Water, sanitation and hygiene (WASH) and Maternal and Newborn Health – using what we know to accelerate

Monday, 19 October 2015: 1330-1500

Global MATERNAL NEWBORN Health Conference
reaching every mother and newborn with quality care

OCTOBER 18–21
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SUSTAINABLE DEVELOPMENT GOALS

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Policy Forum

From Joint Thinking to Joint Action: A Call to Action on Improving Water, Sanitation, and Hygiene for Maternal and Newborn Health

- Enabling stronger integration between the WASH and health sectors has the potential to accelerate progress on MNH; this should be accompanied by improving monitoring of WASH in health care facilities providing MNH services as part of routine national-level monitoring, and at the global level through international instruments.
- Global and national efforts to reduce maternal and newborn mortality and morbidity should adequately reflect WASH as a pre-requisite for ensuring the quality, effectiveness, and use of health care services.
- The Post-2015 development framework is an opportunity for a stronger, more inter-sectoral response to the MNH challenge, and the goals and targets aimed at maximizing healthy lives and increasing access to quality health care should adequately embed WASH targets and success indicators.
- Further implementation research is needed to identify effective interventions to improve WASH at home and in health care facilities, and to impact on MNH in different health system contexts.

Citation: Velleman Y, Mason E, Graham W, Benova L, Chopra M, et al. (2014) From Joint Thinking to Joint Action: A Call to Action on Improving Water, Sanitation, and Hygiene for Maternal and Newborn Health. PLoS Med 11(12): e1001771. doi:10.1371/journal.pmed.1001771

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PART 1

1. The Impact of WASH on Maternal and Newborn Health: What Do We Know? **Oona Campbell**

2. Opportunities for Improvement: Lessons from the WASH & CLEAN study in India and Bangladesh. **Kranti Vora**

3. Driving Improvements in WASH in Healthcare Facilities in Cambodia: Facility Level Assessments to National Level Change. **Alison Macintyre**

4. Access to Water and Sanitation in Obstetric Facilities in 14 Western and Central African Countries: Review of Emergency Obstetric and Newborn Care Needs Assessments. **Fabrice Fotso**

Questions from the floor

PART 2

5. Starting Out Right: Building Improved Hygiene Practices into the Antenatal Platform. **Merri Weinger**

6. Impact of Promoting Waterless Hand Cleansing with Chlorhexidine on Hand Cleansing Behaviour during the Neonatal Period: Findings from a Randomized Controlled Trial in rural Bangladesh. **Pavani Ram**

Questions from the floor

The impact of WASH on maternal & newborn health: What do we know?

Oona Campbell

on behalf of

Lenka Benova, Oliver Cumming, Laura Monzon-Llamas, Giorgia Gon, Moke Magoma, Kaosar Afsana, Joanna Esteves Mills

MARCH centre for MATERNAL REPRODUCTIVE & CHILD HEALTH

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Background:

- Links between WASH & child health well known & reflected in programme design
- Recognition of WASH's importance to maternal and newborn health is nascent
- Evidence-base growing, but remains limited

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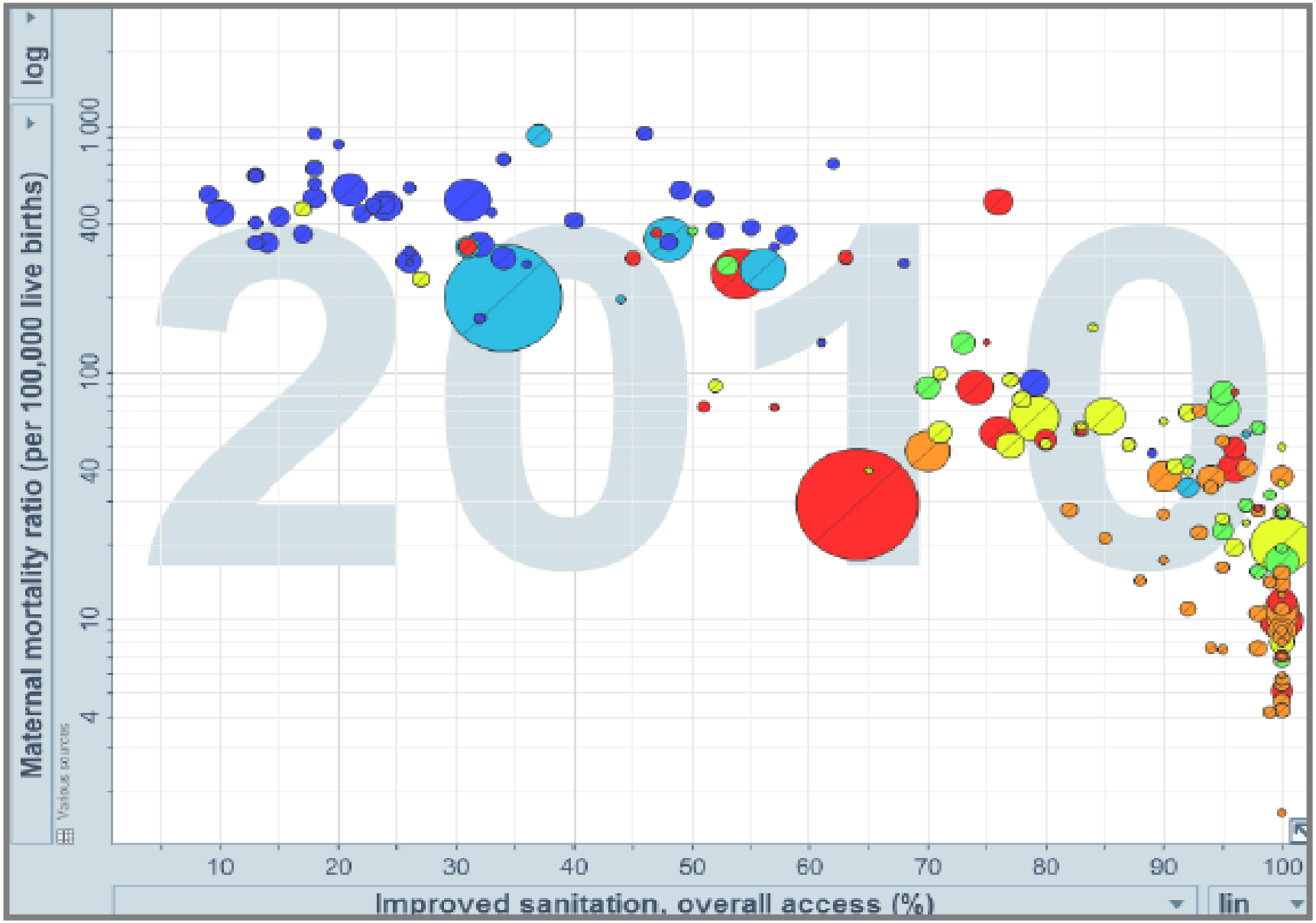
Is Sanitation correlated with Maternal Mortality?

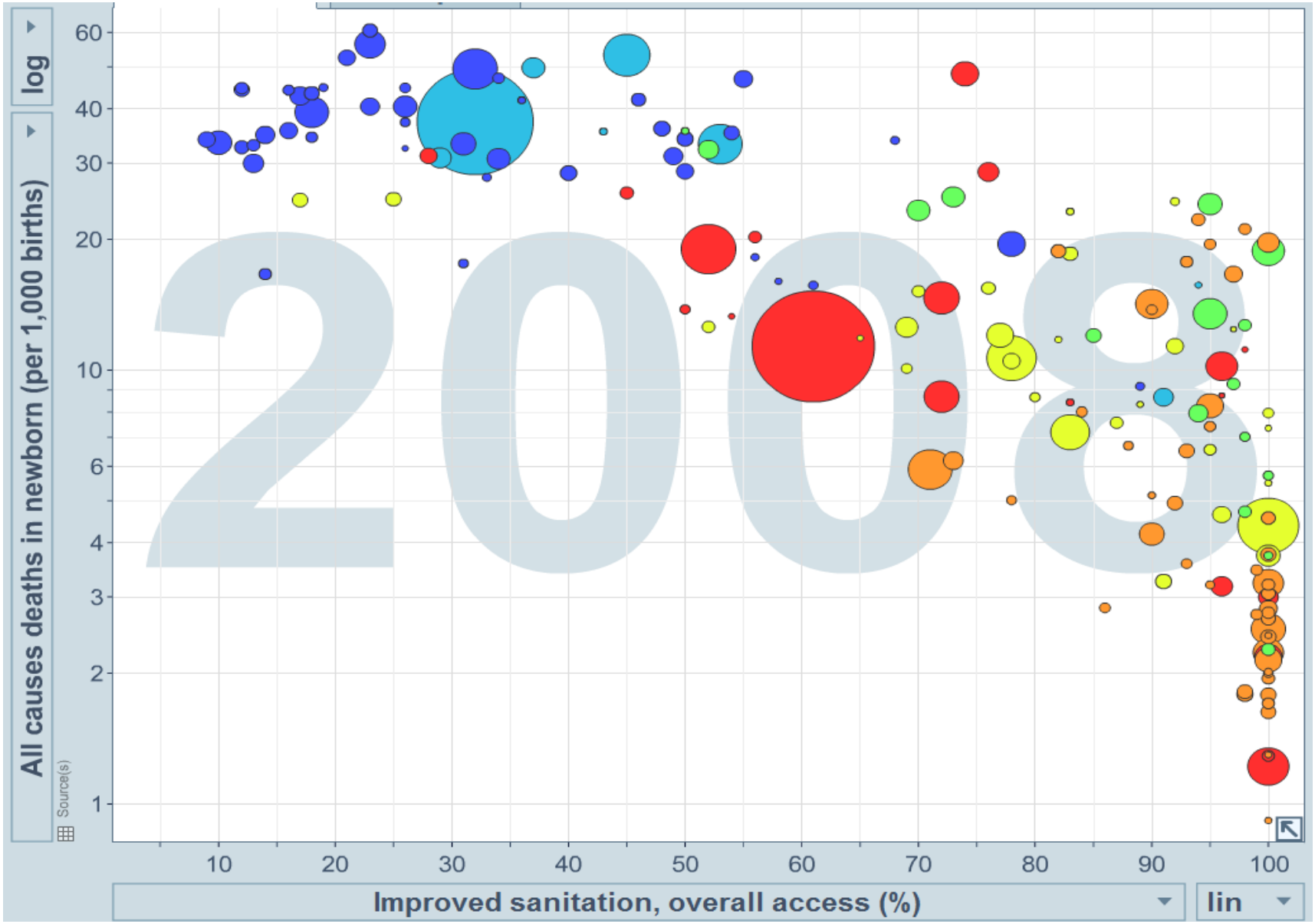
Yes.... Water is Too



Source: Gapminder.org

What about Sanitation and Neonatal Mortality?

