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The Lancet's Stillbirth Series

Presenter name

Title

Location of presentation

Date

On behalf of *The Lancet'sStillbirth* Series Steering Committee

The Lancet's Stillbirth Series 6 papers

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1. Invisibility of stillbirth: Making the unseen seen
2. Information on making stillbirths count: Where? When? Why?
3. Interventions: evidence on what works
4. Implementation: integrated care has triple
5. High-income settings: priority actions
6. 2020 vision: goals and research priorities

All papers can be accessed free at www.thelancet.com/series/stillbirth

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The Lancet's Stillbirth Series

Research articles (2)

- Stillbirth rate estimate and trends for 193 countries
- Risk factors for stillbirth in high-income countries

Commentaries (8)

- Lancet editors
- Parent's perspective
- Professionals' perspective and commitment
- Including stillbirths in family health
- Stillbirth estimates
- Stillbirth risk factors
- Inequalities in stillbirth
- Stillbirth and reproductive rights

Executive summary – also available in French and Italian

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The team

- 69 authors from 18 countries
- Over 50 partner organizations
- Funding by all the partners, with The Bill & Melinda Gates Foundation as the main funder

The Lancet's Stillbirth Series Steering committee

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Name	*Affiliation*
J Frederik Frøen	Norwegian Institute of Public Health and International Stillbirth Alliance, Norway
Joy E. Lawn	Saving Newborn Lives/Save the Children, South Africa
Zulfiqar A. Bhutta	Division of Women and Child Health, Aga Khan University, Pakistan
Robert Pattinson	Medical Research Council and University of Pretoria, South Africa
Vicki Flenady	International Stillbirth Alliance and Mater Medical Research Institute, Australia
Robert L Goldenberg	Department of Obstetrics and Gynecology, Drexel University, USA
Monir Islam	Family Health and Research, WHO Regional Office for South-East Asia

Special thanks to **Zoë Mullan, Senior Editor at *The Lancet* and Mary Kinney, International Stillbirth Alliance consultant**

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Definition of stillbirth

- In the Series, stillbirth refers to all pregnancy losses after 22 weeks of gestation.
- WHO definition of stillbirth is a birthweight of at least 1000 g or a gestational age of at least 28 weeks (third trimester stillbirth).
- New stillbirth estimates for 193 countries using WHO definition
- In some high-income countries other definitions are used

If high-income country stillbirth definitions were used for all countries then the global total would be about 45% higher

Stillbirths 1

Stillbirths: why they matter

J Frederik Frøen, Joanne Cacciatore, Elizabeth M McClure, Oluwafemi Kuti, Abdul Hakeem Jokhio, Monir Islam, Jeremy Shiffman, for The Lancet's *Stillbirths Series steering committee**

In this first paper of *The Lancet*'s Stillbirths Series we explore the present status of stillbirths in the world—from

Published Online

Paper 1: Stillbirth visibility What is new?

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- Two web-based surveys of health professionals from 135 countries and parents from 32 countries regarding perceptions of stillbirth
- Review of current global policy
- Socio-political analysis of who "owns" stillbirths
- Suggestions for how stillbirths could gain more visibility

Source: Frøen JF, Cacciatore J, McClure EM, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: why they matter. Lancet 2011; published online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Perceptions of the stillborn baby and mother

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- Stillborn babies do not get societal or family recognition - rarely named, have funeral rites or are held or dressed by the mother
- One in four stillborn babies is not seen by either the mother or her family
- Nearly one third of stillbirths are attributed to the mother's sins or evil spirits
- Many people believe that stillbirth is a natural selection process and that the baby was not destined to live
- Two of every three stillbirths occur where there is no proper public understanding about stillbirths and where no national or international institution guides

Source: Frøen JF, Cacciatore J, McClure EM, et al, for the Lancet's Stillbirths Series steering committee. Stillbirths: why they matter. Lancet 2011; published online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Perceptions of the stillborn baby and mother

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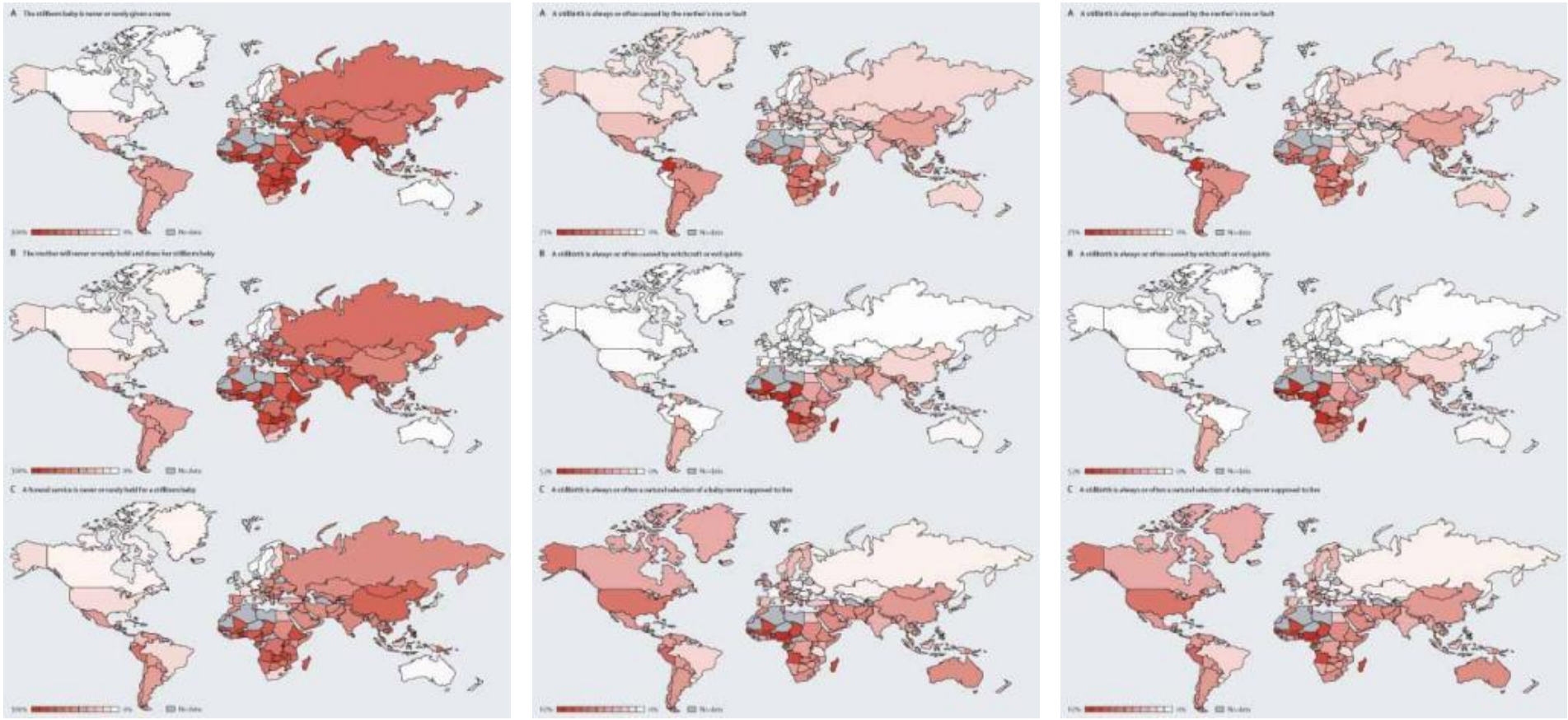

Source: Frøen JF, Cacciatore J, McClure EM, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: why they matter. Lancet 2011; published online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Stillbirth is a marker of development and women's status

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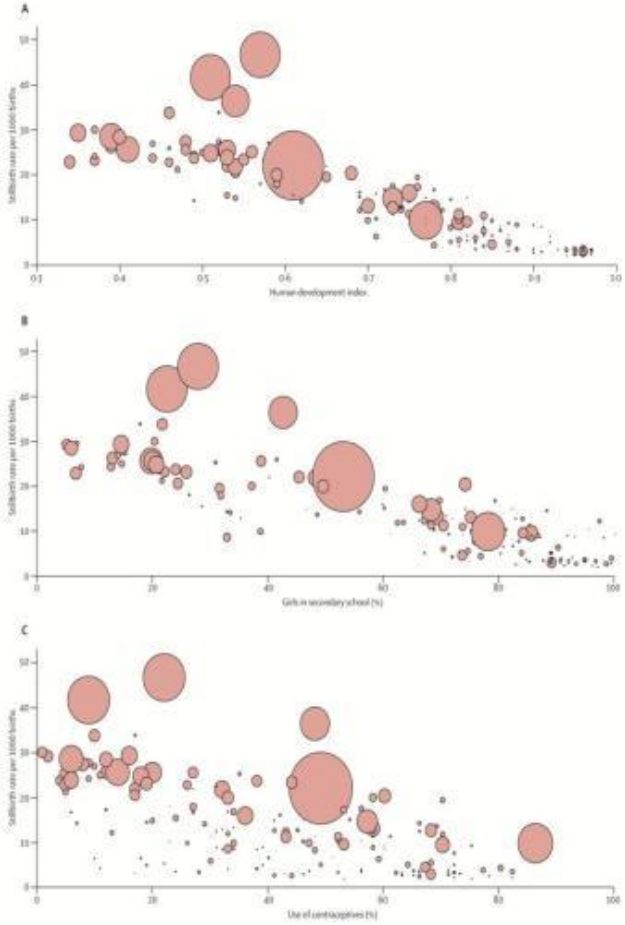
Stillbirth rates inversely correlate with:

- **The wealth and development of nations**
- **Secondary education**
- **Reproductive control, such as the use of contraceptives**



Source: Frøen JF, Cacciatore J, McClure EM, et al, for The Lancet's Stillbirths Series steering comm hed online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Addressing the void of ownership for stillbirths

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- In global efforts in maternal health, the woman's own aspiration of a live baby is missing from the world's health agenda

- Newborn survival gets more attention, especially by representing 41% of the MDG 4 target

- Stillbirth attention must link to these and also needs to be institutionalised in UN and professional bodies

- Parental groups must join with professional bodies eg midwives (ICM) and obstetricians (FIGO) to advocate for change

Source: Lawn JE, Cousens S, Zupan J, for the Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: when? where? why? Lancet 2005; published online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Paper 1: Why stillbirths matter Key messages

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- **Stillbirths have been relatively overlooked as a global public health problem**
- **Not included in the Millennium Development Goals for maternal and child health set by the UN**
- **Social perception – affected women are often subjected to stigma and marginalisation in communities that blame her stillbirth on her own sins, evil spirits, and destiny**
- **Parental groups must join with professional bodies eg midwives (ICM) and obstetricians (FIGO) to advocate for change**

Source: Frøen JF, et al. Stillbirths: why they matter. Lancet 2011; published online April 14. DOI:10.1016/S0140-6736(10)62232-5.

Stillbirths 2

Stillbirths: Where? When? Why? How to make the data count?

*Joy E Lawn, Hannah Blencowe, Robert Pattinson, Simon Cousens, Rajesh Kumar, Ibinabo Ibiebele, Jason Gardosi, Louise T Day, Cynthia Stanton, for The Lancet's Stillbirths Series steering committee**

Published Online
April 14, 2011

Despite increasing attention and investment for maternal, neonatal, and child health, stillbirths remain invisible—not counted in the Millennium Development Goals, nor tracked by the UN, nor in the Global Burden of Disease metrics.

