THE LANCET

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Prost A, Colbourn T, Seward N, et al. Women's groups practising participatory learning and action to improve maternal and newborn health in low-resource settings: a systematic review and meta-analysis. *Lancet* 2013; **381:** 1736–46.

WEB APPENDICES

Appendix 1: Search terms used for the systematic review

MEDLINE: Community mobilisation.mp. OR Community participation.mp. OR Maternal Health Services/ or Health Knowledge, Attitudes, Practice/ OR participatory action.mp. OR Community-Based Participatory Research/ AND women* Group*.mp. OR participatory[All Fields] AND ("women"[MeSH Terms] OR women's groups[Figure/Table Caption] OR women's groups[Section Title] OR women's groups[Body - All Words] OR women's groups[Title] women's groups[Abstract])

Embase: Community mobilisation.mp. OR Community participation.mp. OR Maternal Health Services/ or Health Knowledge, Attitudes, Practice OR participatory action.mp. OR Community-Based Participatory Research OR women* Group*.mp. (MH "Action Research/ED/EV/OG") OR (MH "Group Exercise/ED/EV/MO/NU/OG/PF") OR (MH "Focus Groups/ED/EP/EV")
Cochrane: participatory action groups

CINAHL: "participatory action groups" OR "women group" OR (MH "Group Exercise") OR (MH "Women's Health Services") OR (MH "Women's Rights") OR (MH "Women's Health") (MH "Randomized Controlled Trials") OR (MH "Clinical Trials") OR (MH "Action Research") OR (MH "Group Exercise") OR (MH "Support Groups")

ASSIA: all(participatory action group) AND all(women)

SCI: Topic=(participatory action group*) AND Topic=(women*)

AIMS: community mobilisation [Key Word] or community participation [Key Word] or women's groups [Key Word] or participatory action [Key Word] or women* group* [Key Word]

Appendix 2: Methods for estimating the impact of the women's group intervention in Countdown countries

We estimated the impact of the women's group intervention if it was rolled out to all Countdown countries in rural areas excluding South Sudan, for which insufficient data was available (74 remaining countries). The list of 75 Countdown countries was taken from the 2012 "Countdown to 2015" report.[1] We generated two estimates: firstly we assumed that the intervention at scale would have the same effectiveness as that given by the meta-analysis for the four rural trials where 30% or more of pregnant women reported participating in groups, and, secondly, that there would be a 30% loss of effectiveness when implemented at scale (to provide a conservative lower bound). Risk ratios were applied to most recent available data for the 74 countries.

We give the methods for neonatal mortality below. The method for maternal mortality is exactly the same except with maternal mortality rates used instead.

Impact will be quantified in two ways: the estimated number of newborns saved over one year and the proportion of all neonatal deaths in each of the 74 countdown countries which this represents. We will also present the 7 countries where there would be greatest estimated impact (both for total lives saved and proportion lives saved to total deaths in the absence of the intervention).

Notation for each country:
Let T be the total population.
Let r denoted the proportion of the population that is rural.
Let b be the crude birth rate in rural regions.
Let B be the total number of rural births.
Let s be the rate of skilled attendance in rural regions.
Let d be the neonatal mortality rate and d_r be the neonatal mortality rate in rural areas. If d_r is not available we will use d instead as an estimate since we know that, almost always, $d_r \geq d$ [6]

Let d_{sr} and d_{nr} denote the neonatal mortality rate for rural deliveries with and without skilled birth attendance respectively. Note that $0 \leq d, d_{sr}, d_r, d_{nr} \leq 1$.
Let D_O and D_I be the number of neonatal deaths in rural regions without and with the intervention respectively.
Let G be the total number of neonatal deaths for the country without the intervention (i.e. including urban, rural, SBA and non SBA deliveries).
Let OR be the Odds Ratio for the participatory action cycle intervention in rural deliveries for neonatal mortality.
Let RR be the Risk Ratio for the participatory action cycle intervention in rural deliveries for neonatal mortality.
Let RR_s and RR_n be the neonatal Risk Ratios for the participatory action cycle intervention in rural deliveries with and without skilled birth attendance respectively.
Let z be the Risk Ratio of the skilled birth attendance in rural regions after the intervention compared to no intervention.