Yes.... Water Too



Source: Gapminder.org

Birth Environments have poor Water and Sanitation

Editorials

Lack of toilets and safe water in health-care facilities

Jamie Bartram,[a] Ryan Cronk,[a] Maggie Montgomery,[b] Bruce Gordon,[b] Maria Neira,[b] Edward Kelley[c] & Yael Velleman[d]

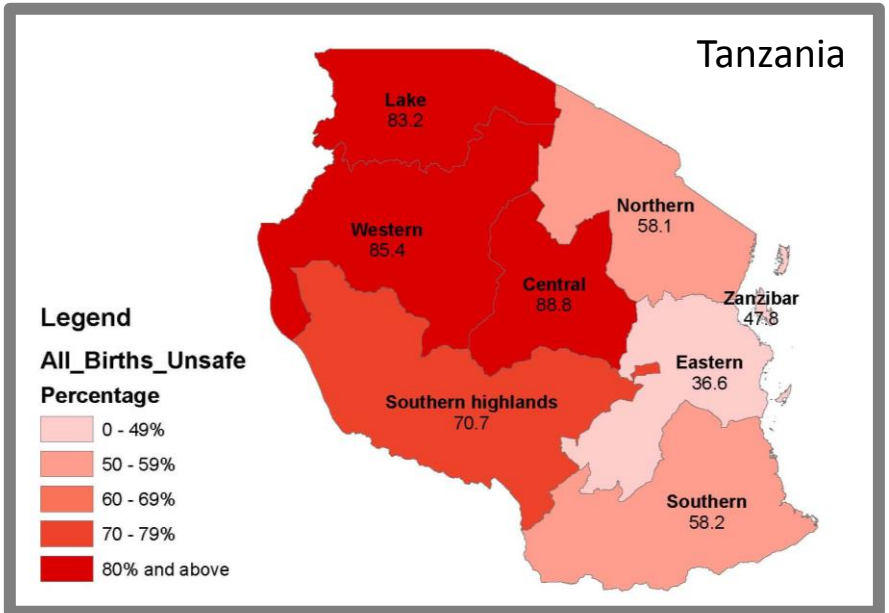
OPEN ACCESS Freely available online PLOS ONE

Where There Is No Toilet: Water and Sanitation Environments of Domestic and Facility Births in Tanzania

Lenka Benova[1]*, Oliver Cumming[2], Bruce A. Gordon[3], Moke Magoma[4], Oona M. R. Campbell[1]

Geographic distribution:

% all births in WASH unsafe environment



Impact of WASH on Maternal & Newborn Health

- **Conceptual framework** of potential links: review of reviews

- **Systematic review & secondary data analyses** of evidence on effect of water & sanitation on maternal mortality

- **Subsequent work by others**

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Is WASH important for maternal & reproductive health?

Conceptual framework with three lenses:

1. Gender (biological, social and behavioural)
2. WASH transmission (biological)
3. Life-course (long-term perspective)

1. In the water

2. Behaviour & location

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Gender inequalities

National Institutes of Health (1991) distinguish women's health as diseases or conditions:

- unique to women or some subgroup of women
- more prevalent
- more serious
- for which the risk factors are different
- for which the interventions are different

Used to highlight conditions relevant to:

- Pregnant women/mothers
- Where exposure of pregnant women to WASH-related hazards affected foetus or newborn

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A. In the water: Inorganic contaminants

Industrial Contaminants

- Metals (lead, manganese, mercury, potassium, thallium)
- Cyanide, selenium, sulphate
- Nitrates/nitrites
- Pesticides & herbicides
- Pharmaceuticals & personal care products (endocrine disruptors)

Naturally Occurring

- Arsenic
- Fluoride
- Salinity
- Hardness (Ca & Mg)

Deliberate additives

- Chlorine & by-products
- Fluoride

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B-D. In the water: Infectious agents

Water-borne

- Salmonella, Listeria, E Coli
- Hepatitis E
- Hookworm, other helminths, Toxoplasmosis

Water-based

- Schistosomiasis
- Tapeworm
- Guinea worm

Water Systems

- Legionellosis

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E-F. Behavioural aspects: infectious

Water-related insect vector borne

- Mosquito (Malaria, Dengue)
- Black flies (onchocerchiasis)
- Tse-tse flies (sleeping sickness)

Water-washed

- Wound infections (tetanus)
- Enteric infections
- Puerperal sepsis
- Respiratory infections (influenza)
- Skin, eye, ear infections
- Lice & flea-borne
- Rodent transmitted

Isolated water & sanitation facilities

Real or perceived availability or risk

Physical burden

Costs

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G-I. Behavioural aspects: non-infectious

Water-related insect vector borne

Water-washed

Isolated water & sanitation facilities

- Pests (insects, snakes)
- Drowning
- Perverts (harassment/rape)

Real or perceived availability or risk

- Fear, isolation & mental distress
- Reduction in drinking or eating
- Alcohol substitution
- Avoiding Education or Health facilities

Physical burden

- Water load (prolapse, spinal effects, calories)
- Handling faeces (infection)

Costs

- Time (opportunity costs, school dropout)
- Financial (buy/treat water, illness)

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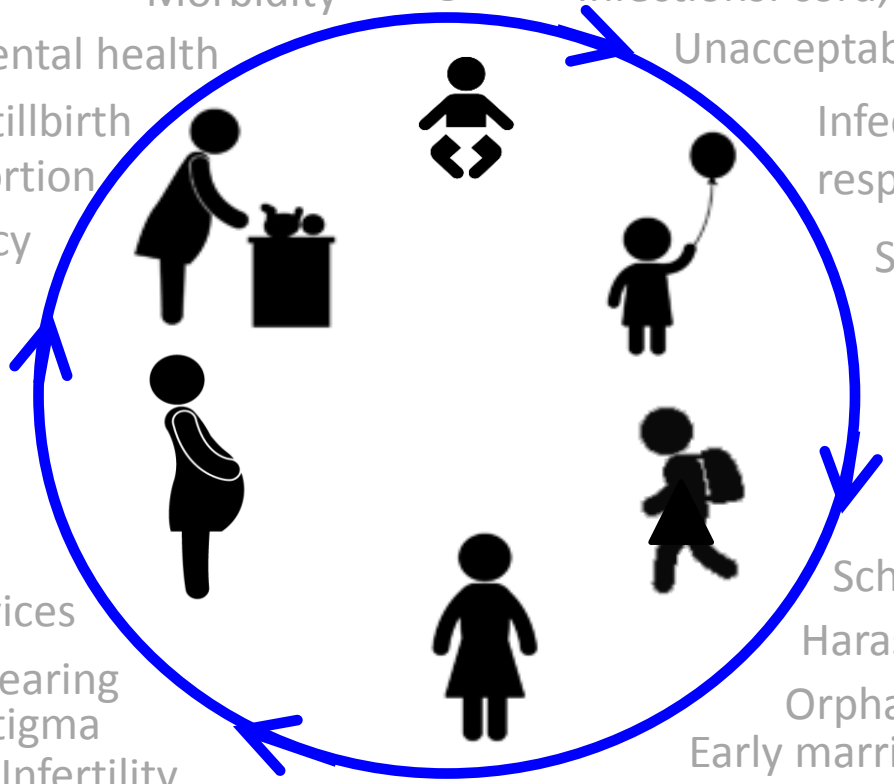
Life course perspective on potential impacts



Low birth weight
Morbidity
Infections: cord, skin & eye
Poor mental health
Unacceptable child health services
Stillbirth
Infections: enteric, parasitic, respiratory
Spontaneous abortion
Repeated pregnancy
Stunting
Maternal Death
C-section
Anaemia, rheumatic disease
Obstructed labour
Cognitive impairment
Cardiac disease
UTI
Anaemia
UTI
Unacceptable schools
Unacceptable ANC, delivery & PNC services
School absenteeism/dropout
Harassment, rape
Early childbearing
Orphans
Stigma
Early marriage
Infertility
Opportunity costs
Unacceptable FP services
Pelvic inflammatory disease
Spinal compression
Short adult
Prolapse
Caloric expenditure

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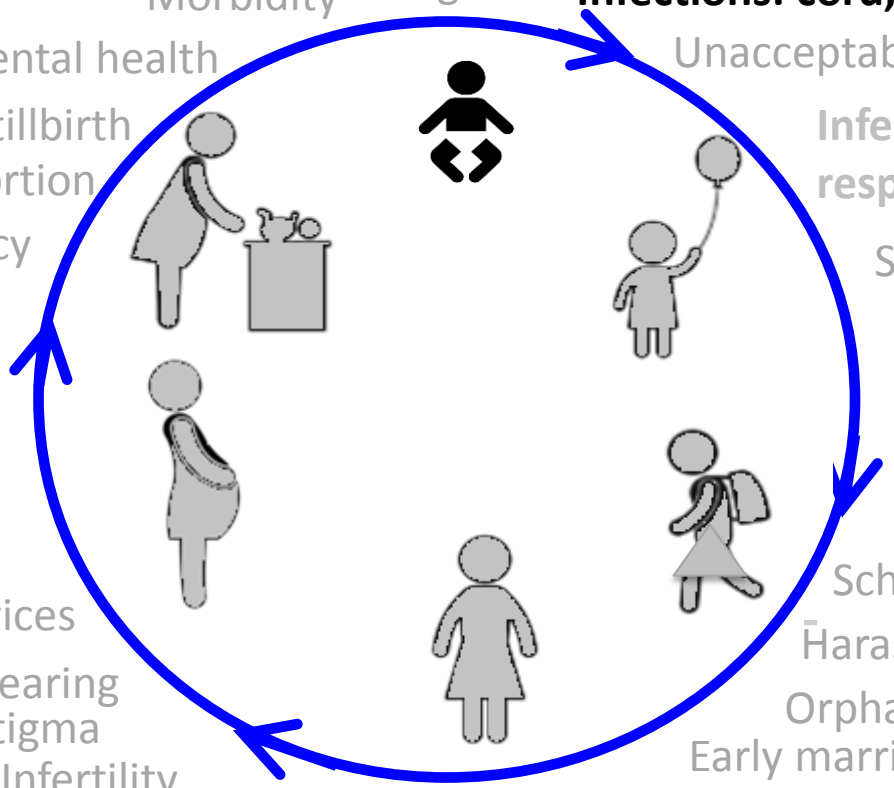
Infections



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Poor mental health

Morbidity

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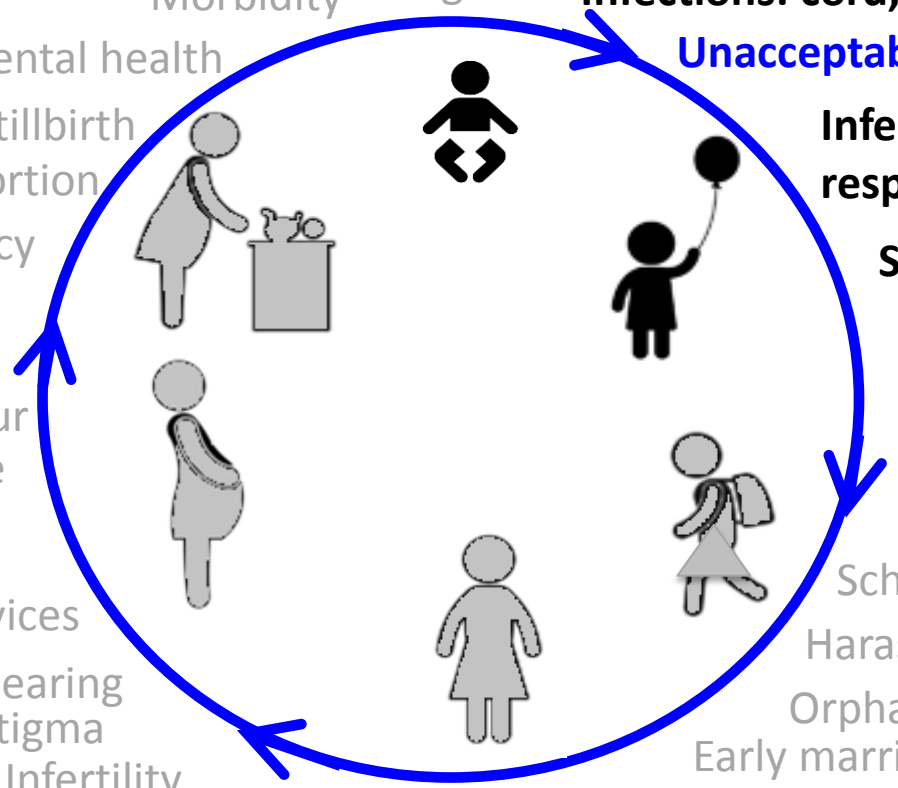
Infections → Stunting