Paper 2: Counting stillbirths What is new?

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- **New estimates of stillbirth rate for 193 countries**
  - **Undertaken by Saving Newborn Lives/Save the Children and London School of Hygiene and Tropical medicine with the World Health Organization and a process to discuss the data with countries**
  - **Large increases in the input data, more reported data, better modelling**
  - **Time trends from 1995 to 2009 (first time ever)**
- **New estimates of intrapartum stillbirths**
- **Advances towards more comparable cause comparisons**

Source: Lawn JE, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62187-3.

Stillbirths don't count in global numbers

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1. **Global mortality tracking**

   NOT measured in most national surveys and NOT routinely reported to WHO

2. **MDGs**

   Stillbirths NOT mentioned in the MDGs although intimately linked to:

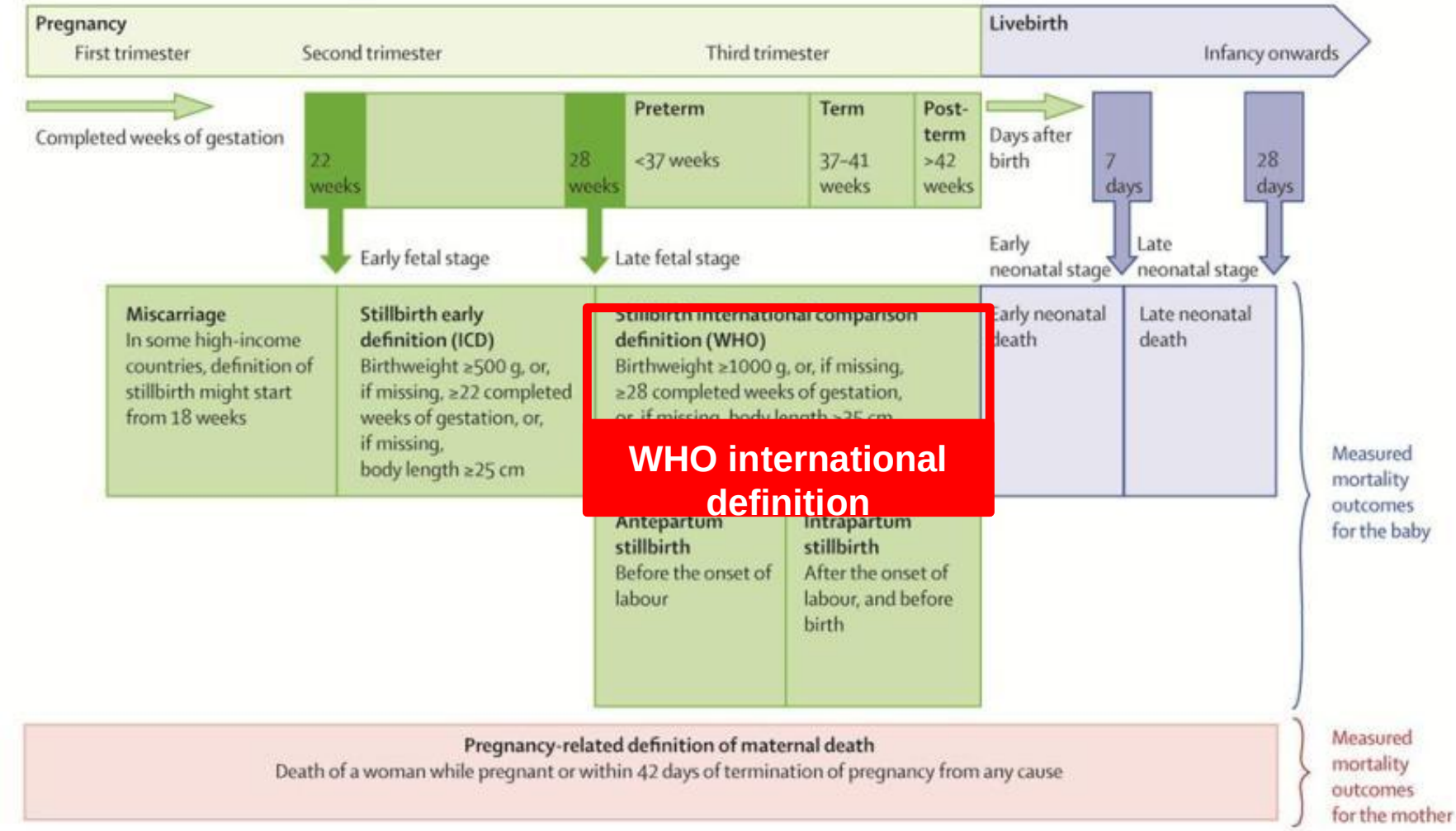
   - Maternal deaths and near misses in MDG 5
   - Neonatal deaths, accounting for 41% of child deaths in MDG4
   - Poverty (MDG 1) and girls education (MDG2)

3. **Global burden**

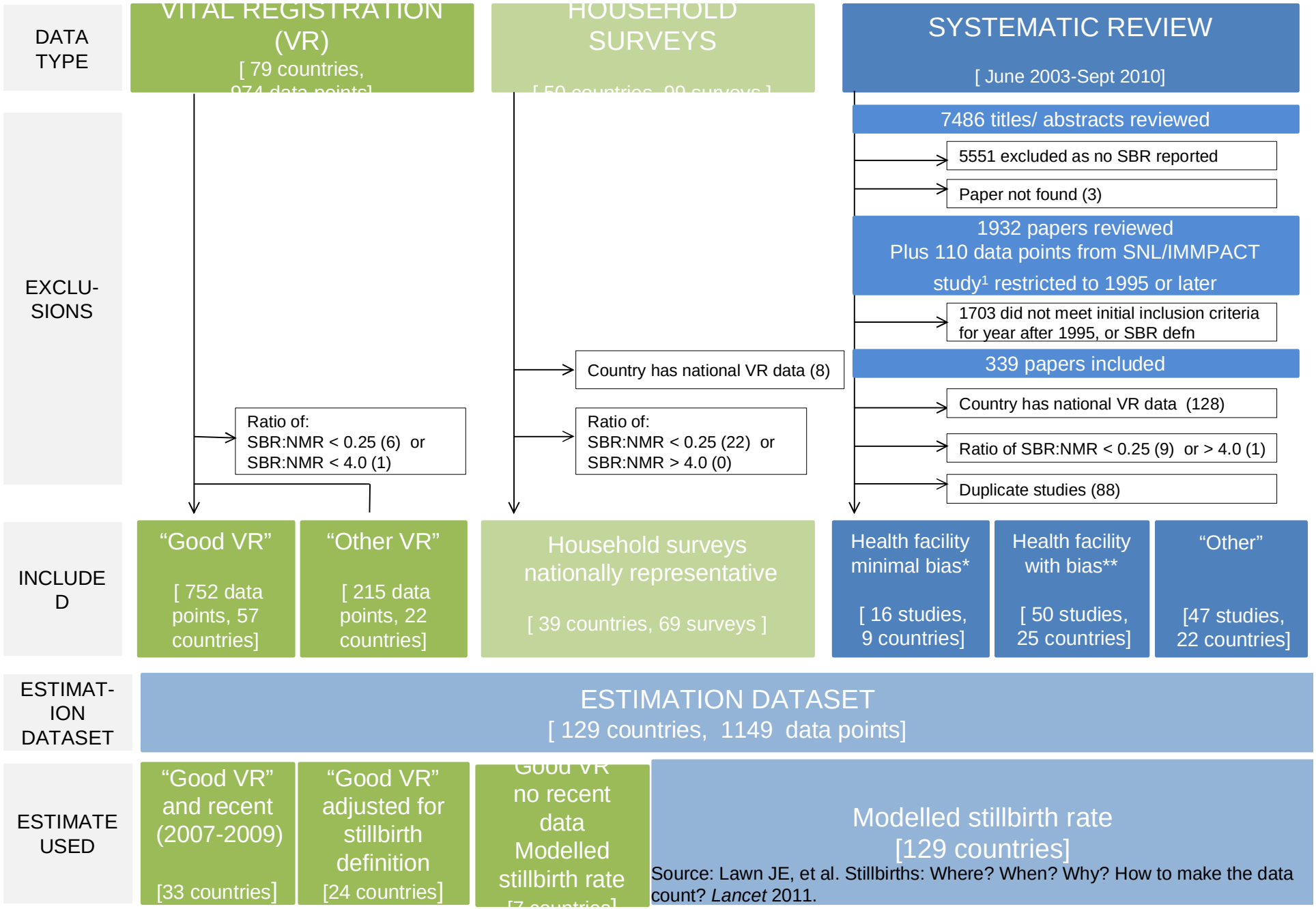
   Stillbirths not been included in the Global Burden of Disease or

Stillbirths often missed in national or international health policy and programmes... partly a data issue

Defining stillbirths



Source: Lawn JE, Blencowe H, Pattinson R, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62187-3.



Source: Lawn JE, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011.

Country variation in stillbirth rates

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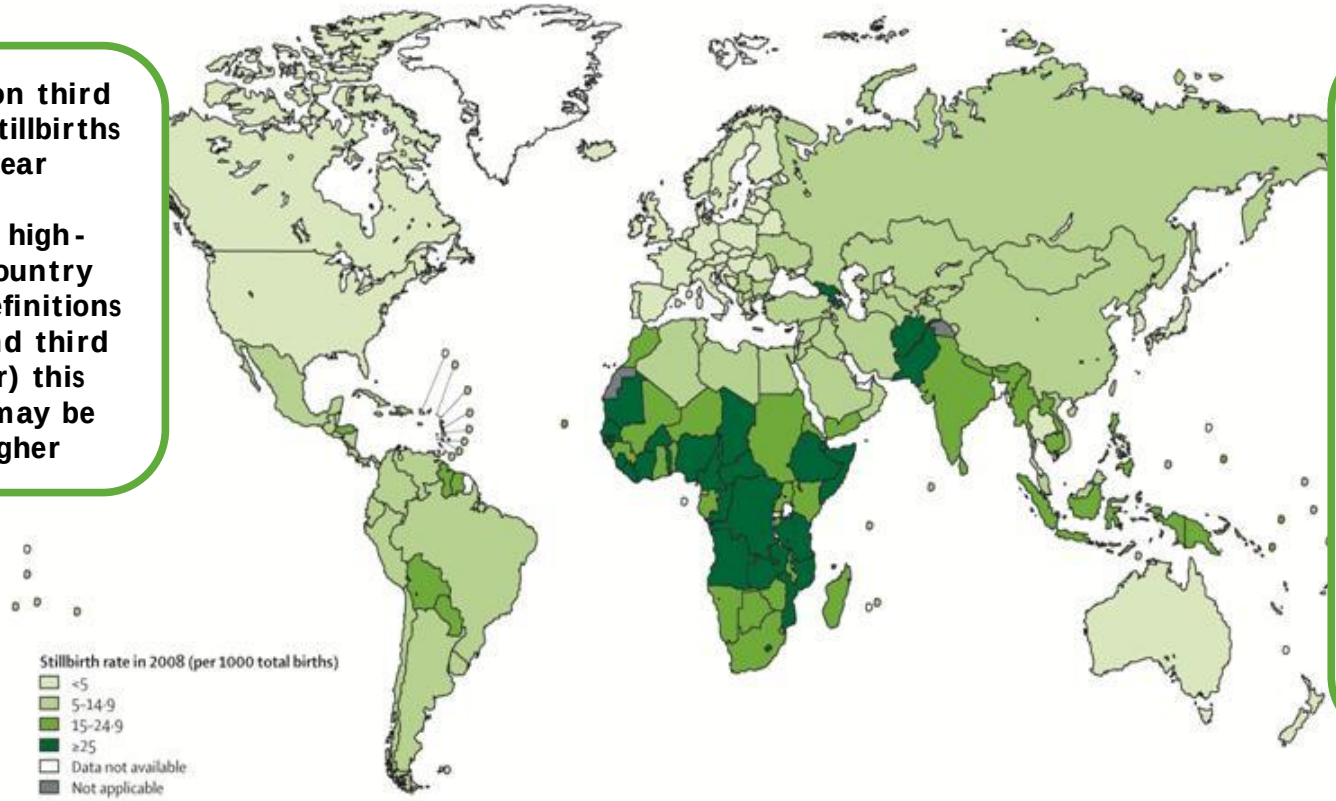
2.65 million third trimester stillbirths each year

