergency obstetric care (clinic)	<input type="checkbox"/>	11.1	8.0

Child deaths

ug 1	
Total (0-60 months)	
<1 month	
1-5 months	
6-11 months	
12-23 months	
24-59 months	
Base projection - No coverage	
Total (0-60 months)	
<1 month	
1-5 months	
6-11 months	
12-23 months	
24-59 months	

Periconceptual

- Folic acid fortification /supplementation

Pregnancy

- Tetanus toxoid
- Syphilis detection/case mx

Childbirth – facility

- Skilled attendance
- BEmOC
- CEmOC
- Neonatal resus
- Antenatal steroids
- Antibiotics for PROM

Childbirth - home

- Clean delivery
- Simple immediate newborn care
- Resuscitation

Postnatal

- Preventive postnatal care practices

Curative outpatient

- Infections case management (oral)
- Infections case management (injection)
- ORS

Curative inpatient

- Kangaroo mother care
- Neonatal illness full case management

LiST menu for neonatal - Indirect effects

EasyLiST - ug 1

Configure years

	On/Off	Start: 2009	Target: 2015
Pregnancy			
Antenatal care	<input type="checkbox"/>	40.0	62.8
Case management during pregnancy	<input type="checkbox"/>	40.0	62.8
Syphilis detection and treatment	<input type="checkbox"/>	20.0	31.4
Calcium supplementation	<input type="checkbox"/>	0.0	22.8
Pregnant women protected via IPT or sleeping under an ITN	<input type="checkbox"/>	0.0	73.8
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Balanced energy supplementation (maternal)	<input type="checkbox"/>	0.0	30.0
Multiple micronutrient supplementation (maternal)	<input type="checkbox"/>	0.0	30.0
Case management of malaria (clinic)	<input type="checkbox"/>	0.0	22.8
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Child deaths

ug 1

Total (0-60 months)
<1 month
1-5 months
6-11 months
12-23 months
24-59 months
Base projection - No coverage
Total (0-60 months)
<1 month
1-5 months
6-11 months
12-23 months
24-59 months

Nutrition (thru IUGR)

- Balanced protein energy nutrition
- Multiple micronutrient supplementation

Malaria (thru IUGR)

- IPTp

PMTCT (thru AIM module)

Contraception (thru FP module)



LiST costing module

- Considers the type and amount of drugs, supplies, and personnel time required for each intervention
- Uses standard WHO protocols and expert opinion
- Data from UNICEF, MSH, and WHO CHOICE

Question 3.

How many lives can be saved in different health system contexts with achievable coverage?





Saving lives with achievable coverage increases

- Three categories of health system context based on coverage of skilled birth attendance:

Low	→	skilled birth attendance < 30%
Middle	→	skilled birth attendance 30-60%
High	→	skilled birth attendance > 60%