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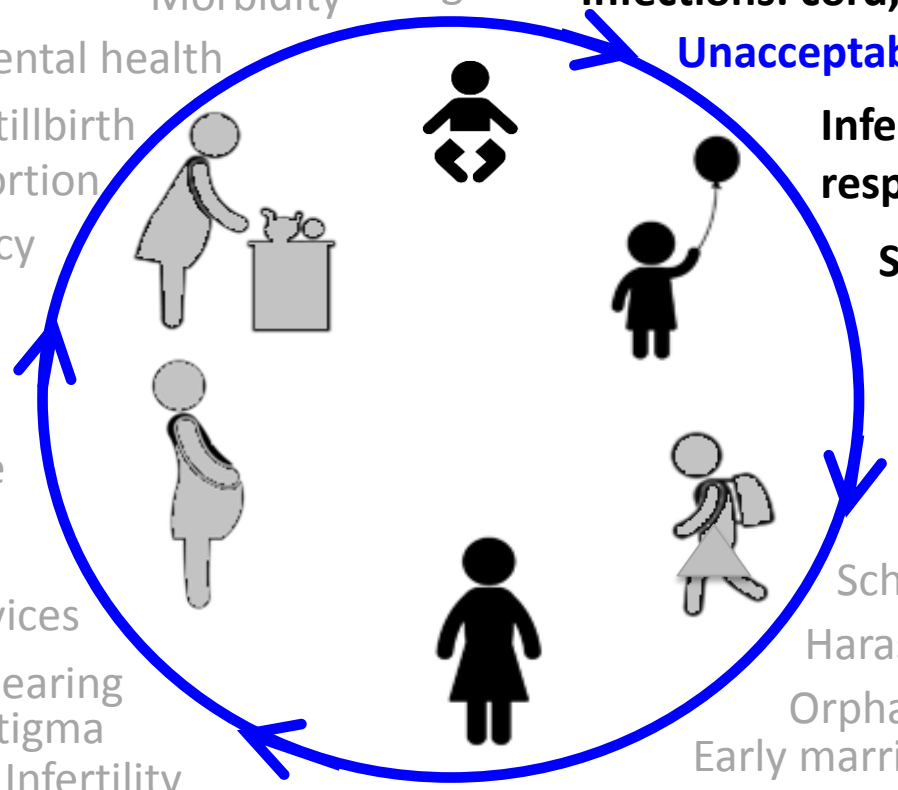

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UTI

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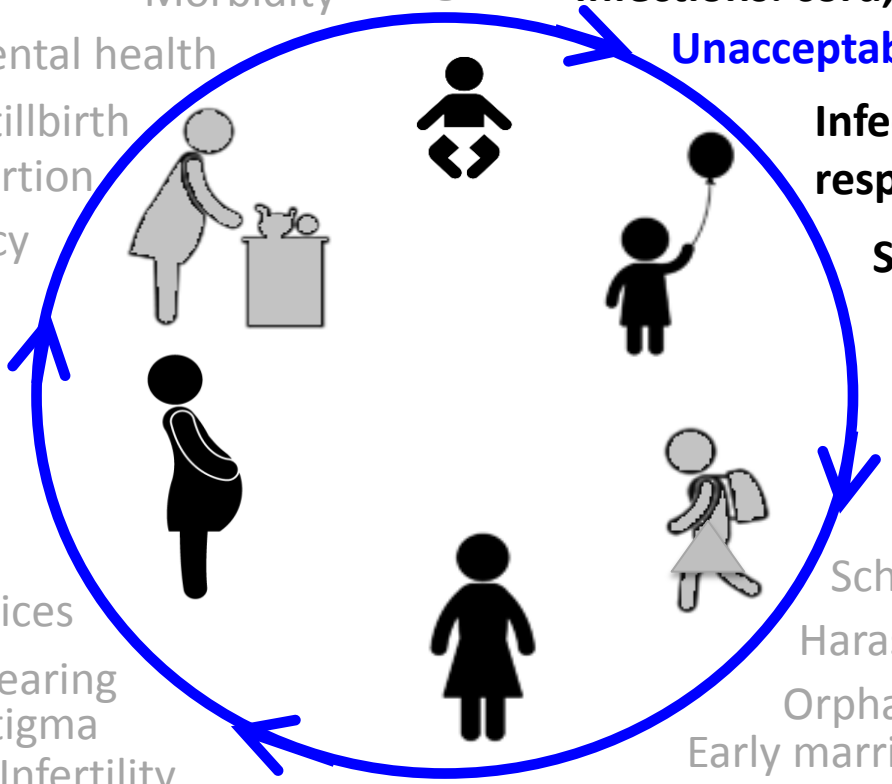
Infections → Stunting → Obstructed Labour



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Morbidity

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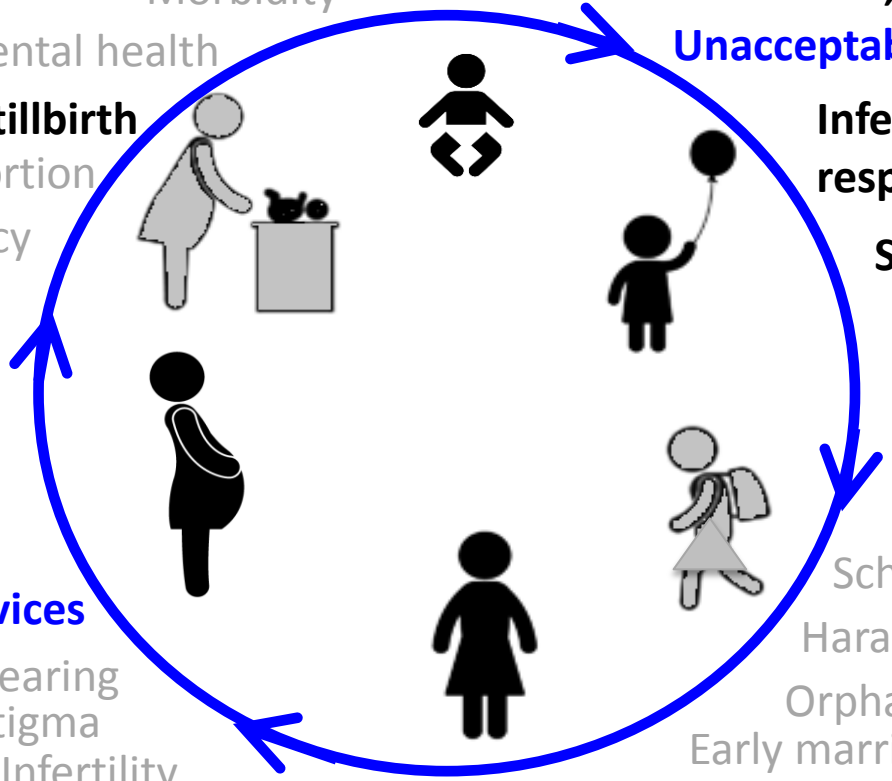
Infections → Stunting → Obstructed Labour → C-section or Maternal Death or Stillbirth



We found 67 potential biological/chemical linkages and 10 potential behavioural linkages

77 Systematic reviews needed!

Secondary analyses & new data collection needed too!

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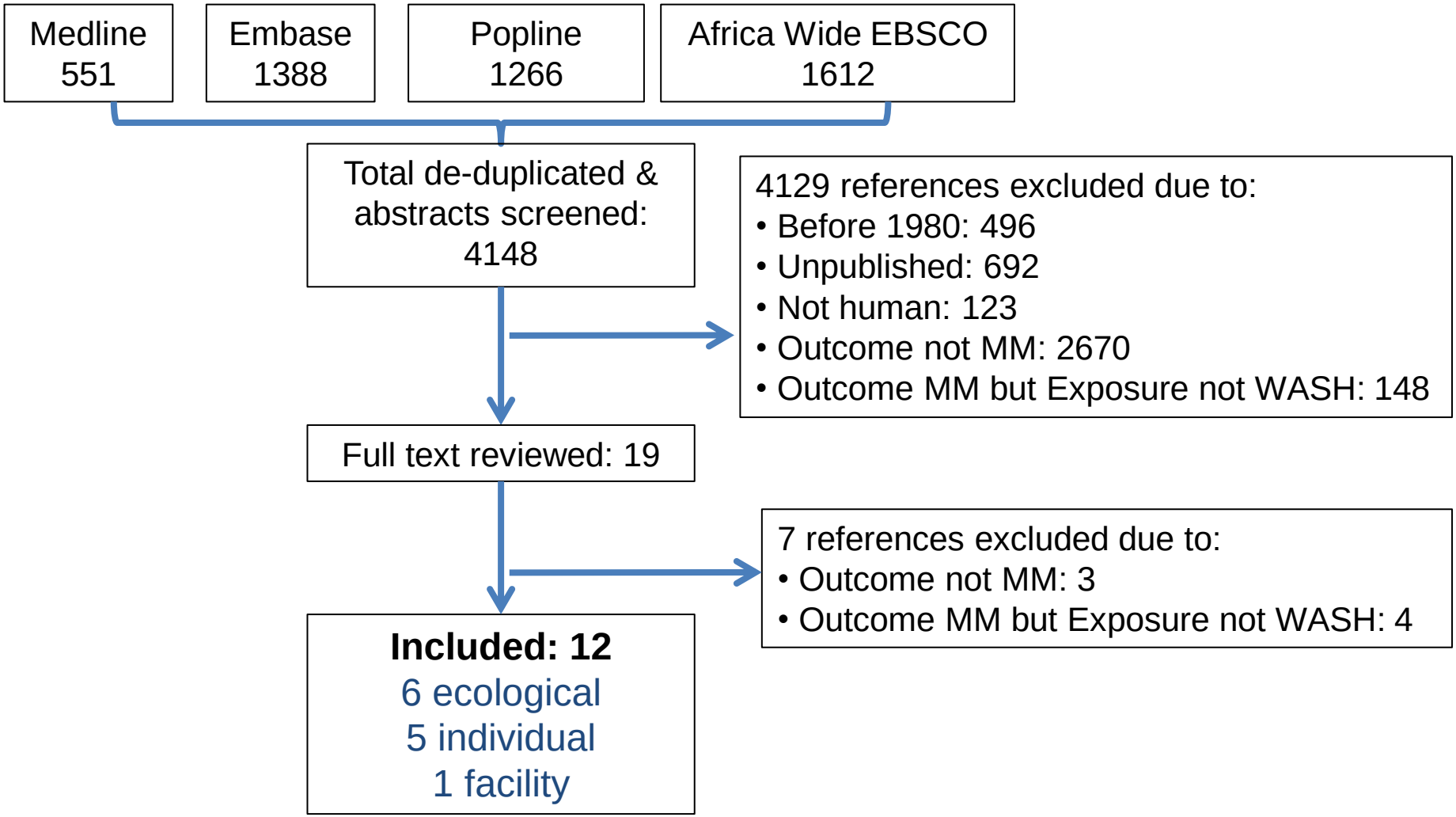
One of them: systematic literature review on maternal mortality