Applying high-income country stillbirth definitions (second and third trimester) this number may be 40% higher



10 countries account for 66% of the world's stillbirths – and also 66% of neonatal deaths and over 60% of maternal deaths

1. India
2. Pakistan
3. Nigeria
4. China
5. Bangladesh
6. Dem Rep Congo
7. Ethiopia
8. Indonesia
9. Tanzania
10. Afghanistan

98% of stillbirths occur in low-income and middle-income countries; more than two-thirds are in rural families

Regional variation of intrapartum stillbirth rates

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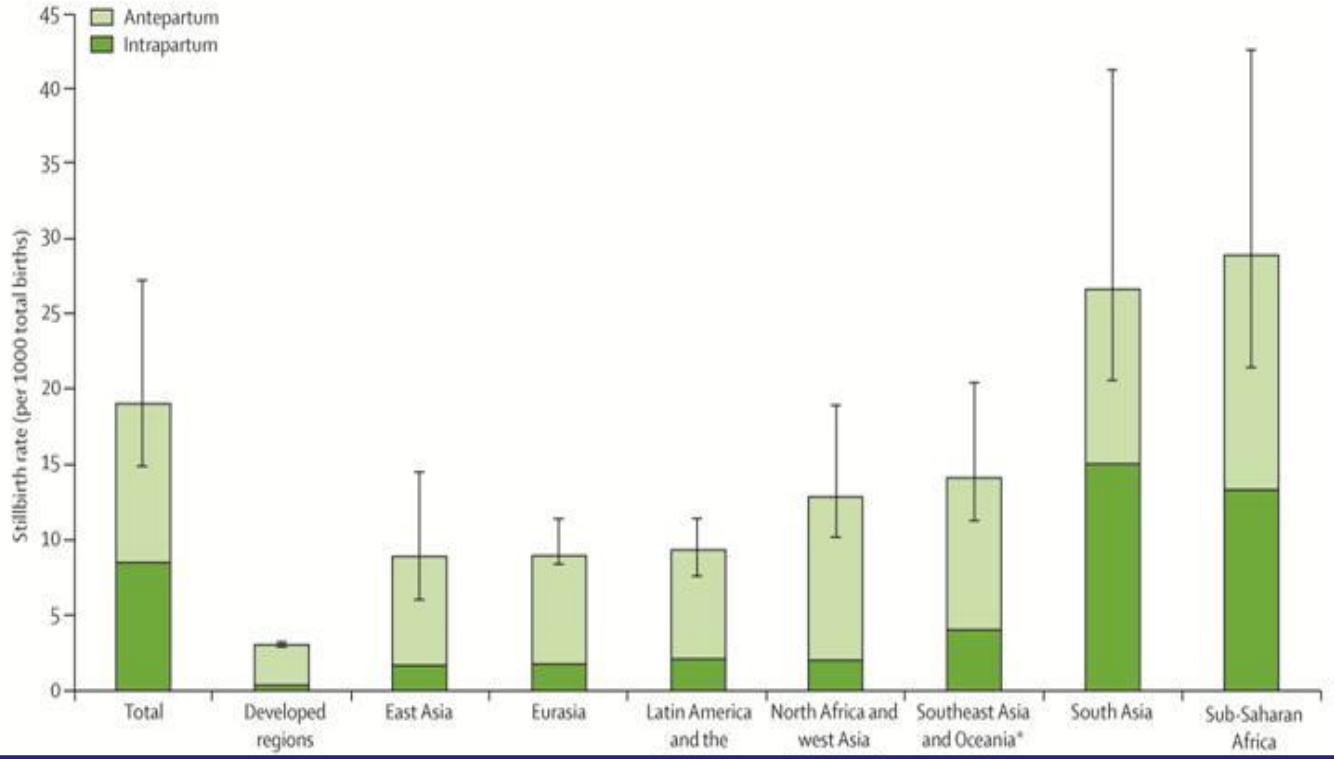

Worldwide, 1.2 million stillbirths occur during labour (intrapartum)
The risk of intrapartum stillbirth for an African woman is 24 times higher than for a woman in a high-income country

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Cause of stillbirth

Estimates for stillbirth are impeded by more than 35 different classification systems

The "big five" causes:

1. **Childbirth complications**
2. **Maternal infections in pregnancy**
3. **Maternal conditions, especially hypertension and diabetes**
4. **Fetal growth restriction**
5. **Congenital abnormalities**

These overlap with the causes of maternal and neonatal

Source: Lawn JE, Blencowe H, Pattinson R, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62187-3.

2 million deaths at the time of birth: Triple return on investment

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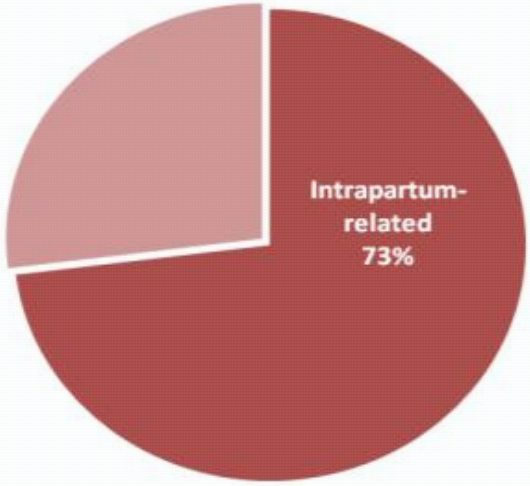
Maternal deaths
358,000 per year

Intrapartum-related maternal deaths (2008)
Death during labour, birth and first 24 hrs

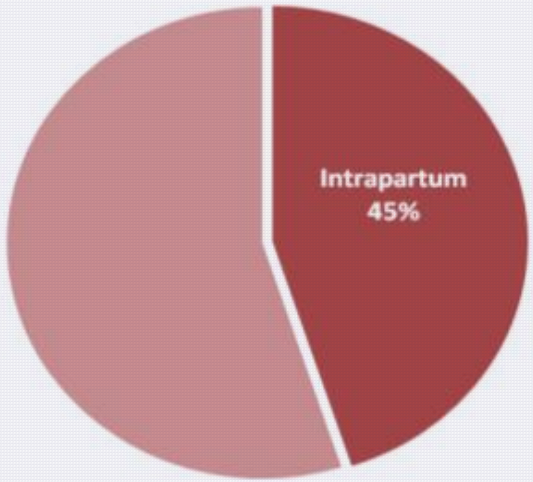


261,000

+

Stillbirths (>1000 g)
2.65 million per year

Intrapartum stillbirths (2009)
Fetal death during labour (fresh stillbirths)

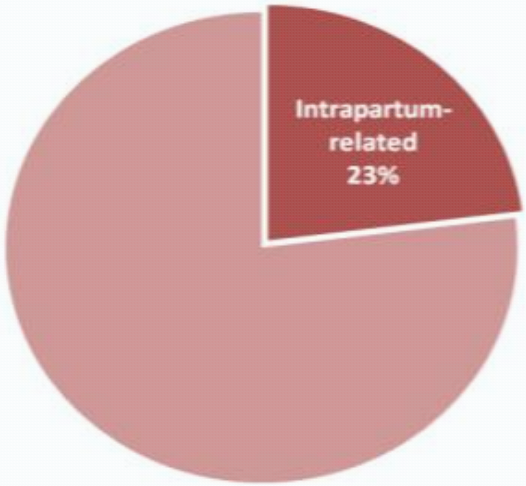


1,200,000

+

Neonatal deaths
3.6 million per year

Intrapartum-related neonatal deaths (2009)
Previously called "birth asphyxia"



814,000

Source: Lawn JE, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011

Regional stillbirth rates trends and projections to 2020

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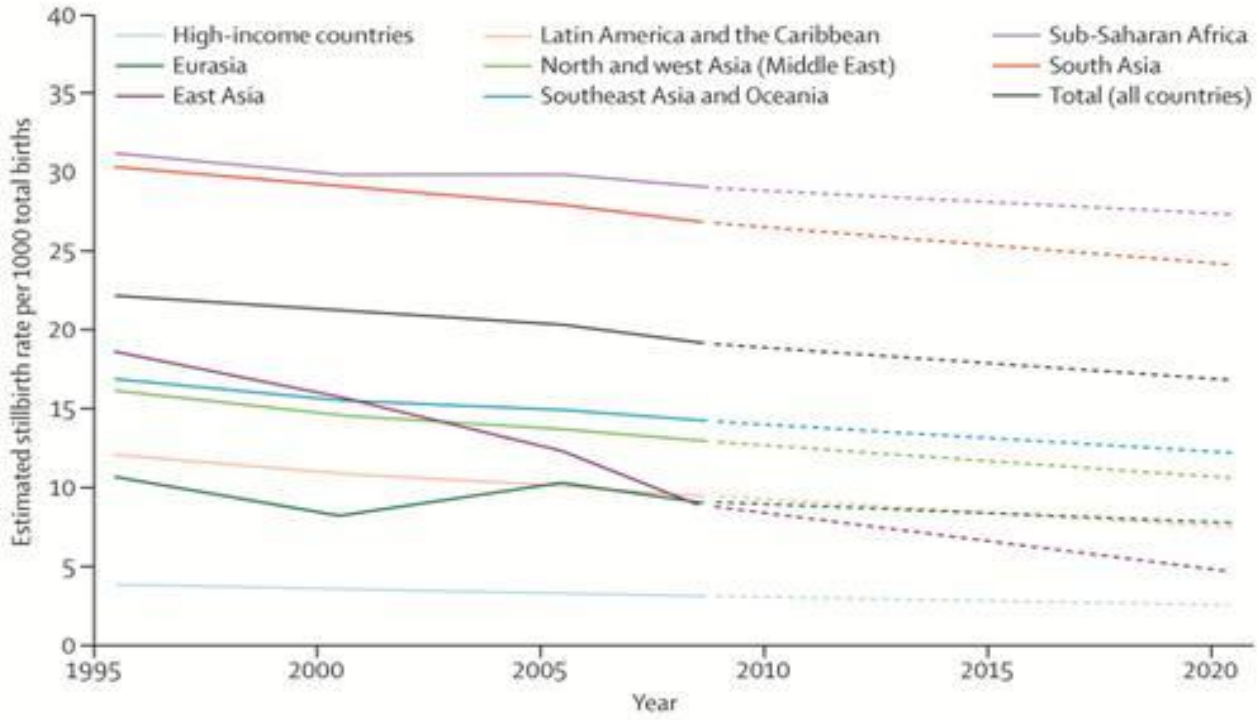

Sub-Saharan Africa and south Asia have the slowest rates of decline
Latin America, Eurasia, and east Asia have made more progress

Paper 2: Counting stillbirths
Key messages

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- **Where?**
  - **2.6 million per year, 98% in low-income countries**
  - **55% in rural families in south Asia and sub-Sahara Africa**
- **When?**
  - **1.2 million while the woman is in labour (intrapartum)**
  - **1.4 million before labour**
- **Why?**
  - **The "big five" causes link with causes of maternal and neonatal deaths**
- **Improving the data?**
  - **Already news with WHO releasing official estimates**
  - **Urgent need to improve stillbirth data in household surveys and simplify cause of death classification**

Source: Lawn JE, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet* 2011

Stillbirths 3

Stillbirths: what difference can we make and at what cost?