Risk Ratios
We use the reported odds ratio given by the meta-analysis for rural trials where 30% or more of pregnant women participated in groups to estimate the proportion of neonates or mothers saved by the intervention. However, to do this we first need to convert the reported odds ratio to risk ratios, since this is what is needed to estimate impact:
$RR = \frac{D_I/B}{D_O/B} = \frac{D_I}{D_O}$ so that $D_I = RR \times D_O$.
Since we know the overall neonatal mortality rate for control arms we can convert the reported odds ratio to the corresponding risk ratio using the formula:

$$RR = \frac{OR}{1 - (1 - OR)NMR\_Control}$$

For the lower bound estimate (assuming 30% reduction in effectiveness at scale) we replace RR with RR* where RR* is calculated by:

Proportion of lives saved is 1-RR. Reducing this by 30% gives: new proportion of lives saved is 0.7*(1-RR). New risk ratio RR* is then 1-new proportion of lives saved.

Estimating impact for each country:

The participatory action cycle intervention can have the effect of a) increasing rates of skilled birth attendance and / or b) improving outcomes with SBA delivery (perhaps by empowering women to ask for care). We also know that mortality rates for SBA and non-SBA deliveries are very different (and we have denoted them separately in the notation above). Also, many countdown countries have significantly higher SBA rates (even in rural areas) than the trial areas and so we cannot ignore the difference between SBA and SBA deliveries.

The average number of neonatal deaths in rural regions in one year without the intervention is then given by:

$$D_O = B\big(d_{sr}s + d_{nr}(1-s)\big)$$

And the number of deaths in rural regions in one year with the intervention is given by:

$$D_I = B(d_{sr}RR_s zs + d_{nr}RR_n(1-zs))$$

We do not have good estimates of the increase (if any) in SBA deliveries due to the intervention, and such an impact is likely to be very context specific in each country. However, we have not observed a reduction in SBA deliveries in any of the trial sites so the assumption that $z \geq 1$ is reasonable. We can also assume that the mortality rates in rural SBA deliveries are lower than those in non-SBA deliveries $d_{sr} < d_{nr}$, so that it is less risky for an individual woman to have an SBA delivery.
Then we can write:

$$D_I \leq B(d_{sr}RR_s s + d_{nr}RR_n(1-s))$$

We also do not have good estimates of the differential impact of the intervention for SBA and non-SBA deliveries. If the intervention has no effect on the outcomes of SBA deliveries then $RR_s = 1$. It is reasonable to assume that $RR_s \leq 1$ (any effect would be positive) and also that $RR_n \leq RR$ (impact is greater in home deliveries than on the home & SBA deliveries combined) so we can then write:

$$D_I \leq B(d_{sr}s + d_{nr}RR(1-s))$$

Thus the number of lives saved by the intervention can be written as;

$$D_O - D_I \geq Bd_{nr}(1-RR)(1-s)$$

Again, since we can assume that (almost always) that $d_{nr} \geq d_r$, we can write:

$$D_O - D_I \geq Bd_r(1-RR)(1-s) \qquad (1)$$

While the participatory learning and action cycle can reduce mortality either by increasing SBA deliveries or by improving the outcomes of SBA deliveries, the largest impact of the intervention is among deliveries without skilled birth attendance. Thus we believe that the estimate for the number of lives saved in one year by the intervention from equation (1):

$$Bd_r(1-RR)(1-s)$$

represents a conservative estimate of impact that captures most of the benefit of the participatory learning and action cycle intervention.

Estimating Total Impact

To estimate total impact we sum the total number of lives saved across all countries. We additionally calculate the overall number of neonatal deaths across all countries and then express the impact as the percentage reduction in total deaths due to the intervention:

Proportional impact (%) $= \frac{\sum_{countries}(D_I - D_O)}{\sum_{countries} G} \times 100$

Data:

The sources for our estimates are given in the table below:

Quantity	Source	Reference
Total population	UNSTATS	http://unstats.un.org/unsd/demographic/products/indwm/default.htm [Accessed on 22nd February 2013]
% Rural population	UNSTATS	http://unstats.un.org/unsd/demographic/products/indwm/default.htm [Accessed on 22nd February 2013]
Total NMR (2011 estimate)	UNICEF	http://www.childinfo.org/mortality_neonatalcountrydata.php [Accessed on 22nd February 2013]
Total MMR (2010 estimate)	UNICEF	http://www.childinfo.org/maternal_mortality_indicators.php [Accessed on 22nd February 2013]
SBA rural % (latest year available as of 2012)	UNICEF	http://www.childinfo.org/delivery_care_countrydata.php [Accessed on 22nd February 2013]
Crude birth rate total (2010)	UN	http://data.un.org/Data.aspx?d=SOWC&f=inID%3A90 [Accessed on 22nd February 2013]
Rural crude birth rate	DHS	http://www.measuredhs.com/Where-We-Work/Country-List.cfm [Accessed on 22nd February 2013]
Rural NMR	DHS	http://www.measuredhs.com/Where-We-Work/Country-List.cfm [Accessed on 22nd February 2013]

Table 1: Sources of data for estimates

Notes on the data:
Rural MMR data was not available anywhere apart from Afghanistan where we did use the estimate from the Special Report 2010. [2] For other countries we used total MMR as the best estimate of rural maternal mortality ratio. Where either rural skilled birth attendance or neonatal mortality rates were not available, we used the overall skilled birth attendance or neonatal mortality rates as estimates.