Medline, Embase, Global Health, Web of Science

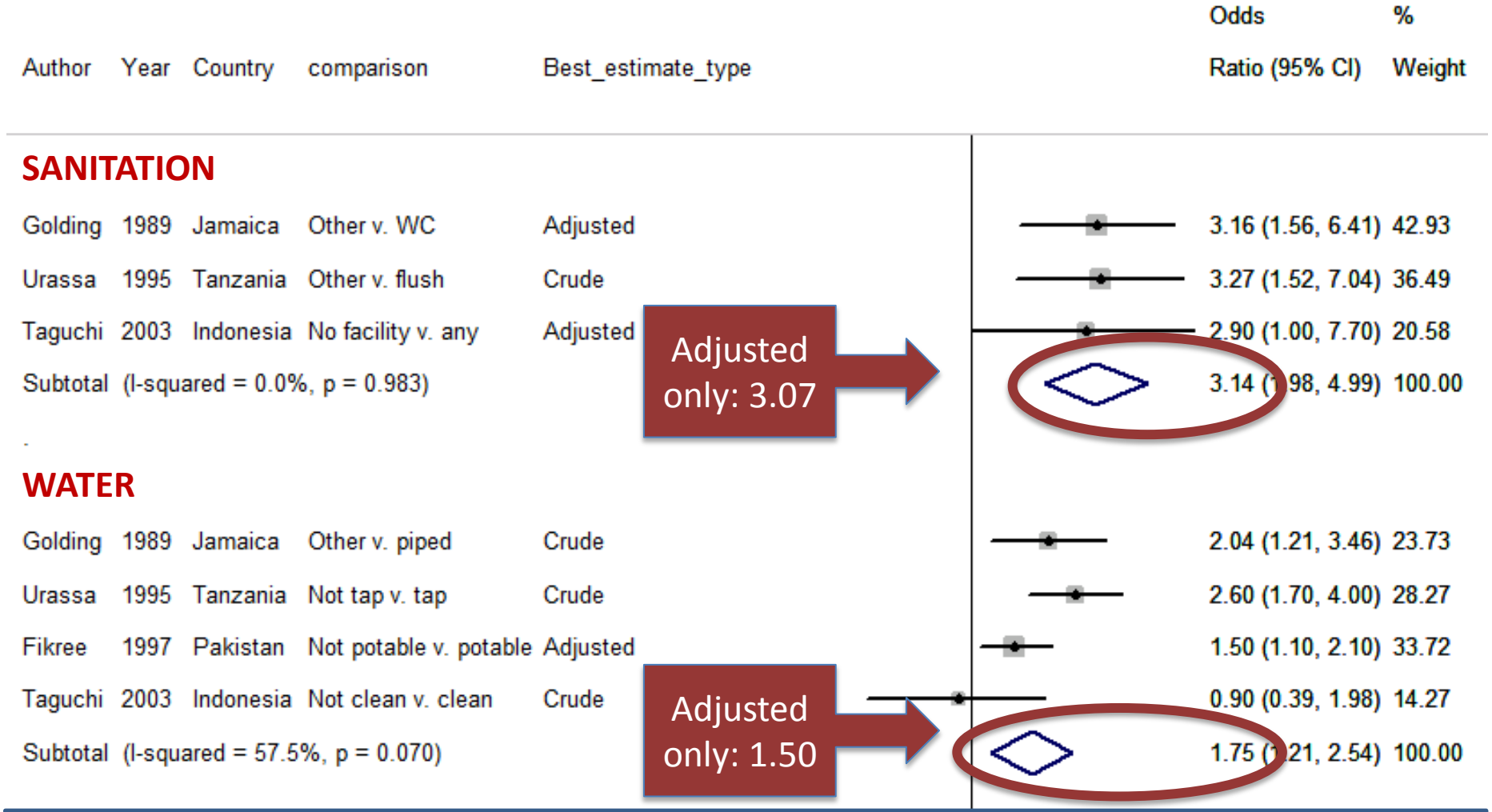


WASH & Maternal Mortality: ecological studies

Author, Year	Study sample/ year of data	Water	Sanitation	Confounders
Paul, 1993	36 African countries 1980-1987	% with access to safe water	NA	7
Hertz et al, 1994	55 countries no timeframe	% without safe water	% without excreta disposal facilities	6
Herrera et al, 2001	210 countries (final model 89) 1998	% with access to adequate amount of safe water (20 liters/day)	% with adequate extreta disposal	crude
Alvarez et al, 2009	45 sub-Saharan African countries 1997-2006	% with access to protected sources of water	% with access to sanitation	crude
Muldoon et al, 2011	136 countries MMR -2008; other- 2001-2008	% with sustainable access to water	% with sustainable access to sanitation	3
Cheng et al, 2012	193 countries MMR -2010; other 2008-2010	% with access to improved water source	% with access to improved sanitation	4

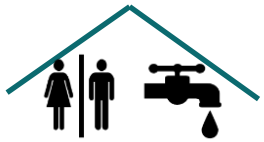
No effect Borderline Significant

Water & Sanitation and Individual Level Maternal Mortality Studies: Meta-analysis



We also see independent associations for analyses we have done in Afghanistan, Bangladesh and Pakistan

Our own secondary data analysis: Afghanistan



Main outcome: pregnancy-related mortality vs survived delivery and postpartum

Main exposures: household water sources & toilet facilities at the time of interview

- Joint Water Supply and Sanitation Monitoring Program classification *(JMP, 2011)*
- Binary (improved vs. unimproved) & ordered categorical (high, medium & low) to test dose-response

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Non-cases	Cases
All women aged 12-49 interviewed: 47,848	Verbal autopsies of all deceased adults age 12+: 1,831
Women with a birth/stillbirth since 21st March 2007: 15,584	Females who died since 21st March 2007: 780
Slept in household night before interview: 15,480	Pregnancy-related mortality (excluding abortion cases and early pregnancies): 66
Aged 12-49: **15,480**	Aged 12-49: **66**

Inclusion criteria

Comparable in all relevant aspects except dead/alive status

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Confounders adjusted for:
(potential alternative explanations)

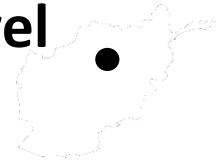
Individual level

- age
- current marital status
- education
- ethnicity of the household
- parity

Household level

- socio-economic position
- crowding

Cluster level



- place of delivery
- infrastructure quintile

Temporal & spatial characteristics

- woman's place of residence
- region
- year & season of delivery (non-cases) or death (cases)

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What do we see?
Overall association

Water Source: Adjusted OR=1.91 (95% CI 1.11-3.30); p-value=0.020

Toilet facilities: Adjusted OR=2.25 (95% CI 0.71–7.19); p-value=0.169

Adjusted for age, ethnicity, education, socio-economic position, crowding, place of delivery, infrastructure quintile, residence, season, year and region

No important changes when **sensitivity analyses** were run imputing missing parity values

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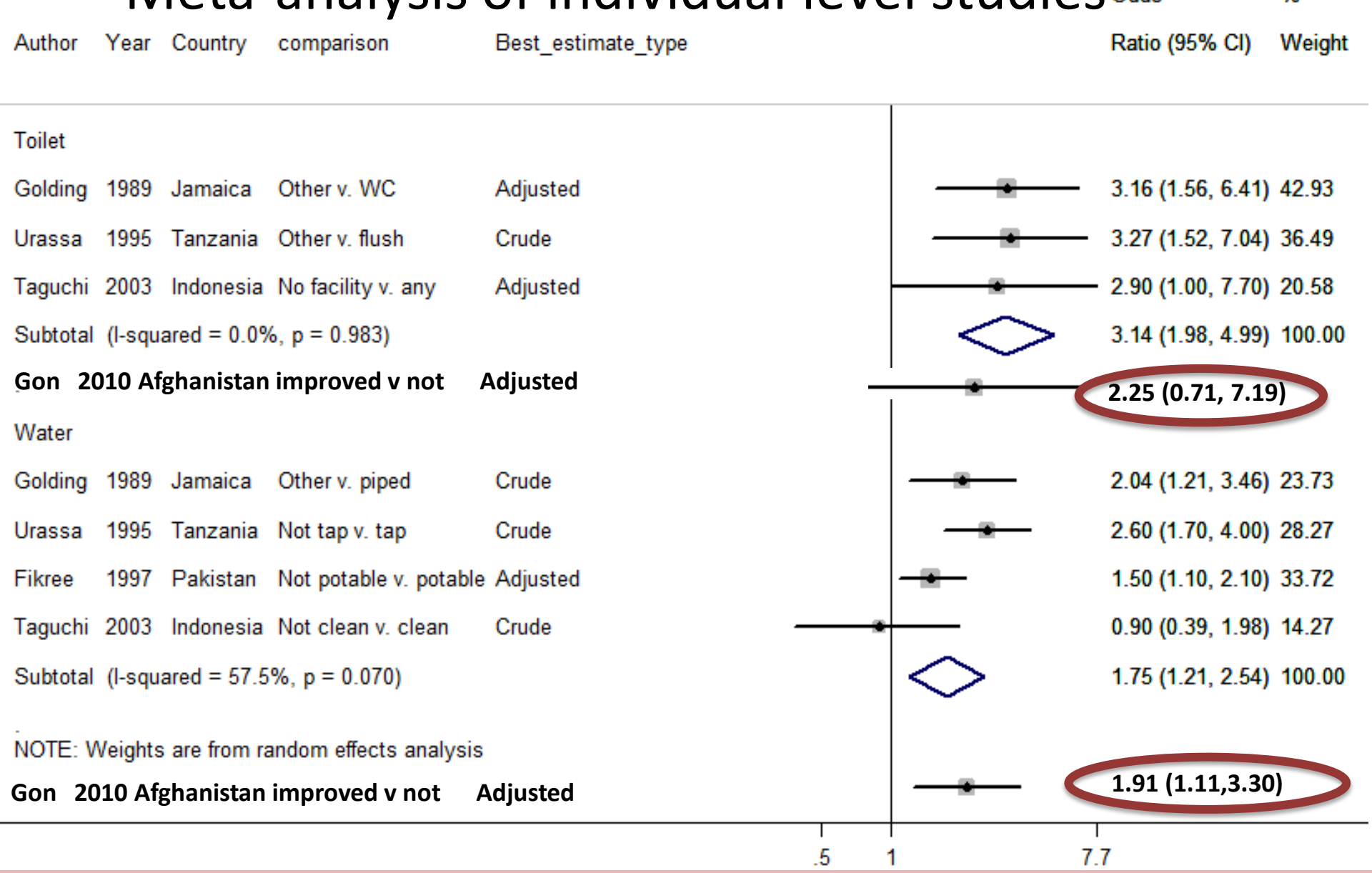
Meta-analysis of individual level studies



Adjusted for age, ethnicity, education, socio-economic position, crowding, place of delivery, infrastructure quintile, residence, season, year & region

Work on Impact of WASH & Maternal and Newborn Health

1. WASH and Maternal & Perinatal Health
   - Conceptual Framework paper published (open access)
2. Water & Sanitation and Maternal Mortality
   - Systematic Review published (open access)
   - Analyses of Afghanistan, Bangladesh & Pakistan completed
   - Afghanistan published (open access)

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Work on impact is continuing