Zulfiqar A Bhutta, Mohammad Yawar Yakoob, Joy E Lawn, Arjumand Rizvi, Ingrid K Friberg, Eva Weissman, Eckhart Buchmann, Robert L Goldenberg, for The Lancet's *Stillbirths Series steering committee**

Worldwide, 2·65 million (uncertainty range 2·08 million to 3·79 million) stillbirths occur yearly, of which 98% occur in countries of low and middle income. Despite the fact that more than 45% of the global burden of stillbirths occur intrapartum, the perception is that little is known about effective interventions, especially those that can be implemented in low-resource settings. We undertook a systematic review of randomised trials and observational

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See Online/Comment

Paper 3: Interventions What is new?

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- **Systematic reviews for interventions with effect on stillbirth**
  - **Effect of 35 interventions reviewed and 10 interventions selected**
  - **Delphi process to agree effect on stillbirths where studies not available eg for comprehensive obstetric care effect**
- **Lives Saved Tool (LiST) and cost modelling**
  - **New module added to liST to address stillbirths**
  - **How many stillbirths could be averted at universal coverage?**
  - **Which interventions have the most effect and may be more feasible in low income settings?**
  - **Running cost per year of the interventions**
- **Research priorities for interventions**

Source: Bhutta Z, et al. Stillbirths: what difference can we make and at what cost? *Lancet* 2011; published online April 14.

Systematic review of potential interventions (additional background papers)

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1. Ishaque S, Yakoob MY, Imdad A, Goldenberg RL, Eisele TP, Bhutta ZA. Effectiveness of interventions to screen and manage infections during pregnancy on reducing stillbirths: a review. *BMC Public Health* 2011, 11(Suppl 3):S3. doi:10.1186/1471-2458-11-S3-S3

2. Imdad A, Yakoob MY, Siddiqui S, Bhutta ZA. Screening and triage of intrauterine growth restriction (IUGR) in general population and high risk pregnancies: a systematic review with a focus on reduction of IUGR related stillbirths. *BMC Public Health* 2011, 11(Suppl 3):S1. doi:10.1186/1471-2458-11-S3-S1

3. Imdad A, Yakoob MY, Bhutta ZA. The effect of folic acid, protein energy and multiple micronutrient supplements in pregnancy on stillbirths. *BMC Public Health* 2011, 11 (Suppl 3):S4. doi:10.1186/1471-2458-11-S3-S4

4. Yakoob MY, Ali MA, Ali MU, Imdad A, Lawn JE, Den Broek NV, Bhutta ZA. The effect of providing skilled birth attendance and emergency obstetric care in preventing stillbirths. *BMC Public Health* 2011, 11(Suppl 3):S7. doi:10.1186/1471-2458-11-S3-S7

5. Syed M, Javed H, Yakoob MY, Bhutta ZA. Effect of screening and management of diabetes during pregnancy on stillbirths. *BMC Public Health* 2011, 11(Suppl 3):S2. doi:10.1186/1471-2458-11-S3-S2

6. Hussain AA, Yakoob MY, Imdad A, Bhutta ZA. Elective induction for pregnancies at or beyond 41 weeks of gestation and its impact on stillbirths: a systematic review with meta-analysis. *BMC Public Health* 2011, 11(Suppl 3):S5. doi:10.1186/1471-2458-11-S3-S5

7. Jabeen M, Yakoob MY, Imdad A, Bhutta ZA. Impact of interventions to prevent and manage preeclampsia and eclampsia on stillbirths. *BMC Public Health* 2011, 11(Suppl 3):S6. doi:10.1186/1471-2458-11-S3-S6

Interventions selected for implementation and modeling

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1. Periconceptional folic acid fortification
2. Prevention of malaria with insecticide-treated bednets or intermittent preventive treatment with antimalarials
3. Syphilis detection and treatment
4. Detection and management of hypertensive disease of pregnancy
5. Detection and management of diabetes of pregnancy
6. Detection and management of fetal growth restriction (including caesarean section or induction, if needed)
7. Identification and induction of mothers with 41 weeks of gestation
8. Skilled care at birth and immediate care for neonates
9. Basic emergency obstetric care
10. Comprehensive emergency obstetric care

Source: Bhutta Z, et al. Stillbirths: what difference can we make and at what cost? *Lancet* 2011; published online April 14.

10 evidence-based interventions for stillbirth

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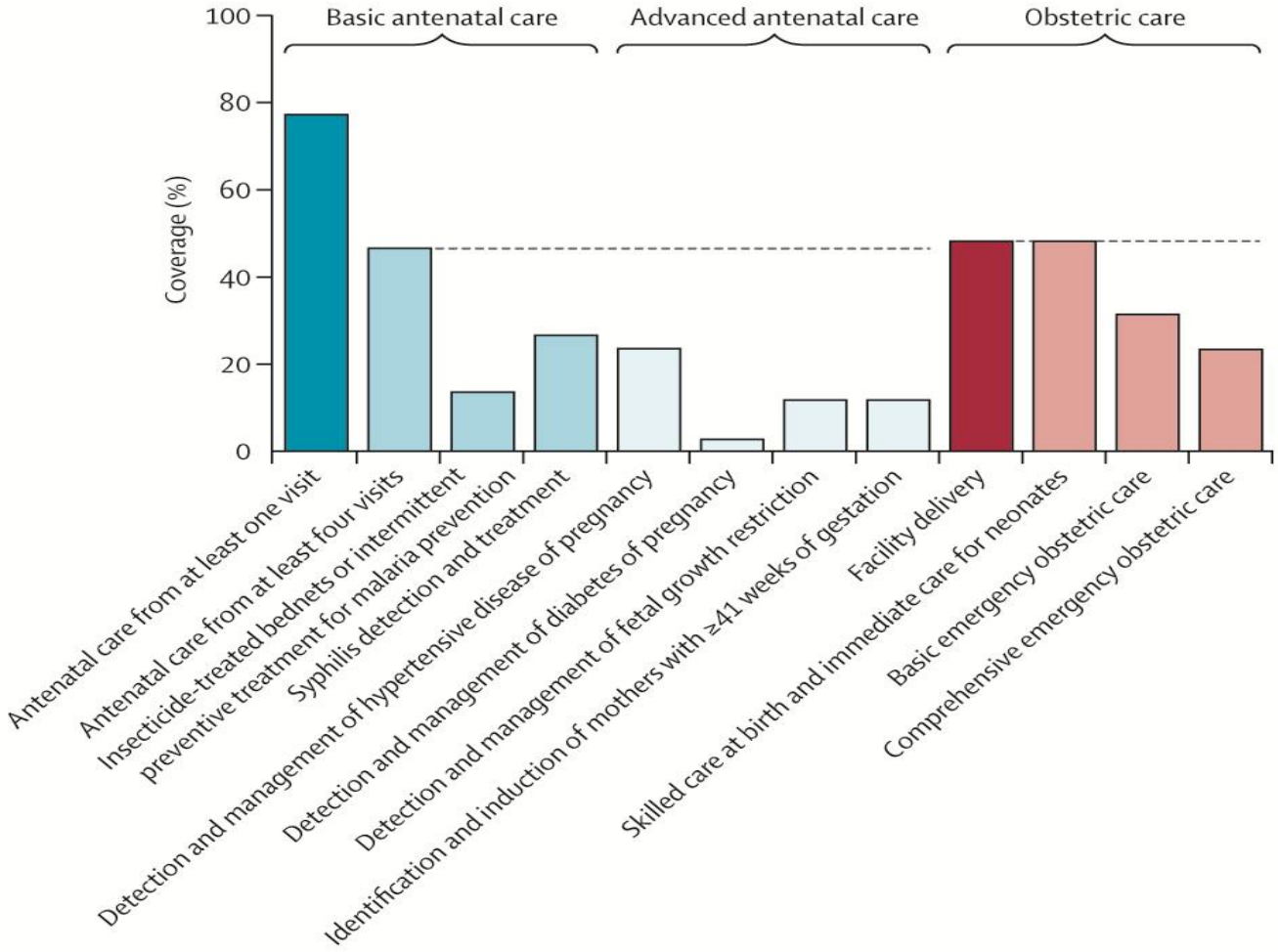
Interventions considered in the model		99% coverage	
		Stillbirths	Reduction
Periconceptual folic acid supplementation	Basic antenatal care	27,000	1%
Malaria in pregnancy - ITNs & IPTp		35,000	1%
Syphilis screening and treatment		136,000	5%
Hypertensive diseases in pregnancy and mar	Advanced antenatal care	57000	2%
Diabetes screening and management		24,000	1%
Fetal growth restriction management		107,000	4%
Induction of labor at or beyond 41 complete		52,000	2%
Obstetric Care (3 levels of care)	Childbirth care	696,000	28%
	Total stillbirths averted	1,134,000	45%