Nine example countries – health system context based on skilled attendance



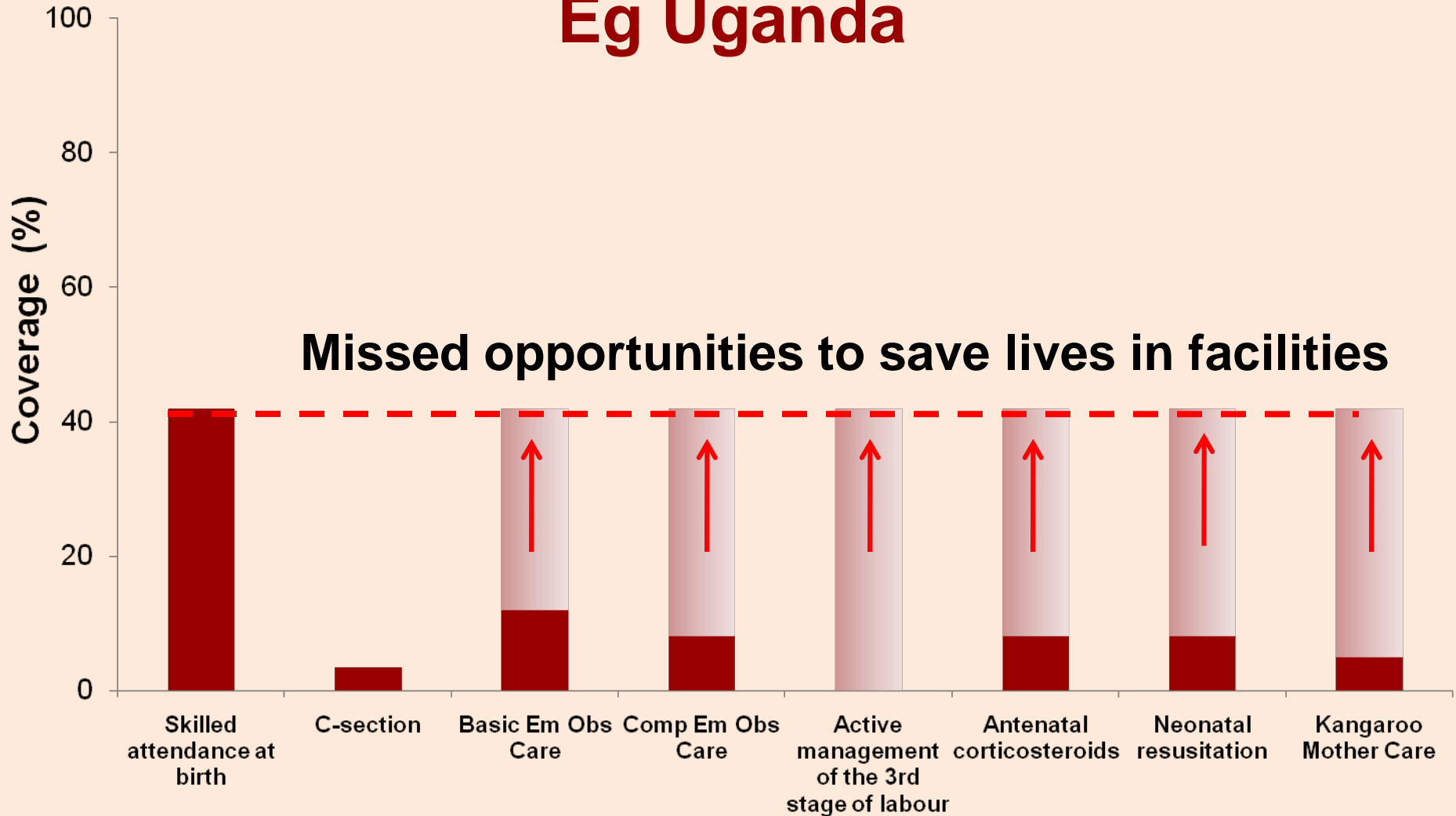
	Coverage of skilled attendance at birth		
	Countries with <30% coverage	Countries with 31-60% coverage	Countries with >60% coverage
Where do the nine example countries currently fit in?	Ethiopia and Northern Nigeria	Ghana, Kenya, Senegal, Uganda and Tanzania	Cameroon, South Africa and Southern Nigeria
Total number of annual maternal, newborn, and child deaths	1,140,000	724,000	528,000