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RESEARCH ARTICLE

Risk of Adverse Pregnancy Outcomes among Women Practicing Poor Sanitation in Rural India: A Population-Based Prospective Cohort Study

Bijaya K. Padhi[1], Kelly K. Baker[2], Ambarish Dutta[1], Oliver Cumming[3], Matthew C. Freeman[4], Radhanatha Satpathy[1], Bhabani S. Das[1], Pinaki Panigrahi[5]*

1 Asian Institute of Public Health, Bhubaneswar, India, **2** College of Public Health, University of Iowa, Iowa City, Iowa, United States of America, **3** Faculty of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, United Kingdom, **4** Rollins School of Public Health, Emory University, Atlanta, Georgia, United States of America, **5** College of Public Health, University of Nebraska Medical Center, Omaha, Nebraska, United States of America

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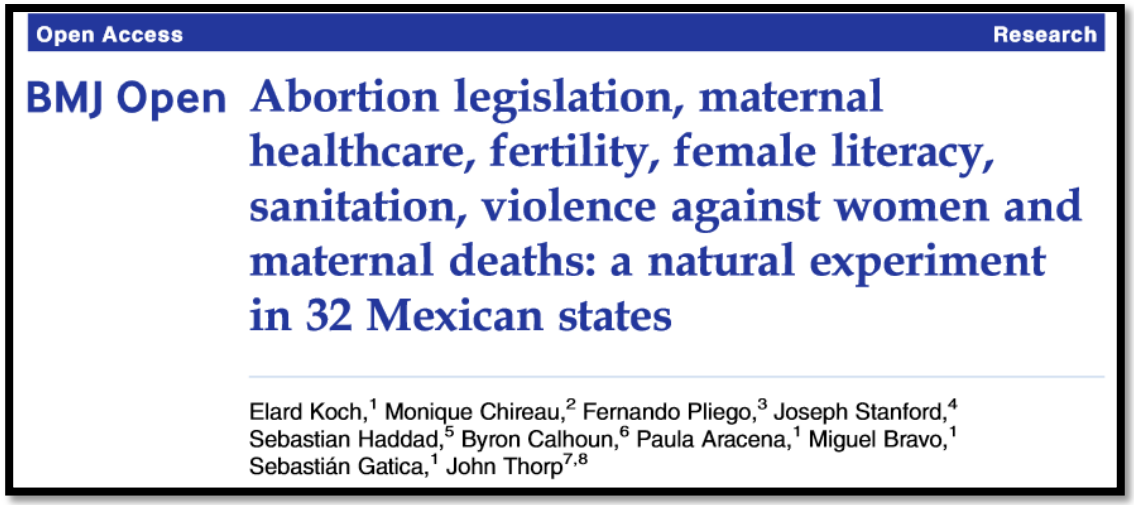

Open Access Research

BMJ Open

Abortion legislation, maternal healthcare, fertility, female literacy, sanitation, violence against women and maternal deaths: a natural experiment in 32 Mexican states

Elard Koch,[1] Monique Chireau,[2] Fernando Pliego,[3] Joseph Stanford,[4] Sebastian Haddad,[5] Byron Calhoun,[6] Paula Aracena,[1] Miguel Bravo,[1] Sebastián Gatica,[1] John Thorp[7,8]

What we know: Summary

- Plausible biological and social mechanisms link WASH with maternal health
- Poor water and poor sanitation environments are associated with higher maternal mortality
- Opportunities exist for improved synergy in policy domain
- High burden of poor water and sanitation in domestic and facility birth settings exists
- Existing evidence confirms that benefits of improvement may be substantial

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What we know: Summary

- Many gaps remain requiring primary research to investigate specific exposure-outcome relationships and systematic reviews of existing evidence on the more dominant pathways.
- Whilst more evidence is needed, there is sufficient evidence to give greater consideration to WASH in in improving Maternal and Neonatal Health, including in improving WASH in health facilities in the first instance

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Action Points

General:

- WASH & Maternal Health interface relates to many other big agenda issues
- Acts as an entry point & catalyst for joined-up thinking around quality of care, patient safety, women's empowerment, other non-health sector issues, etc. – many things currently being dealt with in silos

Policy:

- Ensure WASH and Health Policies synergize and specifically mention WASH in Health Facilities;
- Support WHO collaborative efforts to define adequate Facility WASH indicators and goals

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Action Points

Programmes:

- Support provision of facility-based Water and Sanitation

- WASH in facility based needs-assessments (SPA/SARA)
  - Definitions applied
  - Data available, updated, expanded (census/private)

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Action Points

Research:

- Support more research on links between WASH and Maternal and Neonatal Health

- Understand responsibilities and bottlenecks for sanitation in health facilities

- Increase understanding and channel action to improve hygiene on labour wards

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Supported by:

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through the SHARE Research Consortium

The SHARE Research Consortium generates new findings and synthesis of existing knowledge on sanitation and hygiene in order to improved policy and practice.

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share
Sanitation and Hygiene Applied Research for Equity

Opportunities for Improvement:

Methods & key findings from the WASH & CLEAN Study

Funded by
SHARE – Sanitation & Hygiene Applied Research for Equity & The Soapbox Collaborative

Presenter:

Dr Kranti Vora, Indian Institute of Public Health Gandhinagar, India – on behalf of the WASH & CLEAN Study Team

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Content

- WASH & CLEAN study rationale & objectives
- WASH & CLEAN methods & tools
- Key findings
- Recommendations

A preventable burden

- 100,000s of maternal and newborn deaths each year
- Significant proportion due to infections caused by unhygienic environments & practices at the time of delivery
- 99% of these infection-related deaths are preventable

Study objectives

- To develop tools for capturing levels of cleanliness on maternity wards & key determinants
- To apply tools to sample of maternity units in Gujarat State, India & in Dhaka Division, Bangladesh
- To synthesize and communicate the findings

Study methods

- Mixed methods approach
- Multiple stakeholders
- Novel elements - photo-elicitation, microbiology

Pilot Phase (Dec 2013-Jan 2014)

- Two maternity units Gujarat, India
- Two maternity units Dhaka Division, Bangladesh

Situation Analysis Phase (Feb – May 2014)

- Seven maternity units, Gujarat
- Eight maternity units, Dhaka Division
- Public & private facilities
- High and low caseloads
- Obstetric functionality

WASH & CLEAN Tools

Tool 1: Walkthrough Checklist

Tool 2: Facility Needs Assessment Tool & Document Capture

Tool 3: Semi-structured interview with management

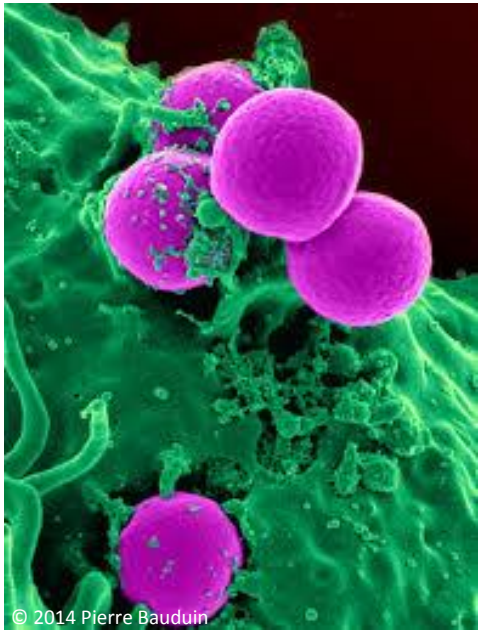
Tool 4: Photo-prompted semi-structured interviews with healthcare providers

Tool 5: Photo-prompted semi-structured interviews with cleaners

Tool 6: Photo-prompted semi-structured interviews with recently delivered women

Tool 1: Walkthrough Checklist

- Healthcare environment
- 3 methods of data collection:
  - Walkthrough Checklist Questionnaire
    - Visual state of hygiene & determinants
  - Photographs
    - Visual state of hygiene & determinants
  - Microbiology
    - State of hygiene



Tool 2: Facility Needs Assessment Tool & Document Capture

- Healthcare organisation, systems & operations, human resources, infection prevention & control (IPC) & healthcare practices
- Questionnaire
  - Interview format
- Document Availability Checklist
  - Policies & Protocols
  - Healthcare system

Tools 3-5: Interviews using Photo Elicitation

- Involves the use of photo prompts to generate discussion
- Provides insights rarely gained through direct questioning
- Technique proved useful particularly with illiterate/semi-literate participants and marginalised groups
- Rarely applied in developing country contexts, less so in healthcare environments

Tool 6: Photo-prompted semi-structured interviews with recently delivered women

- Views and perceptions of women on their understanding of hygiene at birth, & their satisfaction with care on maternity unit
- Respondent characteristics
- Use of photo-prompted & closed questions
- India – Exit interviews; Bangladesh – Exit Interviews & Community follow-up

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WASH & CLEAN Toolkit

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WASH & CLEAN Key Findings

- Visual cleanliness is not a proxy for safety. Hand hygiene necessary but not sufficient.
- Health facility cleaners are a neglected part of the healthcare workforce with little/no training in IPC
- Knowledge of IPC does not automatically translate into practice
- Routine data on maternal and neonatal infections is lacking

WASH & CLEAN Recommendations

- National IPC policies and guidelines available, up-to-date and practiced
- Dedicated IPC person/team ensuring IPC guidelines followed, and supervision and audit performed
- Routine, standardised training in IPC for **all** staff
- Data on newborn and maternal sepsis captured by routine health information systems

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Access to water and sanitation in obstetric facilities in 14 Western and Central African Countries: A review of Emergency Obstetric and Newborn Care needs assessments

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Global MATERNAL NEWBORN Health Conference
reaching every mother and newborn with quality care
OCTOBER 18–21 2015 Mexico City

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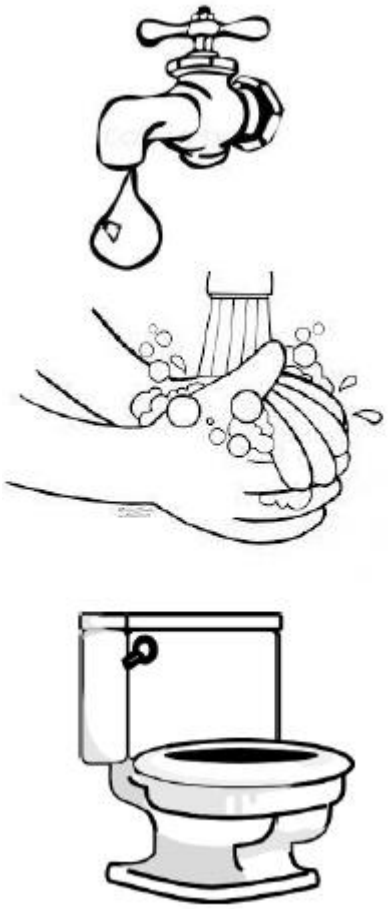
Outline of the presentation

1. Providing quality EmONC service
2. Importance of WASH
3. Methodology
4. Results (water supplies in obstetric facilities)
5. Discussions
6. Conclusions