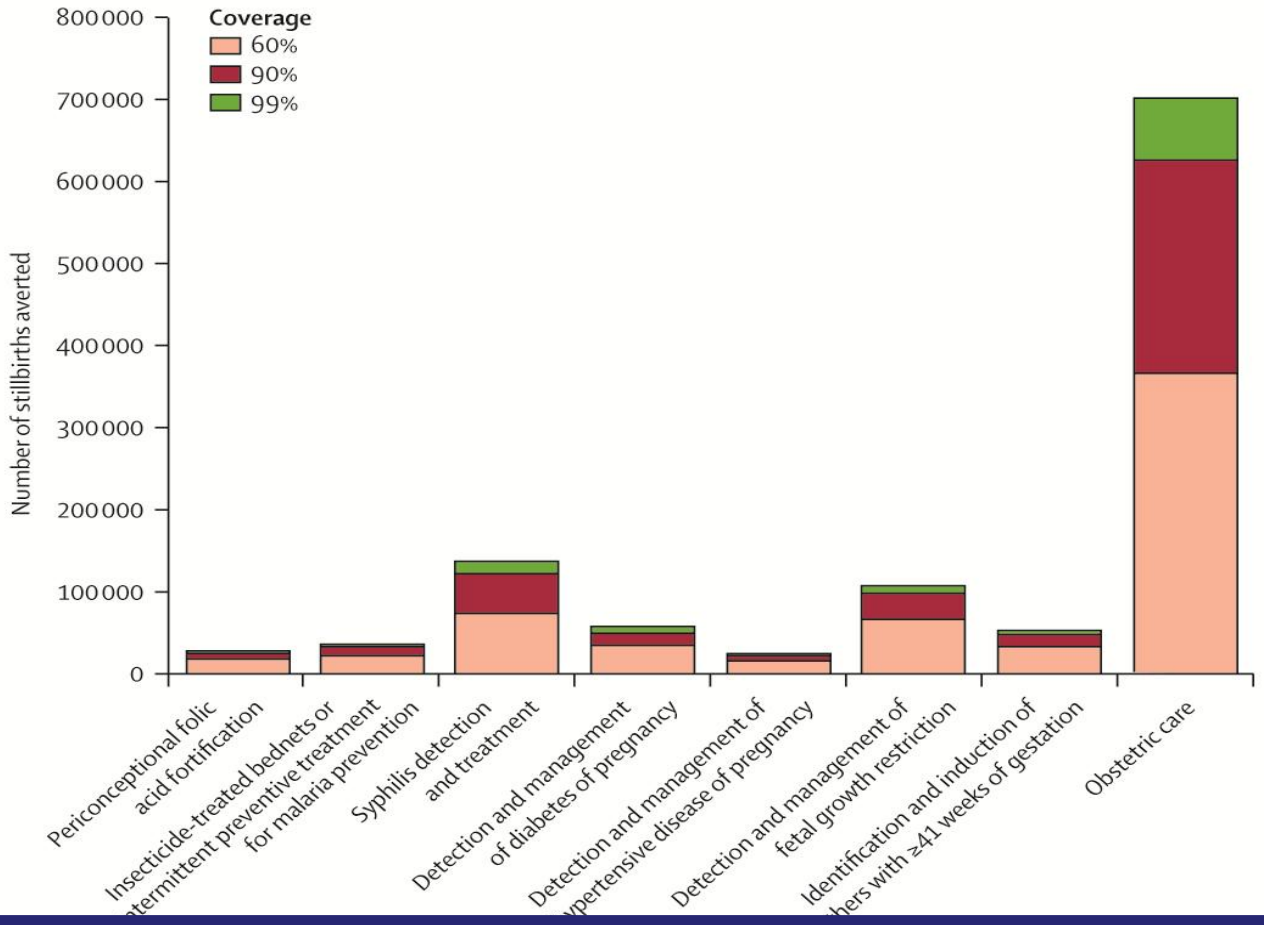
Coverage is low and there are many missed opportunities within existing health system contact points, especially antenatal care

Coverage of interventions for stillbirths in 68 Countdown countries



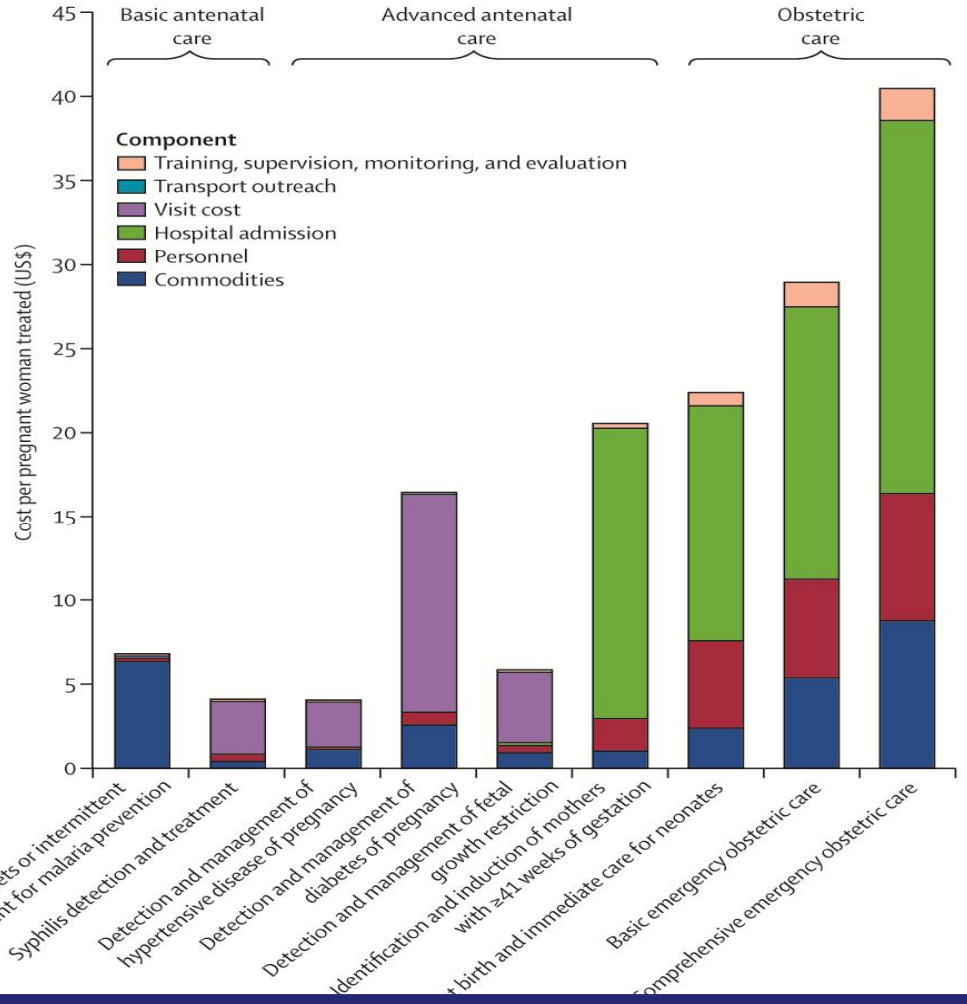
Source: Bhutta ZA, Yakoob MY, Lawn JE, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: what difference can we make and at what cost? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62050-8.

Universal coverage with 10 interventions



45% of stillbirths averted (1.13 million)
Community and outreach services alone could avert 280,000

Universal coverage will cost $9.6 billion for the 10 inventions that prevent stillbirths



Costs largely determined by facility-based basic and emergency obstetric care and the advanced packages of

Paper 3 and 4: Interventions and Implementation What is new?

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- **Systematic reviews for interventions to reduce stillbirths**
  - **Effect of 35 interventions were reviewed.**
  - **10 interventions clearly effective in reducing stillbirth**
- **New computerized model created to estimate**
  - **How many stillbirths could be prevented with various treatments?**
  - **How many mothers and newborns would also be saved?**
  - **What is the cost of introducing various interventions?**
- **Implementation priorities based on feasibility and cost**

10 evidence-based interventions for stillbirth

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	Stillbirths prevented
Periconceptional folic acid fortification	27 000
Insecticide-treated bednets or intermittent preventive treatment for malaria prevention during pregnancy	35 000
Syphilis detection and treatment	136 000
Detection and management of hypertensive disease of pregnancy	57 000
Detection and management of diabetes in pregnancy	24 000
Detection and management of fetal growth restriction	107 000
Identification and induction for pregnant women with ≥41 weeks' gestation	52 000
Comprehensive emergency obstetric care	696 000
Combined	1134 000

Table 1: **Interventions and number of stillbirths averted at 99% coverage in 2015**

Source: Bhutta Z, et al. Stillbirths: what difference can we make and at what cost? *Lancet* 2011; published online April 14.

Paper 3 and 4: Interventions and implementation Key messages

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- Effective interventions that reduce stillbirths overlap with those that reduce maternal and neonatal deaths.
- In 68 countries accounting for 92% of the worldwide stillbirths, universal coverage of care with the 10 effective interventions could save up to 1·1 million (45%) third-trimester stillbirths, 201,000 (54%) maternal deaths, and 1·4 million (43%) neonatal deaths.
- The additional cost would be $2.32 per person, well below the WHO and World Bank criteria for cost-effectiveness.
- Total cost to implement these 10 effective interventions in the 68 high burden countries would be less than $11

Paper 3: Interventions
Key messages

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- Of 35 potential interventions, we strongly recommend ten for implementation including: periconceptional folic acid fortification, insecticide-treated bednets or intermittent preventive treatment for malaria prevention, syphilis detection and treatment, detection and management of hypertensive disease of pregnancy, detection and management of diabetes of pregnancy, detection and management of fetal growth restriction, routine induction to prevent post-term pregnancies, skilled care at birth, basic emergency obstetric care, and comprehensive emergency obstetric care.

- Childbirth care, particularly emergency obstetric care including caesarean section, reduces the highest number of stillbirths, and should be the first priority, especially because of the additional benefits to women and neonates.

- Estimates modelled with the Lives Saved Tool indicate that 99% coverage with these ten interventions could prevent 45% of stillbirths at

Paper 3: Interventions
Key research gaps

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- Stillbirth data (intrapartum versus antepartum) should be included in all existing surveillance sites, and instruments developed to assess gestational age for stillbirths

- Improved detection and management of pregnancy-induced hypertension, detection of fetal distress and the use of modified partograph for optimal management of labour

- Appropriate detection and management of infections in the antenatal period such as urinary tract infections, preterm premature rupture of membranes and their association with the risk of stillbirths

- The role of birth spacing promotion and interventions to address environmental risk factors were also highlighted as priorities for

Stillbirths 4

Stillbirths: how can health systems deliver for mothers and babies?

Robert Pattinson, Kate Kerber, Eckhart Buchmann, Ingrid K Friberg, Maria Belizan, Sonia Lansky, Eva Weissman, Matthews Mathai, Igor Rudan, Neff Walker, Joy E Lawn, for The Lancet's *Stillbirths Series steering committee**

The causes of stillbirths are inseparable from the causes of maternal and neonatal deaths. This report focuses on prevention of stillbirths by scale-up of care for mothers and babies at the health-system level, with consideration for effects and cost. In countries with high mortality rates, emergency obstetric care has the greatest effect on maternal and neonatal deaths,

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Paper 4: Implementation What is new?