51 % of all MNC deaths in sub Saharan Africa

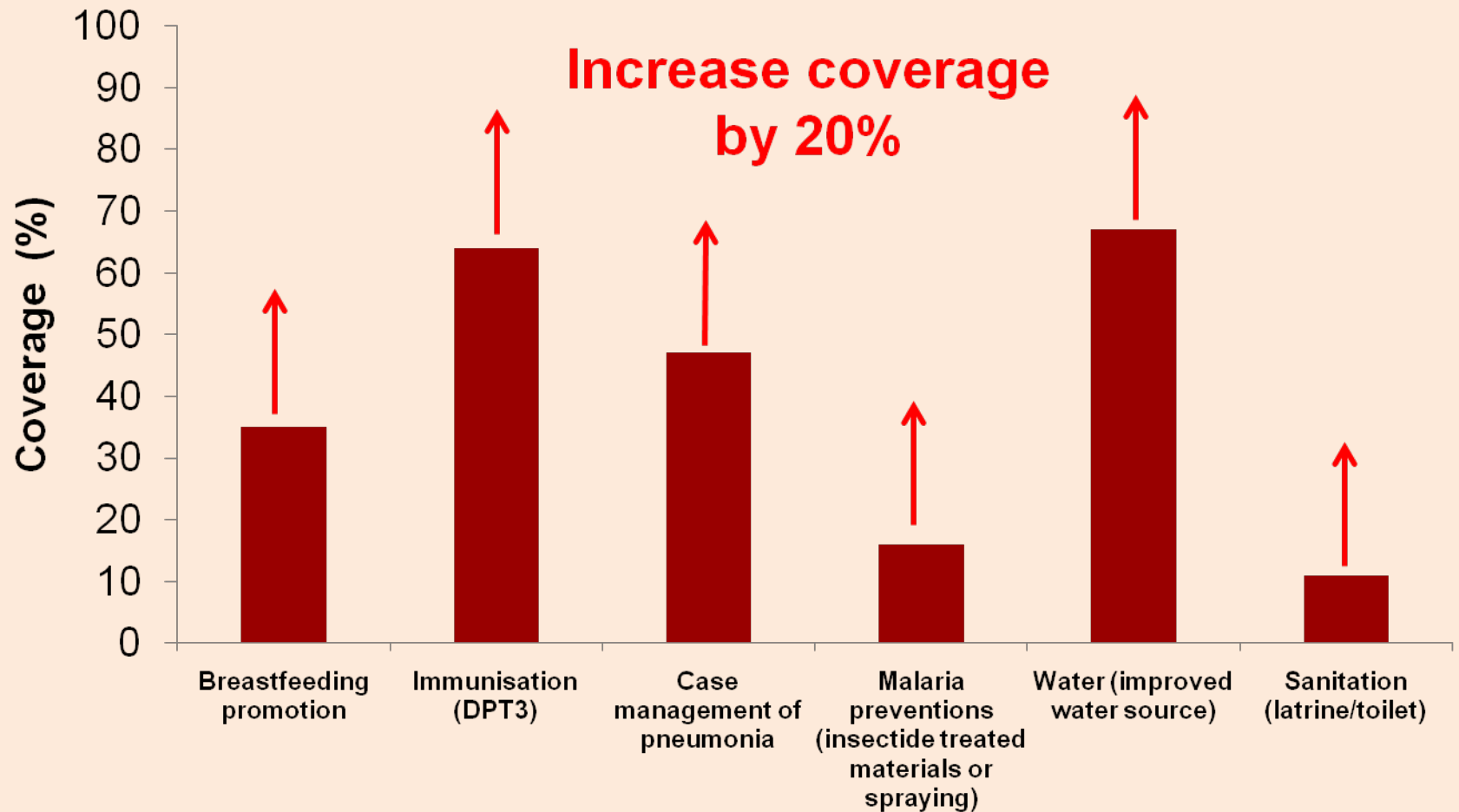
Births already happening in facilities

QUALITY GAPS = MISSED OPPORTUNITIES

Eg Uganda



Analysis of lives saved with achievable coverage increases - part 2 outreach/community level Uganda example



Outreach/community interventions - feasible (20%) increases



Low health system context

Egs. Ethiopia and Northern Nigeria

Situation: low coverage levels and a lack of supplies

Maternal

Contraception prevalence		
Active case management of 3 rd stage of labor	16,200 lives saved (38% reduction)	US\$ 0.17 per capita

Newborn

Tetanus toxoid		
Preventative postnatal care Oral antibiotics for neonates	24,000 lives saved (8% reduction)	US\$ 0.03 per capita

Child

Breastfeeding improvements Vit A		
Malaria prevention Vaccines Child curative	188,700 lives saved (25% reduction)	US\$ 0.57 per capita



Mid health system context

Egs. Ghana, Kenya, Senegal, Tanzania, Uganda

Situation: constraints on supply of outreach and quality of care within health facilities with barriers preventing demand of services