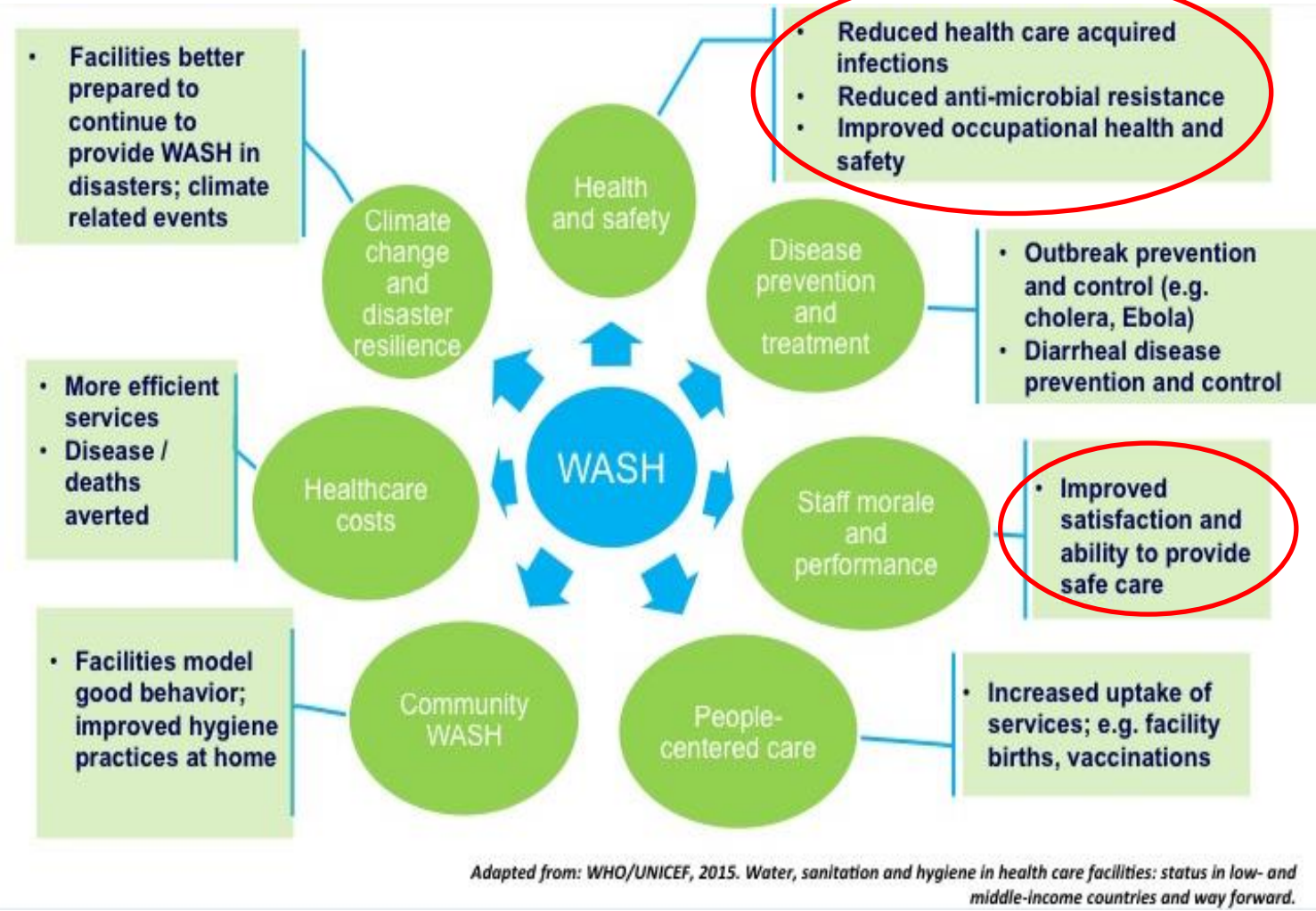
Providing quality EmONC services

- Maternal and neonatal mortality have decreased significantly in West and Central Africa (WCA) since 1990 (MMR: from 1000 to 590; NMR: 49 to 32) but rates remain very high. No country achieved MDG5

- Provision of the 7 signal functions defining Emergency Obstetric & Neonatal Care* remains low as revealed by National Emergency Obstetric and Newborn Care Needs Assessments (EmONC NA)

- Globally, sepsis is responsible for 15% of maternal and neonatal mortality; tetanus for 2% of neonatal mortality

Introduction – Importance of WASH

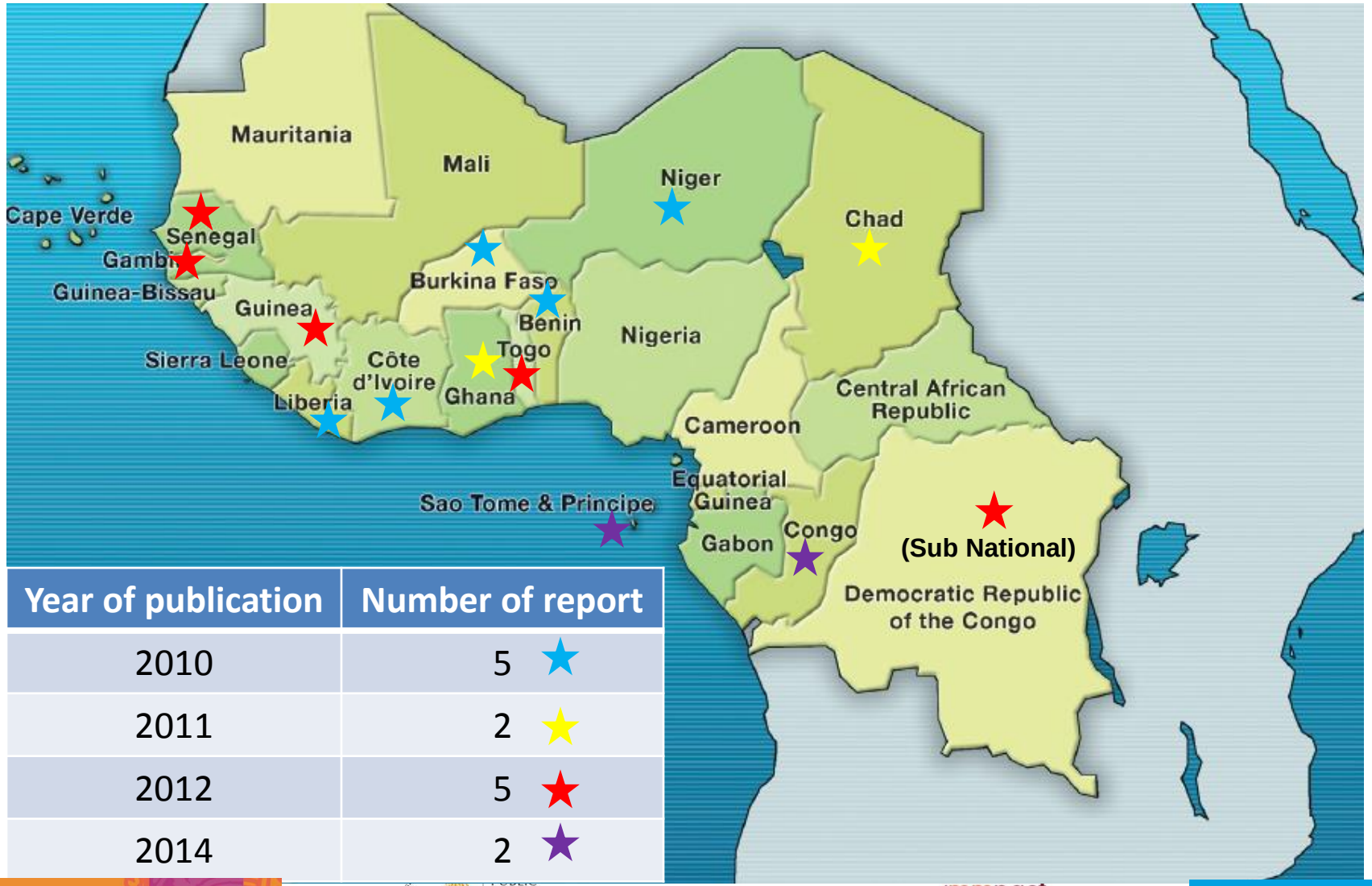


Adapted from: WHO/UNICEF, 2015. Water, sanitation and hygiene in health care facilities: status in low- and middle-income countries and way forward.

Methodology

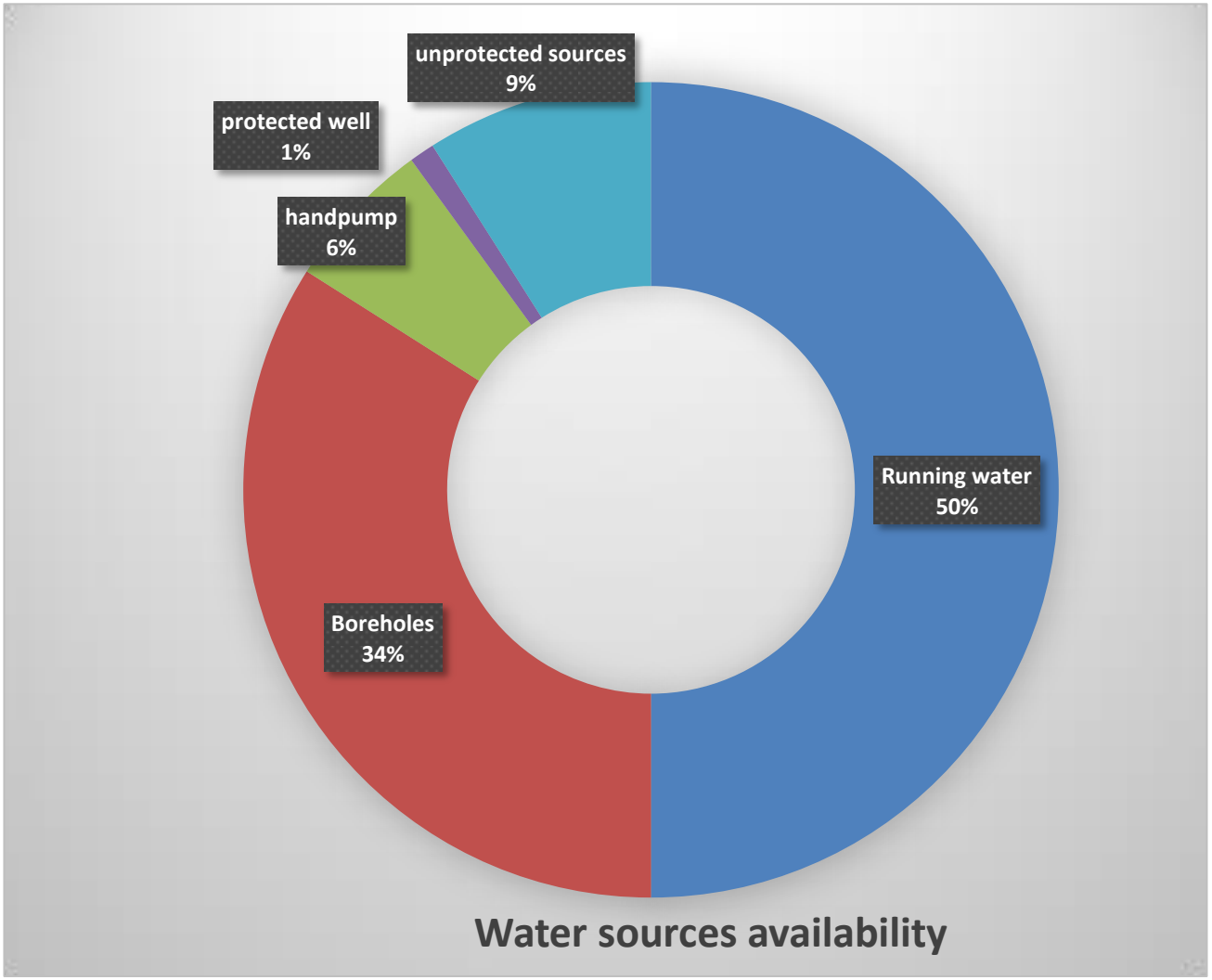
- Review of EmONC NA reports from 14 Western and Central African countries, carried out since 2010
- Available Water Sanitation and Hygiene (WASH) information was collected, organized and analysed
- We compiled information representing **8,207** maternities and **2,102,740** deliveries