Total population and rural population proportion estimates covered data from years 2001-2010. The rural SBA proportion estimates were from years 2000 – 2011. DHS reports covered the time period 1987-2012. Where rural crude birth rate (CBR) or rural NMR data were not available we used the total CBR and total NMR as estimates. Where rural CBR and NMR were out of date (from before 2004) or clearly out of step with latest total estimates, we applied the more recent rural/urban ratio to the most recent overall CBR and / or NMR value to estimate the rural CBR and NMR using the following equation:

$$f_r = \frac{f \times y_r}{(1-r) \times y_u + r \times y_r}$$

where y_r and y_u are the most recent known rural and urban rates respectively, f is the known current rate and f_r is the rate in rural areas that we wish to estimate. The estimated numbers of maternal deaths with and without the intervention were calculated using rural specific CBR (for the better estimate of the number of births) but overall MMR (since rural specific MMR rates were not available).

Where possible we calculated overall neonatal deaths for a country using urban / rural CBR and NMR estimates. When not possible, we used overall CBR and NMR estimates to estimate the overall number of neonatal deaths. The overall number of maternal deaths was always calculated using overall CBR and MMR estimates.

Appendix 3: Quality assessment of included studies included, appraised using the CONSORT statement for cluster-randomised trials [3]

Trials	Abstract & Introduction		Methods					Randomisation					Results							Discussion		
	Design	Background	Participant	Intervention	Objective	Outcome	Sample	Sequence	Allocation	Implementation	Blinding	Statistical	Participant flow	Recruitment	Baseline data	Numbers analysed	Outcomes and Estimation	Ancillary Analyses	Adverse Events	Interpretation	Generalisibility	Overall Evidence
Manandhar et al. 2004 [12]*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
More et al. 2012 [25]*	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Azad et al. 2010 [14]*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Tripathy et al. 2010 [13]*	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Fottrell et al. 2013 [28]*	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Colbourn et al. 2013 [27]*	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Lewycka et al. 2013 [26]*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Appendix 4: Risk of bias assessment, conducted using the Cochrane Collaboration Tool [4]

STUDY	Random sequence generation[§]	Allocation concealment*	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Manandhar et al. 2004 [12]*	LOW	LOW	HIGH	HIGH	LOW	LOW	LOW
	Page 971: Matched 42 clusters into 21 pairs based on topographic stratification, ethnic group distributions, and population densities. List of random numbers used to select 12 pairs.	Page 971: Randomly allocated one cluster in each pair to either intervention or control on the basis of a coin toss.	Page 972: Because of the nature of the intervention the trial allocation was not masked.	Page 972: Analysis of primary and secondary outcomes was not done until just before the data monitoring committee meeting at 30 months, but not stated if assessors were blinded.	Page 975 and figure 3: Loss to follow up was 5.4% and 5.0% in the intervention and control clusters respectively. Breakdown given in figure 3	Page 975: All outcomes reported on. Figures given in table 3 and 4	Page 976: Small baseline difference in poverty and literacy favouring intervention. Authors do not consider that these could account for differences in mortality.
More et al. 2012 [25]*	LOW	LOW	HIGH	HIGH	UNCLEAR	LOW	LOW
	Page 3: "In a transparent process, social workers external to the trial drew lots to select 48 (settlements/slum communities) in blocks of eight per ward".	Page 3: The same process was then used to allocate four clusters per block to the intervention and control. "We chose this method because of our emphasis on participation and demystification of research."	Page 3: "The nature of the intervention precluded allocation concealment."	Page 4: Analysts were blind to allocation Page 7: As local residents the birth and death identifiers were aware that there was an intervention in their community, but were focused on their task and did not dwell on the comparative nature of the trial.	Page 5 figure 2: Achieved interviews for 84% and 83% of births in intervention and control arm respectively. Some disparity across arms between interview follow up of stillbirths and neonatal deaths.	Page 7,9: All outcomes reported on	Page 4: Baseline difference in age, Islam faith, poverty index, neonatal mortality. Unadjusted are primary analysis but adjusted analyses given.
Azad et al. 2010 [14]*	LOW	LOW	HIGH	HIGH	LOW	LOW	HIGH
	Page 1194: Clusters (unions) were "randomly allocated to either intervention or control groups stratified by district in the presence of four project staff and two external individuals. Cluster names were written on pieces of paper, which were folded and placed in a bottle."	Page 1194: For each district the first three cluster names drawn from the bottle were allocated to the women's group intervention and the remaining three to control. The project manager drew the papers from the bottle. The allocation sequence was decided upon by the project team before drawing the papers.	Page 1195: "Neither the study investigators nor the participants were masked to group allocation."	Page 1195: No specific details were given for those analysing the data	Page 1198: Interviews completed for 84% and 82% of births in the intervention and control arm. Main reason across groups for failure to interview was given as maternal migration	Page 1199: All outcomes reported on table 2 and 3	Page 1194: Control clusters included three areas (tea garden estates) with substantially worse health & socioeconomic indicators than rest of the study area. Researchers did not know about this difference before recruitment and