Maternal

Comprehensive
emergency obstetric
care

8,300 lives saved
(19% reduction)

US\$ 0.29 per capita

Newborn

Antenatal steroids,
neonatal resus,
Kangaroo mother care,
injectable antibiotics

42,300 lives saved
(22% reduction)

US\$ 0.42 per capita

Child

Nutrition and hygiene
Malaria prevention
Vaccines
Child curative

174,800 lives saved
(47% reduction)

US\$ 1.60 per capita



High health system context

Egs. Cameroon, South Africa, Southern Nigeria

Situation: Coverage of basic health packages is high but quality is often lacking

Maternal

Comprehensive emergency
obstetric care
Antenatal coverage

5,400 lives saved
(15% reduction)

US\$ 0.11 per capita

Newborn

Antenatal steroids, neonatal
resus, Kangaroo Mother Care,
preventative postnatal care,
case management of illness

46,800 lives saved
(34% reduction)

US\$ 0.80 per capita

Child

Nutrition and hygiene
Malaria prevention
Vaccines
Child curative

83,200 lives saved
(29% reduction)

US\$ 1.21 per capita

Lives saved with achievable coverage increases



Coverage of skilled attendance at birth:

	Countries with <30% coverage	Countries with 31-60% coverage	Countries with >60% coverage	Total for all 9 countries
9 example countries	Ethiopia Northern Nigeria	Ghana, Kenya Senegal, Uganda Tanzania	Cameroon South Africa Southern Nigeria	
Total maternal, newborn, and child lives saved	344,400	263,300	162,200	769,800
Percentage of maternal, newborn, and child deaths			21%	32%

770,000 million lives saved





Priority strategies for each health system context

- **Low health system context:**
 - Increase coverage levels of community/outreach interventions and supplies while strengthening facility based care
- **Middle health system context:**
 - Improve quality of care in health facilities while increasing demand and reach full coverage of community/outreach interventions
- **High health system context:**
 - Improve quality and equity of care in health facilities and increase complexity of community/outreach interventions

Question 4.

How many lives could be saved if essential MNCH interventions were implemented in all of Africa?



Lives saved with 90% coverage



Coverage of skilled attendance at birth:

	Countries with <30% coverage	Countries with 31-60% coverage	Countries with >60% coverage	Total for all countries
	3 countries plus Northern Nigeria	25 countries	13 countries plus Southern Nigeria	42 countries
Total maternal, newborn, and child lives saved	1,017,600	1,956,700	1,005,600	3,979,900
Percentage of maternal, newborn, and child deaths avoided	81%	89%	83%	85%

Nearly 4 million lives saved





Priorities based on evidence

- **Make childbirth wanted and safe**
 - Skilled care at birth and emergency obstetric care if required
- **Give newborn babies a healthy start**
 - Providing effective care at birth, promotion of breastfeeding, antenatal steroids and KMC for preterm babies
- **Prevent infections**
 - Treated nets and IPTp/I for malaria, PMTCT, nutrition, immunisation, and hygiene
- **Manage infections**
 - Case management through IMCI

Question 5

What are the steps to action?





Actions

- Invest and track resources
- Implement and apply current knowledge to carry out policies and programmes equitably
- Innovate and develop new research and new technologies
- Inform - use evidence as a basis for health policy and resource allocation



Who needs to act?

- **Government** (Ministry of Health and Ministry of Finance)
- Health policy planners and implementers
- Health care professionals
- Development partners
- Academies of science and researchers
- Civil society and communities



Actions for researchers

- Invest in the right research using systematic priority setting
- Implement effective research strategies that inform health systems
- Involve stakeholders in the process of priority setting
- Share knowledge with policy makers and program implementers



Conclusions

- Many proven interventions that can be combined into maternal, neonatal, child service packages
- Health system strength and local context are critical re what is feasible to deliver
- *LiST* useful to support priority setting
- With modest increases in intervention coverage there can be substantial reductions in deaths
- With high coverage up to 4M deaths could be averted annually