Methodology



Year of publication	Number of report
2010	5 ★
2011	2 ★
2012	5 ★
2014	2 ★

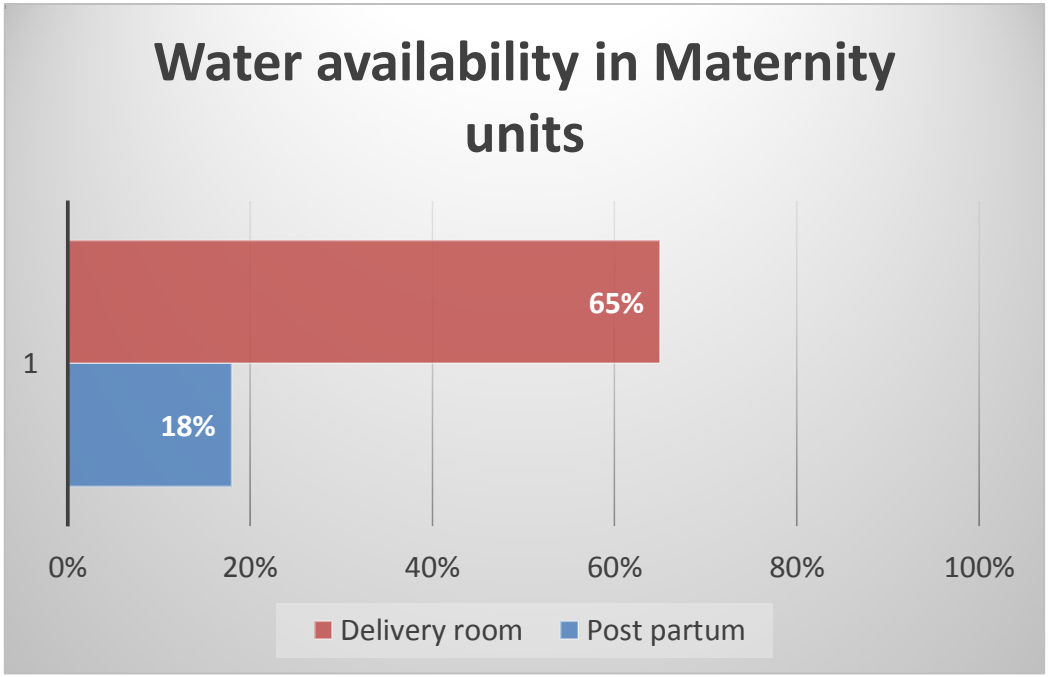
Water supply in maternity wards



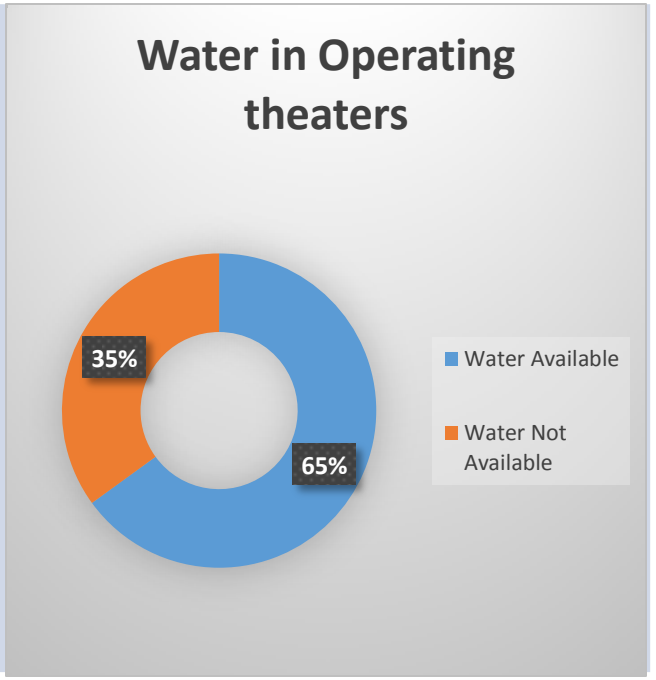
Water availability (By types of sources)	Highest country coverage	Lowest country coverage
Overall (all types)	100%	54%
Running water	80%	11%
Boreholes	78%	11%
Hand pump	84%	3%
Protected well	6%	3%
Unprotected sources	33%	3%

Disparities in maternity units

Data from 7 countries (4,087 maternities with 1,265,980 deliveries)



Data from six countries (3 223 maternities with 1,132,881 deliveries)



Data was not available regarding the situation in ANC rooms and Intensive Care Units

Limitations

- The available data from EmONC NA is purely descriptive as is therefore our review
- The data from the EmONC NA studies are not consistent across countries yielding some degree of uncertainty about the real type of water source; definitions are not systematically provided in the reports
- Associations with clinical outcomes could not be made due to the lack of access to databases

Discussion

Very limited data are available on the status of water, sanitation and hygiene in maternity wards in WCAR

- Final SPA reports are available on the website for only 2 countries in the WCAR region (Ghana - 2002 and Senegal -2012-2013 ; 2014)
- Comparisons across surveys are difficult because of the lack of harmonization of definitions

Most maternity wards (91%) had a *protected* water source but only 50% were reported to have running water

- The absence of water sources in 35% of operating theatres is worrisome, as is the quality of the water in the 65% with “some” source of water
- Data from SPA/SARA/SDI in 54 countries show that globally 62% (and 58% in Africa over 23 countries) of *all* health care facilities have an improved water source *within 500 m*(1)

Discussion

- But there is no evidence that these water sources meet WHO minimum standards of Water Sanitation and Hygiene in health care facilities.
  - Visual cleanliness does not show the whole picture : a recent situation analysis of hygiene in maternity wards in India and Bangladesh suggest that the reliance on visual inspection is necessary but not sufficient and consistent implementation of IPC standards is critical regardless of the appearance of “visual” cleanliness.(2)

- A recent study in Tanzania found that women who rated their local primary care centres as poor quality were more likely to bypass them to deliver in hospitals; **upgrading or renovating the clinics reduced bypassing by 60%.** **(3)**

Conclusion

- The results are alarming with regards to quality of care (Health and safety; staff morale and performance; attractiveness and comfort for community).
- They reveal the need for better addressing this essential component of quality maternal and newborn care
- This situation has the potential to cause great harm to mothers and newborns
- The lack of data is a barrier towards better understanding and addressing the situation
- We acknowledge that some improvements may have occurred since the data were published

Acknowledgements

- Columbia University/ Averting Maternal Death and Disabilty Programme which designed and implemented most of the EmONC NA and which have been very helpful in providing some NA reports

- Colleagues from AMDD who helped us get some of the reports

THANK YOU

"Water-borne diseases are not caused by a lack of antibiotics but by dirty water, and by the political, social, and economic forces that fail to make clean water available to all"

- WHO Commission on the Social Determinants of Health (2008)

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Starting out right: Building improved hygiene practices into the antenatal platform

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Global MNH Conference – October 19, 2015

Background

- Diarrheal disease:
  - a leading cause of childhood illness
  - can be prevented with proven WASH practices
- Antenatal care (ANC) platform: vehicle for WASH behavior change (BC)
- WASH products: incentives for ANC visits and facility deliveries

Malawi program objectives

- Increase target behaviors in mothers
  - Household water treatment and safe storage (HWTS)
  - Handwashing with soap
- Determine whether behaviors are sustained
- Assess changes in ANC service use

Program intervention

- Water hygiene kits (WHK)
  - Improved storage container
  - WaterGuard (WG) solution
  - Soap
  - Educational materials
- Distributed at first ANC visit
- WG and soap refills provided

  at later ANC, delivery, and postnatal visits
- Home visits provided by Health Surveillance Assistants
- Advertising and product distribution by PSI

Program evaluation

- Location: Blantyre and Salima Districts, Malawi
- Enrollment: 389 pregnant women from 15 clinics
- Baseline survey and program implementation: 2007
- Follow-up surveys: 2008 and 2010

Evaluation indicators: HWTS

Observed WG bottle in home

+

Positive test for chlorine in stored water

+

Reports WG purchase after free bottles

Evaluation indicator: handwashing technique

- Lather hands completely
- Rinse
- Dry in air or with clean towel

Results

	2007 Baseline (N=198)	2008 Follow-up (N=198)	2010 Follow-up (N=198)
Confirmed WG use ***(WG bottle + residual chlorine)***	**1%**	**62%**	**28%**
Confirmed WG use and purchase ***(WG bottle + residual chlorine + purchase)***	**1%**	**33%**	**22%**
Demonstrated proper hand washing	**22%**	**60%**	**50%**

Increase % women with 4+ ANC visits
Increase % women delivering at health facility

Conclusions

- ANC-based program: promising approach for sustained behavior change

- Potential for household impact: new mom, newborn, family

Acknowledgements

- Centers for Disease Control
- Ministry of Health Malawi
- UNICEF
- Population Services International (PSI)

THANK YOU!

Waterless Hand Cleansing with Chlorhexidine during Perinatal Period: Results from a Randomized Controlled Trial

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On behalf of
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The Challenge

- Neonatal period is uniquely vulnerable
  - 24% of neonatal mortality is attributable to infections

- Observational data suggests handwashing can prevent umbilical cord infections and neonatal mortality

- Handwashing behavior, efficacious for preventing childhood infections, is stubbornly difficult to change
  - RCT from Pakistan (Soofi et al) showed no effect with a relatively light-touch intervention

- ***How do we overcome lack of handwashing habits and social norms to protect neonates?***

Motivators and Barriers to Handwashing with Soap in the Neonatal Period

- Handwashing materials not available where needed
- Inconvenient to wash hands with soap
- Mothers feel too busy
- Mothers try to avoid water during perinatal period
- Cannot ask others to wash hands with soap before touching the baby
- Previous trial evaluating promotion of handwashing with soap yielded modest results

→ A novel solution is needed to promote hand cleansing among mothers and household contacts of neonates

Chlorhexidine: a hygiene product for the neonate

- Chlorhexidine effective against most bacteria and enveloped viruses
- Bactericidal and bacteriostatic effects
- Well tolerated
- Neonatal cord care with chlorhexidine reduces mortality

Study objectives

- To demonstrate the behavioural impact of chlorhexidine-based hand hygiene intervention on hand cleansing of