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- **Lives Saved Tool (LiST) and cost modelling for the effect on mothers, newborns AND stillbirths**
  - **How many stillbirths could be averted at universal coverage?**
  - **Which interventions have the most effect and may be more feasible in low-income settings?**
  - **Running cost per year of the interventions**

- **Interfaces for health system change**

- **Research priorities for interventions**

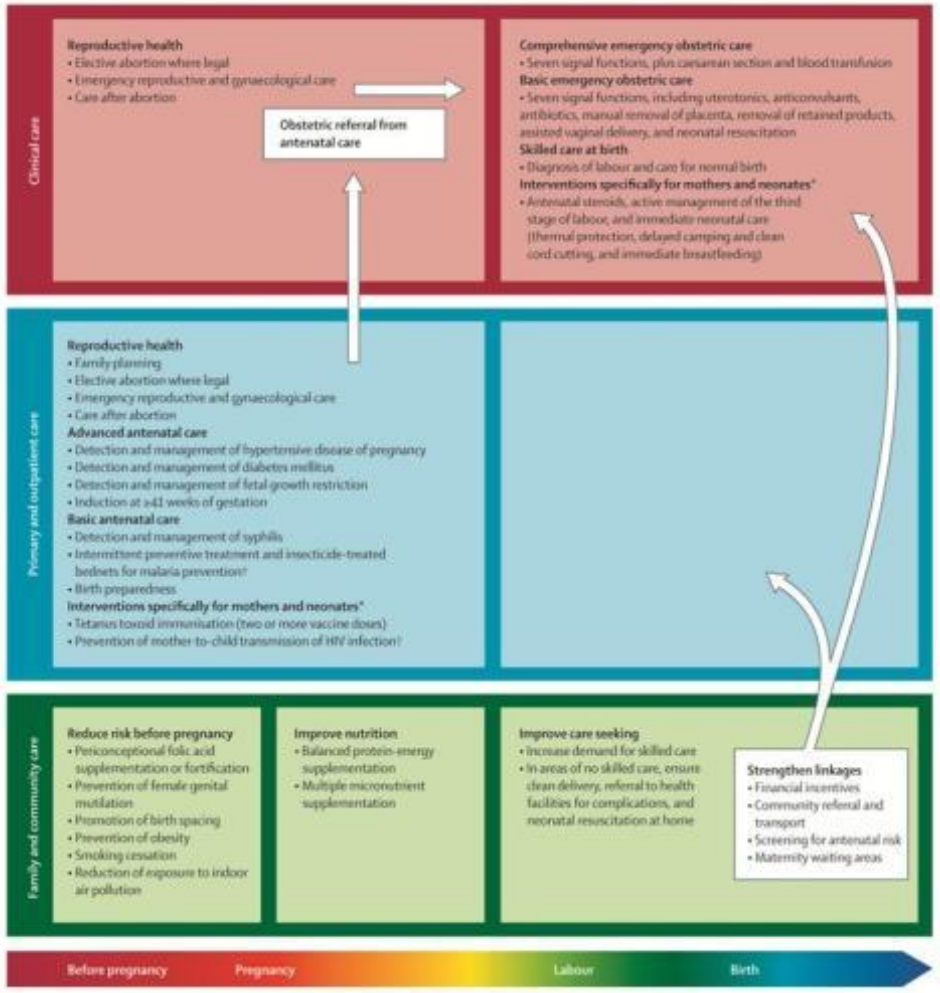
Source: Pattinson R, Kerber K, Buchmann E, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: how can health systems deliver for mothers and babies? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62306-9.

Continuum of care

- 10 effective interventions to reduce stillbirths overlap with those to reduce maternal and neonatal death.

- 5 addition maternal and neonatal interventions:
  - Tetanus toxoid
  - Antibiotics for PPROM
  - Antenatal steroids
  - AMTSL
  - Neonatal resuscitation

- 1 primary prevention – Family planning!



Interventions are most cost-effective provided through integrated packages that are tailored to suit existing health-care systems

Saving lives and preventing stillbirths

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	Stillbirths (2 499 000 at baseline*)		Maternal deaths (371 000 at baseline*)		Neonatal deaths (3 333 000 at baseline*)		Total deaths (6 203 000 at baseline*)	
	Deaths averted	Reduction in deaths	Deaths averted	Reduction in deaths	Deaths averted	Reduction in deaths	Deaths averted	Reduction in deaths
60% coverage†	615 000	25%	106 000	29%	388 000	12%	1 109 000	18%
90% coverage†	1 017 000	41%	175 000	47%	712 000	21%	1 903 000	31%
99% coverage†	1 134 000	45%	198 000	53%	828 000	25%	2 161 000	35%
99% coverage plus maternal and neonatal interventions‡	1 134 000	45%	201 000	54%	1 447 000	43%	2 782 000	45%

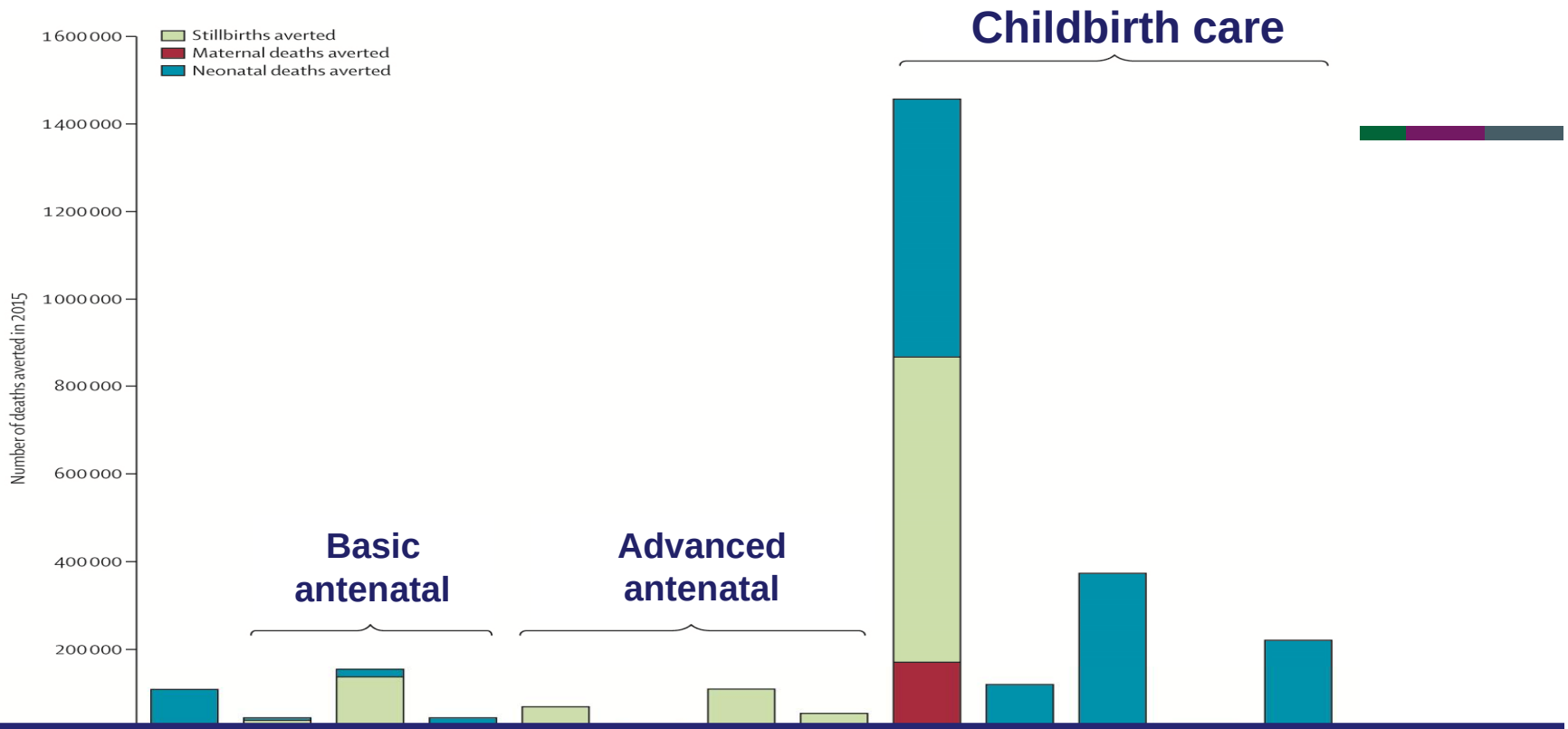
Numbers of deaths averted have been rounded to nearest thousand, but percentages were based on actual numbers. Each death (maternal death, neonatal death, and stillbirth) has equal weight. *Projected number of deaths in 2015, assuming no change in coverage levels from those in 2011. †Coverage of ten stillbirth-specific interventions. ‡Coverage of ten stillbirth-specfic interventions plus five interventions specifically for mothers and neonates and with no estimated effect on stillbirths.

Table 2: **Potential stillbirths, neonatal deaths, and maternal deaths averted in 2015 according to level of coverage**

Universal (99%) coverage could prevent 1.2 million stillbirths, 1.1 million newborn deaths (44%) **and up to 201 000 maternal deaths** (54%)

Preventing maternal and neonatal deaths *and* stillbirths

THE LANCET



Deaths prevented: **Stillbirths 1.1 million (45%)**

Newborn deaths 1.4 (43%)

Maternal deaths 201,000 (54%)

TRIPLE RETURN ON INVESTMENT

Triple benefit is cost effective

THE LANCET

- **US$ 10.9 billion or US$ 2.32 per person for the 68 priority countries is the additional cost of universal coverage for the 10 interventions that prevent stillbirths plus the 5 additional interventions for maternal and newborn health**

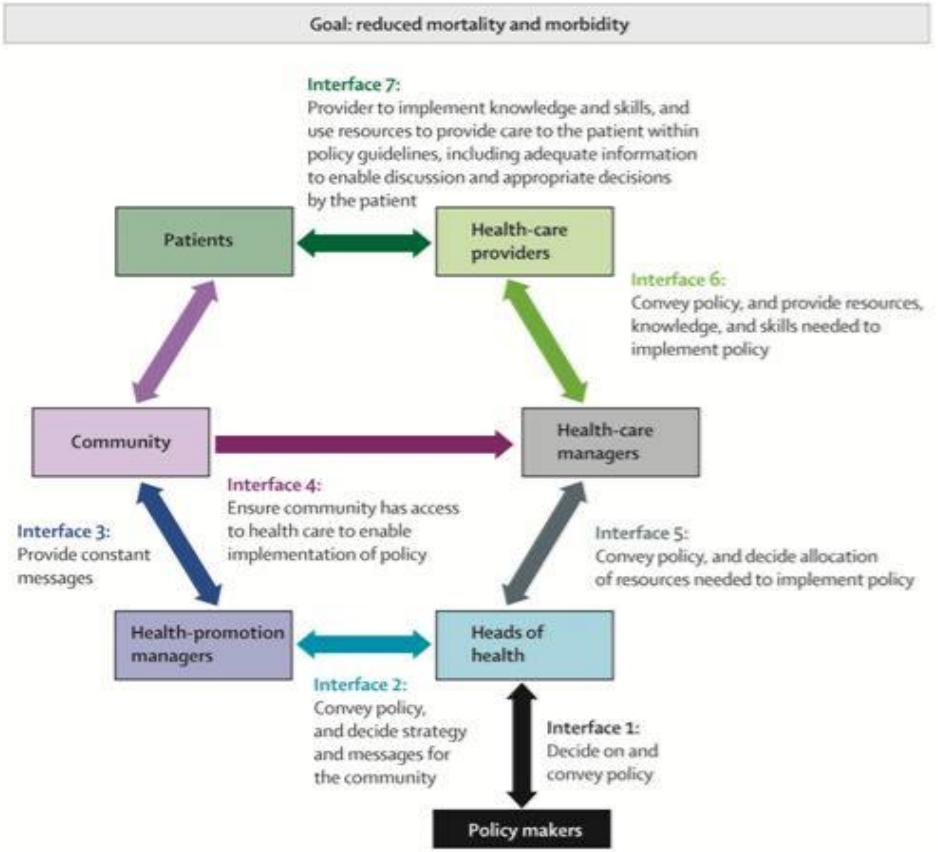
- **The cost per stillbirth averted decreases by half when integrated with maternal and newborn health (from US$9,600 to $3,920)**

Source: Pattinson R, Kerber K, Buchmann E, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: how can health systems deliver for mothers and babies? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62306-9.

Key health-system interfaces for change

THE LANCET

- **A health-care system is a complex adaptive system**
- **Interventions at the key interfaces are needed to successfully implement and sustain programmes**



Source: Pattinson R, Kerber K, Buchmann E, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: how can health systems deliver for mothers and babies? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62306-9.

Paper 4: Implementation Key messages

THE LANCET

- **Effective interventions to reduce stillbirths often overlap with those to reduce maternal and neonatal deaths.**
- **Interventions are best packaged are best integrated to provide a continuum of care from before pregnancy through to postnatal care**
- **Interventions should be tailored to the health-system context, with skilled care at birth and emergency obstetric care taking priority.**
- **In 68 countries accounting for 92% of the worldwide burden of stillbirths in 2008, universal coverage of care (99%) with intervention packages in 2015 could save up to 1·1 million (45%) third-trimester stillbirths, 201 000 (54%) maternal deaths, and 1·4 million (43%) neonatal deaths at an additional cost of US$2·32 per person, which is well below the WHO and World Bank criteria for cost-effectiveness.**
- **A health-care system is a complex adaptive system, so interventions at the key interfaces are needed to successfully implement and sustain programmes.**

Source: Pattinson R, Kerber K, Buchmann E, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: how can health systems deliver for mothers and babies? *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62306-9.

Stillbirths 5

Stillbirths: the way forward in high-income countries

Vicki Flenady, Philippa Middleton, Gordon C Smith, Wes Duke, Jan Jaap Erwich, T Yee Khong, Jim Neilson, Majid Ezzati, Laura Koopmans, David Ellwood, Ruth Fretts, J Frederik Frøen, for The Lancet's *Stillbirths Series steering committee**

Stillbirth rates in high-income countries declined dramatically from about 1940, but this decline has slowed or stalled over recent times. The present variation in stillbirth rates across and within high-income countries indicates that

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Paper 5: High-income countries What is new?

THE LANCET

- Stillbirth data and time trends from 13 countries
- Causes and contributing conditions using a single classification system across high-income countries
- Risk factors analysis
  - Systematic review of studies addressing lifestyle risk factors including obesity, advanced maternal age and smoking
- Research priorities: survey of experts

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Main causes of stillbirth in high-income countries

THE LANCET

- **Placental pathology – 30%**
  - **Dysfunction with grow restriction and abruption**
- **Infection, largely associated with preterm birth – 12%**
- **Congenital abnormalities - 6%**
- **Maternal hypertension and diabetes - <5% (3-fold increased risk)**
- **30% remain unexplained (10 times SIDS numbers)**

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Important risk factors in high-income countries

THE LANCET

- **Primiparity contributes to 14% of stillbirths**
- **Maternal overweight 12%**
- **Maternal age over 35 years 11%**
- **Smoking 6 %**

Source: Flenady V, Koopmans L, Middleton, et al. Major risk factors for stillbirth in high-income countries: a systematic review and meta-analysis. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62233-7.

Disadvantaged women in high-income countries

THE LANCET

- Women living in disadvantage have stillbirth rates around double that of non-disadvantaged and equal to some low- and middle-income countries:
  - eg, US African-American, Indigenous women in Canada and Australia and others living in socioeconomic deprivation

- Higher smoking rates (up to 60%) and access to appropriate health care and education are important factors

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Perinatal mortality audit

THE LANCET

- **Sub-optimal care contributes to around 30% of stillbirths. Audit against best practice standards can reduce stillbirth**

- **Most stillbirths are not thoroughly investigated and unexplained stillbirth may be overestimated by 50%**

- **Different approaches to classification of causes results in inadequate data to inform prevention**

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Interventions to reduce stillbirth in high-income countries

THE LANCET

- **Improvement of general health of women of childbearing age to achieve and maintain optimal weight and diet, smoking cessation**
- **Antenatal detection and management of women with risk factors**
  - ***Detection of growth restriction, awareness of decreased fetal movements***
- **Raising awareness of risk factors in the community**
- **Improving information on causes through better investigation, audit and classification to focus research and clinical practice improvements**

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Research to reduce stillbirth in high-income countries

THE LANCET

- **Focus on antepartum stillbirth as a result of placental dysfunction and preterm birth and infection**
  - **Effects of peri-conceptual environment of fetal development**
  - **Understanding, detecting and managing fetal growth restriction**
  - **Causes of stillbirth in minority groups**
  - **Optimal investigations, classification and models of perinatal audit**

Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

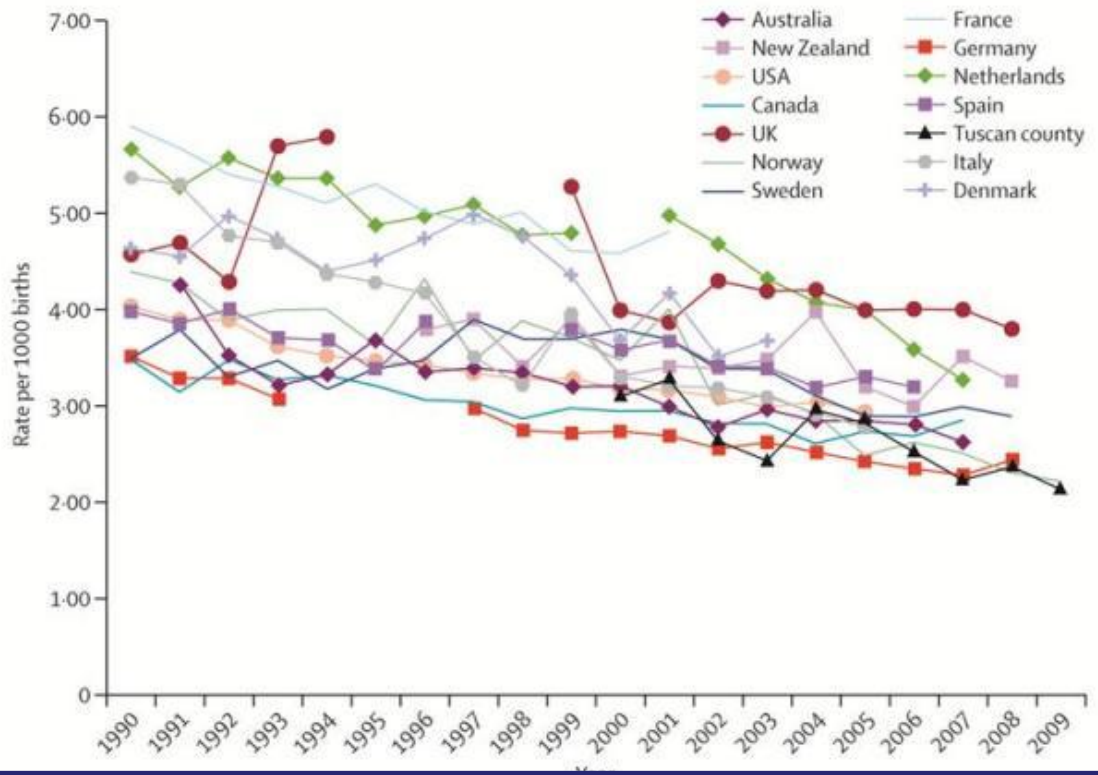
Paper 5: High-income countries Key messages

THE LANCET

- Room for improvement The variation in current stillbirth rates clearly shows that further reduction in stillbirth is possible in high-income countries.
- Disparities Women from disadvantaged backgrounds continue to experience stillbirth rates far in excess of non-disadvantaged women in high-income countries and an increased focus on appropriate programmes is required to address this disparity.
- Modifiable risk factors Maternal overweight and obesity and smoking are important potentially modifiable risk factors for stillbirth. Smoking cessation programs in pregnancy are effective and should be implemented as part of routine care.
- Quality of care Factors relating to suboptimal professional care contribute to a substantial proportion of stillbirths. Implementation of perinatal mortality audit at the national level is an important step towards addressing quality of care.
- Improving the data A thorough investigation of stillbirth is essential. Consensus on definition, investigation and classification is needed.

Stillbirths in high-income settings

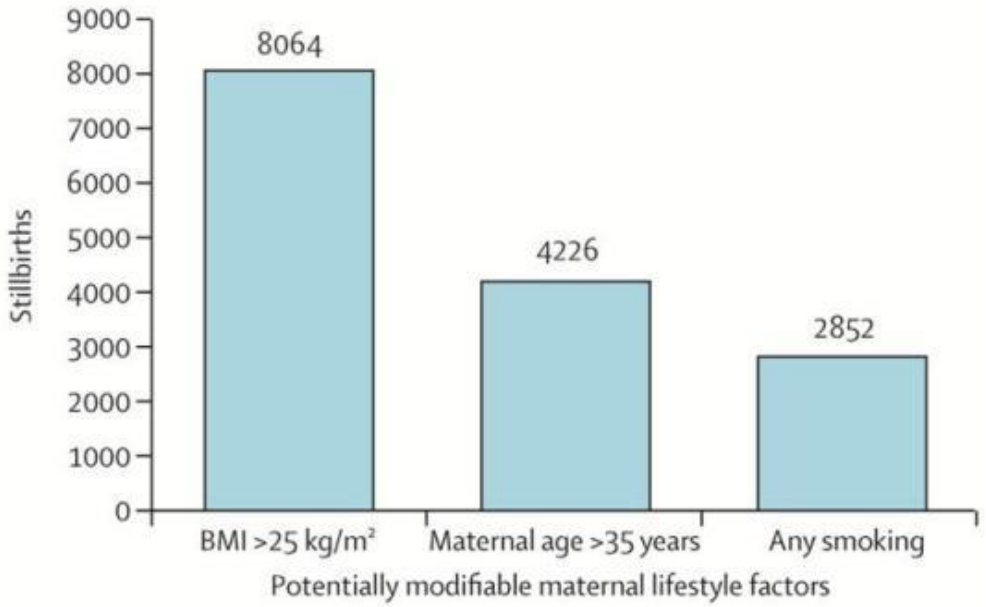
THE LANCET



Differences between countries and within countries show that more reduction in stillbirth rates is achievable

Stillbirths in high-income settings

THE LANCET



Source: Flenady V, Middleton P, Smith GC, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the way forward in high-income countries. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(11)60064-0.