  Mothers: those closest to the neonate

  Family members: those most likely to introduce new organisms to the neonate

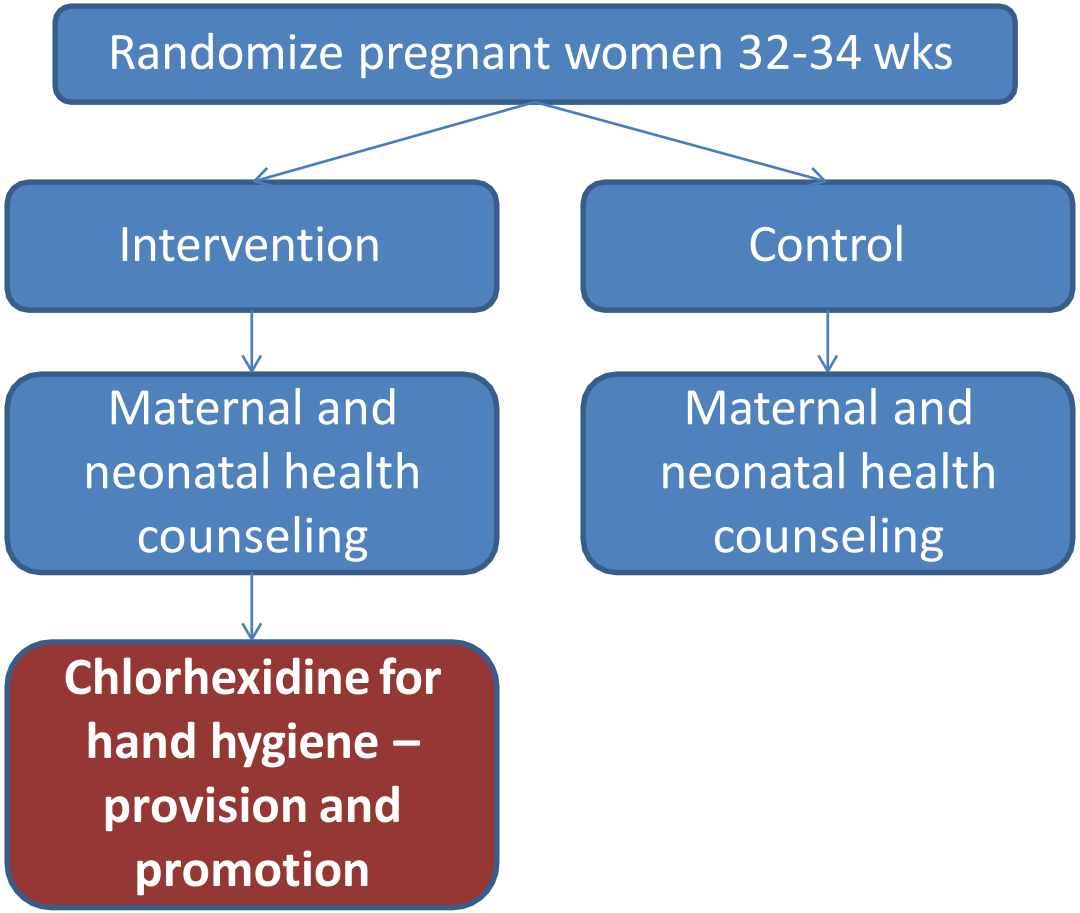
- To evaluate the acceptability of chlorhexidine for hand cleansing in the neonatal period among mothers and family members of neonates

Study design

Approach: Randomized controlled trial
- individual randomization

Setting: Existing demographic surveillance system in Mirzapur

Estimated sample size: 300



Hand Cleansing Intervention

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Motivators for hand cleansing

Nurture

Cue

Convenience

Steps for using chlorhexidine

Fixed times for hand cleansing

Morning

Noon

Night

Times for hand cleansing by mothers and others

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Measurement of outcomes of interest

- Hand cleansing by mothers, family members, visitors
  - Structured observation
  - Presence of chlorhexidine/hand washing materials
  - Chlorhexidine consumption

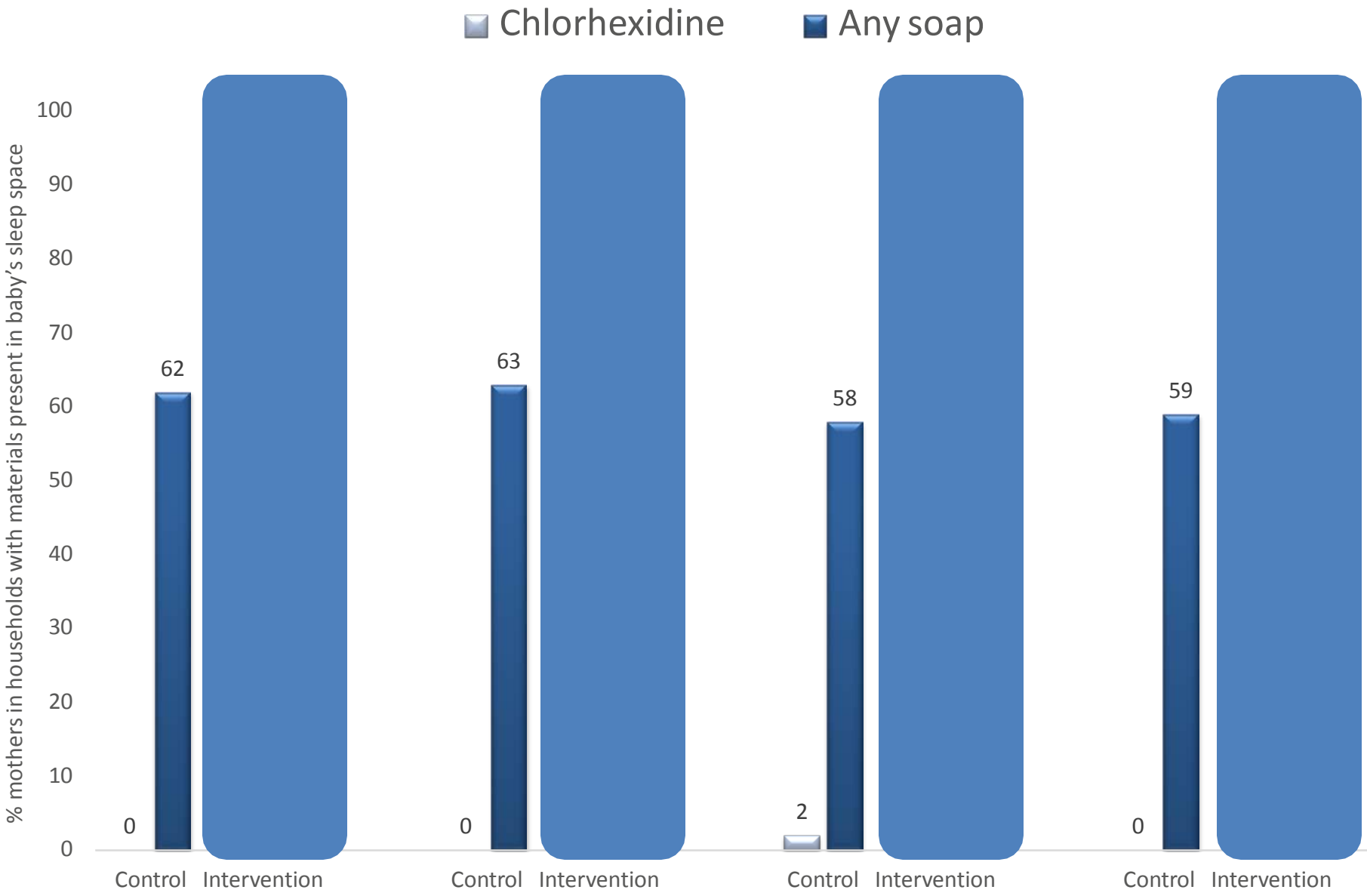
Baseline Demographic Characteristics

Characteristic	Control (N=128)	Intervention (N=130)
Age of respondent Median (IQR)	24 (20-29)	25 (20-28)
Years education of respondent Median (IQR)	7 (5-9)	7 (5-9)
Muslim	92%	88%
Median number of rooms for sleeping (IQR)	2 (2-3)	2 (1-3)
Median number of people living in home (IQR)	4 (3-6)	4 (3-5)

Handwashing at Baseline

Characteristic	Control (N=128)	Intervention (N=130)
Water present at existing handwashing station	95%	96%
Soap present at existing handwashing station*	30%	30%
Self-reported frequency of washing hands before touching a baby	Always: 20% Sometimes: 59% Never: 22%	Always: 15% Sometimes: 57% Never: 28%
Are you able to ask others to clean their hands?	Always: 27% Sometimes: 59% Never: 13%	Always: 20% Sometimes: 61% Never: 19%

Handwashing material present in baby's sleep space



Material present at handwashing station for baby care

Mean number of times hands washed or cleansed by mothers during 3-hour structured observations

Mothers						
	Week 1 Observation			Week 3 Observation		
	Control n=107	Intervention n=105	RR (95% CI) p-value	Control n=117	Intervention n=118	RR (95% CI) p-value
Handwashing with water ≥ 1 time n (%)	70	57	0.8 (0.7, 1.0) 0.05	68	60	0.9 (0.7, 1.1) 0.19
Handwashing with soap ≥ 1 time (SD)	32 (30)	25 (24)	0.8 (0.5, 1.2) 0.3	38 (32)	34 (29)	0.9 (0.6, 1.3) 0.5
Handwashing with soap or chlorhexidine ≥ 1 time (SD)	32 (30)	73 (70)	**2.3 (1.7, 3.2) <0.0001**	38 (32)	92 (78)	**2.4 (1.8, 3.2) <0.0001**

Chlorhexidine Consumption

- 95% of participants used the product at least 5 times

- Median number of grams consumed during the neonatal period: 176 (IQR 95 – 305 grams)

- → a median of 7.8 grams of chlorhexidine consumed per day (IQR 4.2 – 13.8)

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Number of **baby care events** observed among various household members

Relation to neonate	Control (N=128)	Intervention (N=130)
Mother	**849**	**851**
Other adult female	**224**	**215**
Adult male	**10**	**14**
Boys	**40**	**39**
Girls	**92**	**97**

Observed hand cleansing with soap or chlorhexidine before **baby care events**, among mothers and other household members

Relation to neonate	Control	Intervention	Absolute difference	RR (95% CI)
Mother	5%	26%	21%	5.6 (4.0 – 7.7)
Other adult female	3%	34%	31%	10.9 (5.1 – 23.1)
Adult male	0%	29%	29%	-
Boys	0%	44%	44%	-
Girls	1%	40%	39%	37.0 (5.2 – 263.7)

Positive attributes of chlorhexidine: findings from qualitative investigation

- Perceived more effective than soap for preventing illness, and killing germs
- Waterless
  - Can avoid frequent water handling
- Easy to use
- Easy to carry
- Easier to ask others to clean hands with chlorhexidine than to wash hands with soap

Barriers to chlorhexidine use

- Long drying time (e.g. 5 minutes)

- Before breastfeeding
  - Concern about baby swallowing chlorhexidine if mother cleanses hands
  - Mother prefers to soothe baby quickly than to wait 5 mins for hands to dry
  - If acceptable, addition of alcohol would facilitate drying

- Lotion feels oily / sticky
  - Discomfort when eating

- Male participants felt intervention didn't adequately involve them

Implications

- Promotion and provision of a waterless chlorhexidine-based hand cleanser increased hand cleansing
  - 5-fold among mothers (20 pct pt)
  - 11-37 times in other adult caregivers and children
  - There may have been some reactivity to observation

- Chlorhexidine valued by participants for being waterless, effective, convenient, and facilitating ability to ask others to clean hands

- **Such increases in hand cleansing behavior could substantively reduce serious bacterial infections in neonates**

- Similar effects may be observed using more readily available alcohol-based sanitizer but further behavioral and microbiological study needed

Where do we go from here?

Refine communication approaches to foster greater behavior change

Expand efforts to include birth attendants in and out of facilities

Integrate into MNH programmes in facilities and communities

Measure effectiveness

Rebrand handwashing as an essential maternal and newborn care practice

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icddr,b

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"Clean hands for healthy babies"

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