Series

Stillbirths 6

Stillbirths: the vision for 2020

Robert L Goldenberg, Elizabeth M McClure, Zulfiqar A Bhutta, José M Belizán, Uma M Reddy, Craig E Rubens, Hillary Mabeya, Vicki Flenady, Gary L Darmstadt, for The Lancet's *Stillbirths Series steering committee**

Stillbirth is a common adverse pregnancy outcome, with nearly 3 million third-trimester stillbirths occurring worldwide each year. 98% occur in low-income and middle-income countries, and more than 1 million stillbirths occur in the intrapartum period, despite many being preventable. Nevertheless, stillbirth is practically unrecognised

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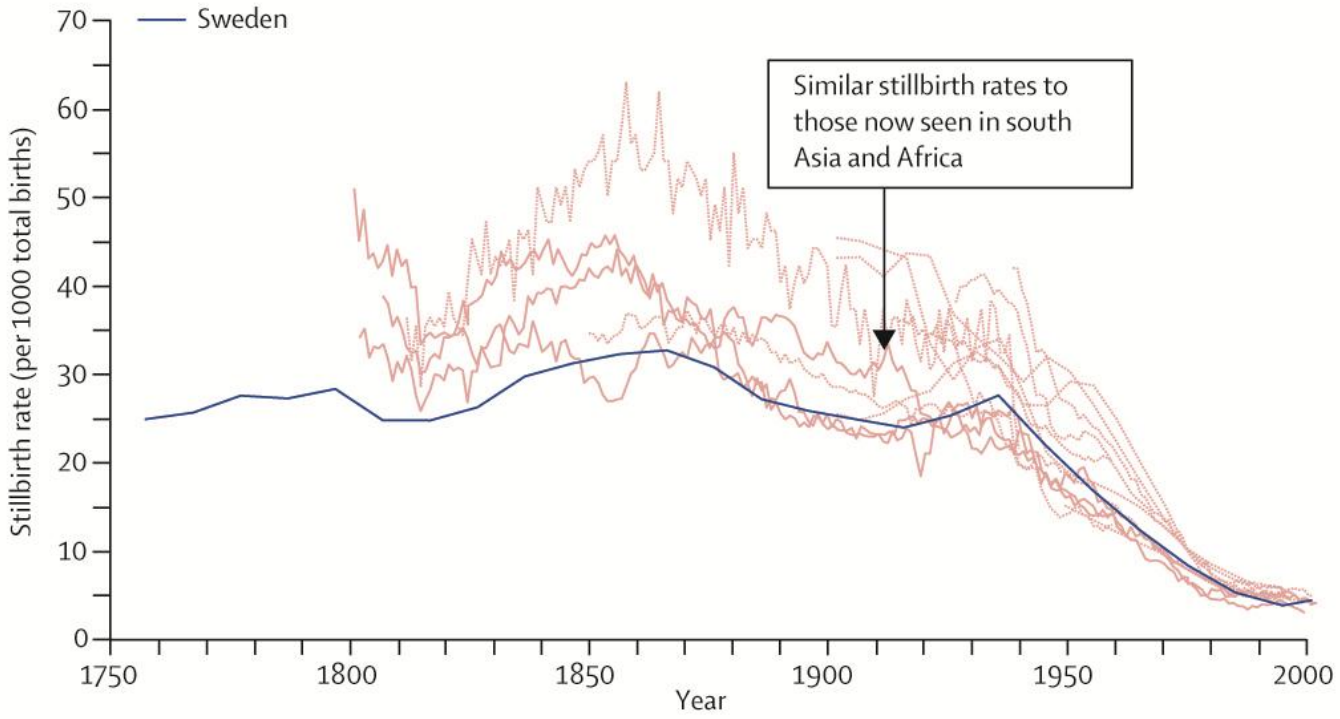
Paper 6: Vision 2020
History sets a precedent for rapid stillbirth reduction

THE LANCET



Stillbirth rates halved in developed countries from 1950-1975 with improvements in obstetric care including hospitalization for delivery – similar reductions are feasible in developing countries now

Causes of stillbirth overlap with causes of maternal and neonatal deaths

THE LANCET

	Mother	Stillbirth	Neonate
Childbirth complications			
Haemorrhage	X	X	X
Obstructed labour	X	X	X
Preterm labour or birth	–	X	X
Infection			
Intrauterine infection	X	X	X
Syphilis	–	X	X
Malaria	X	X	–
Maternal disorders			
Pre-eclampsia or eclampsia	X	X	X
Diabetes	X	X	–
Fetal growth restriction	–	X	X
Congenital abnormalities	–	X	X

Adapted from data in Lawn and colleagues.[1]

Table: **Major causes of death in mothers, stillborn babies, and neonates in low-income countries**

Source: Goldenberg RL, McClure EM, Bhutta ZA, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the vision for 2020. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62235-0.

The Lancet's Stillbirth Series Goal for 2020

THE LANCET

- **All countries to reduce the stillbirth rate to less than 5 per 1000 births, a rate already achieved in 40 high-income countries.**
  - **For countries with a current stillbirth rate of less than 5 per 1000 births, the goal is to eliminate all preventable stillbirths and close equity gaps.**
  - **For countries with a current stillbirth rate of more than 5 per 1000 births, the goal is to reduce their stillbirth rates by at least 50% from the 2008 rates - if they cannot achieve a rate of less than 5 per 1000 births.**

The Lancet's Stillbirth Series
Call to action

THE LANCET

- **Achieving a substantial reduction in stillbirths worldwide by 2020 will require concerted efforts by many participants such as the international health agencies, foundations, research institutions, individual countries and families.**

International Agencies

- **The global partnerships currently advancing maternal and newborn health should include attention to and plans for stillbirth reduction.**

- **Funding for stillbirth prevention should be increased and integrated into donor programs funded to improve global maternal and newborn health.**

Individual Countries

THE LANCET

- **Every country should have a plan for implementing packages of maternal and neonatal care that includes a reduction in stillbirths.**
- **Each country should search for disparities in stillbirth rates based on ethnicity, socioeconomic indicators, and location, and develop plans and programs to reduce those disparities.**

Communities and Families

- **Every community will initiate efforts to increase awareness that stillbirth is a common occurrence, that they happen for medical reasons, and that many can be prevented.**

- **Every community will initiate efforts to acknowledge the impact of stillbirth on families, reduce stigma associated with stillbirth and meet the needs of bereaved families**

The most important research questions

The major research questions for reducing stillbirths world-wide are:

1) How to build a system of care for pregnant women and newborns,

and within such a system

2) How to increase coverage for the most important interventions: a) prenatal care and b) hospitalization at delivery

3) How to improve the quality of prenatal and

Finally, and as soon as possible, we encourage all those with a specific interest in stillbirths to engage with those interested in improving other pregnancy outcomes so that a united front for improving all pregnancy outcomes is created.

We know what interventions work to improve pregnancy outcomes.

Most are not highly technical and relatively easy to perform.

We must make these interventions available and sustain their use in developing country settings.

Reality for families

THE LANCET

- **Over 7200 families a day experience a stillbirth…. But each one is an individual, painful story**
- **Whether they are famous or not, in a rich country or poor, the grief is overwhelming, and usually hidden**
- **Personal story from local family**

Action priorities in high-income countries

THE LANCET

- Reduce inequity, intentionally designing policies and programmes to reach underserved women from poorer communities or ethnic minorities
- Improve quality of care and use audit to link to change
- Address lifestyle risk factors such as obesity, smoking, and advanced maternal age. Identify ways to reduce maternal overweight and obesity

Action priorities in low- and middle-income countries

THE LANCET

Priority programme investments

- Family planning
- Care at birth
- Antenatal care with focus on hypertension
- Advanced antenatal care (diabetes screening, detection of fetal growth restriction, induction for post-term pregnancy)

Source: Lawn JE, Kinney M. The Lancet's Stillbirths Series Executive summary. *Lancet* 2011; published online April 14.

Priority research themes

THE LANCET

Implementation in low-income and middle-income countries:

- **Adapt and scale up the most effective components of intrapartum care, particularly the appropriate use of caesarean section**
- **Adapt and scale up the most effective components of antenatal care, including how to screen for, prevent, and treat various maternal infections**
- **Implement effective quality-improvement programmes, including mortality audits, linking to change**
- **Assess the value of task shifting and the most cost-effective and sustainable training approaches**
- **Assess effective and sustainable mobilisation of communities at scale for behaviour change and care seeking**

Source: Lawn JE, Kinney M. The Lancet's Stillbirths Series Executive summary. *Lancet* 2011; published online April 14.

Priority research themes

THE LANCET

Implementation in high-income countries:

- Reduce disparities in stillbirth rates between groups of different ethnic origins and between people in rural and socioeconomically disadvantaged groups and people in affluent, urban groups
- Reduce risk factors associated with antepartum stillbirth
- Improve antenatal screening for risk factors for stillbirth, including fetal growth restriction
- Prevent early-gestational-age stillbirths
- Implement standard investigation protocols for every stillbirth and linked perinatal audit to improve the quality of maternity care

Source: Lawn JE, Kinney M. The Lancet's Stillbirths Series Executive summary. *Lancet* 2011; published online April 14.

High priority research themes

THE LANCET

Data for programmatic action and tracking:

- Count stillbirths, including through household surveys, sentinel surveillance systems, and strengthening routine vital registration.
- Advance simplified classification of stillbirths that is useful for programme implementation, so that comparisons can be made across locations and time periods, including the use of verbal and social autopsy methods in low-income and middle-income countries.
- Overcome barriers to weighing and gestational age assessment for stillborn babies by use of simplified surrogates such as foot size for gestational age.
- Improve detection of infections in pregnancy in settings with limited laboratory facilities.
- Effective use of simplified audit tools for facility and

Source: Lawn JE, Kinney M. The Lancet's Stillbirths Series Executive summary. *Lancet* 2011; published online April 14.

Goal by 2020

THE LANCET

- **Countries with a current stillbirth rate of more than 5 per 1000 births to reduce their stillbirth rates by at least 50% from the 2008 rates**
- **Countries with a current stillbirth rate of less than 5 per 1000 births to eliminate all preventable stillbirths and close equity gaps**

Source: Goldenberg RL, McClure EM, Bhutta ZA, et al, for The Lancet's Stillbirths Series steering committee. Stillbirths: the vision for 2020. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62235-0.

THE LANCET

The Stillbirth Series

Series

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The Stillbirth Series

Articles

- Cousens S, Stanton C, Blencowe H, et al. National, regional, and worldwide estimates of stillbirth rates in 2009 with trends since 1995: a systematic analysis. *Lancet* 2011; published online April 14. DOI:10.1016/S0140-6736(10)62310-0.
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- Lawn JE, Kinney M, for The Lancet's Stillbirths Series steering committee. The Lancet's Stillbirths Series Executive summary. *Lancet* 2011; published online April 14.
- Translated version in Italian and French available online .

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The Stillbirth Series

Comments

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Snapshot of stillbirth in UK

THE LANCET

Stillbirth data for the UK	
Number of stillbirths per year (2009)	2,630
Rank out of 193 countries – numbers	115
Stillbirth rate per 1000 births (2009)	3.5
Rank out of 193 countries – rates	33
Rate of reduction 1995-2009	1.4%
Important causes	- Placental problems - Congenital abnormalities - Intrapartum causes - Maternal disorders - Pre-eclampsia - Infection

Priority actions:

1. **Reduce inequity, intentionally designing policies and programmes to reach underserved women from poor communities or ethnic minorities**
2. **Improve quality of care and use audit to link to change, and**
3. **Address lifestyle risk factors such as obesity, smoking, and advanced**

Snapshot of stillbirth in USA

THE LANCET

Stillbirth data for the USA	
Number of stillbirths per year (2009)	13,070
Rank out of 193 countries – numbers	156
Stillbirth rate per 1000 births (2009)	3.0
Rank out of 193 countries – rates	17
Rate of reduction 1995-2009	1.5%
Important causes	- Placental problems - Congenital abnormalities - Intrapartum causes - Maternal disorders - Pre-eclampsia - Infection

Priority actions:

1. **Reduce inequity, intentionally designing policies and programmes to reach underserved women from poor communities or ethnic minorities**
2. **Improve quality of care and use audit to link to change, and**
3. **Address lifestyle risk factors such as obesity, smoking, and advanced**

Report card for stillbirths in South Africa

THE LANCET

Stillbirth data	
Number of stillbirths per year (2009), WHO definition Rank for numbers*	23,000 176
Stillbirth rate per 1000 births (2009), WHO definition Rank for rates*	20 148
Av annual rate of reduction 1995-2009	0.9%

* From 193 countries

2000-2009 progress

Stillbirth rate reduced from 23 to 20 per 1000 (12%, or