							allocation of clusters therefore did not exclude before allocation. Adjusted analyses were undertaken but primary analyses were on all cases.
Tripathy et al. 2010 [13]*	LOW Page 1183: An external observer from a partner NGO drew folded papers with numbers corresponding to clusters from a basket. This was done separately for each of the three districts.	LOW Page 1183, figure 2: The first clusters drawn from the basket were allocated to the intervention group, the rest to the control group. In each district this was undertaken in the presence of external observers We chose this method because of simplicity and visibility, as it was necessary to convince the local community.	HIGH Page 1183: "Because of the nature of the intervention, neither the intervention team nor the participants were masked to group assignment during the trial."	HIGH Page 1191: "There were no incentives or disincentives for under or over reporting deaths and births and several processes were put in place to detect error"	LOW Page 1187, figure 6: Loss to follow up was <1% and 2% in the intervention and control clusters.	LOW Page 1187: All outcomes are reported in table 2 and 3	LOW Page 1187: baseline differences show greater poverty and disadvantage in intervention clusters. Adjusted analyses were given, and do not influence findings.
Colbourn et al. 2013 [27]*	LOW Page 6: "Clusters were allocated to each, both or no intervention with a random number sequence generated in Stata 7. Randomisation was stratified by the two interventions and by district, so that the numbers of intervention and control clusters in each district were balanced."	LOW Page 6: To ensure concealment of intervention allocation, identification numbers were assigned for each cluster and a random number generated for each. The random numbers were then sorted in ascending order, and a new 'order' variable generated. This sequence was used to allocate to each of the four intervention groups in each district. The sequence was concealed until interventions were assigned. One researcher generated the allocation sequence and assigned clusters to their groups in the presence of two other researchers.	HIGH Page 6: Neither participants nor those administering the interventions were blinded to group assignment.	HIGH Page 6: The analysis plan was pre-specified (in a stata do file) before the final analysis was carried out.	HIGH Page 10: 29% loss to follow up. Authors suggest that given that observed birth rates in the study matched those expected from the crude birth rate to within 3%, and that in-migration probably broadly matched out-migration, many of the pregnancies recorded by key informants as 'lost to follow-up' may have been mis-attributed, (in other words recorded as pregnancies by mistake) and the true loss-to-follow-up probably much lower. Little difference in loss-to-follow-up between arms. All maternal deaths were verified but 300/2088 (14.4%) stillbirths and neonatal	LOW Page 10: All outcomes reported in tables 2-6	LOW Page 13: No data on individual level covariates. Small cluster level variations were found and adjustments made with little difference to unadjusted models.

					deaths were unverified.		
Lewycka et al. 2013 [26]*	LOW	LOW	HIGH	HIGH	LOW	LOW	UNCLEAR
	Page 8: Random number sequence generated in STATA 7.0	Page 8: Clusters were allocated randomly. Two researchers allocated clusters to intervention groups using a random number sequence.	Page 8: The nature of the interventions made masking of allocation impossible at the participant level.	Page 8: Masking at the level of analysis and trial monitors. Data were collected independently of programme implementation and no results were fed back to inform the intervention.	Figure 4: Participants loss to follow up accounted for.	Page 17: All outcomes were reported in tables 3-6	Page 17: Some small baseline difference. Limitations section in discussion difficult to follow
Fottrell et al. 2013 [28]*	LOW	LOW	HIGH	HIGH	LOW	LOW	
	Page 2: Same randomisation sequence as in Azad 2010	Page 2: Same allocation concealment as in Azad 2010	Page 3: Neither the study investigators nor the participants were masked to group allocation.	No details given for analysts.	Page 5: 99% of interviews were completed, interviews that were not completed were due to maternal migration	Table 2: All outcomes reported	

* Reference is in main manuscript rather than in web appendix reference list.

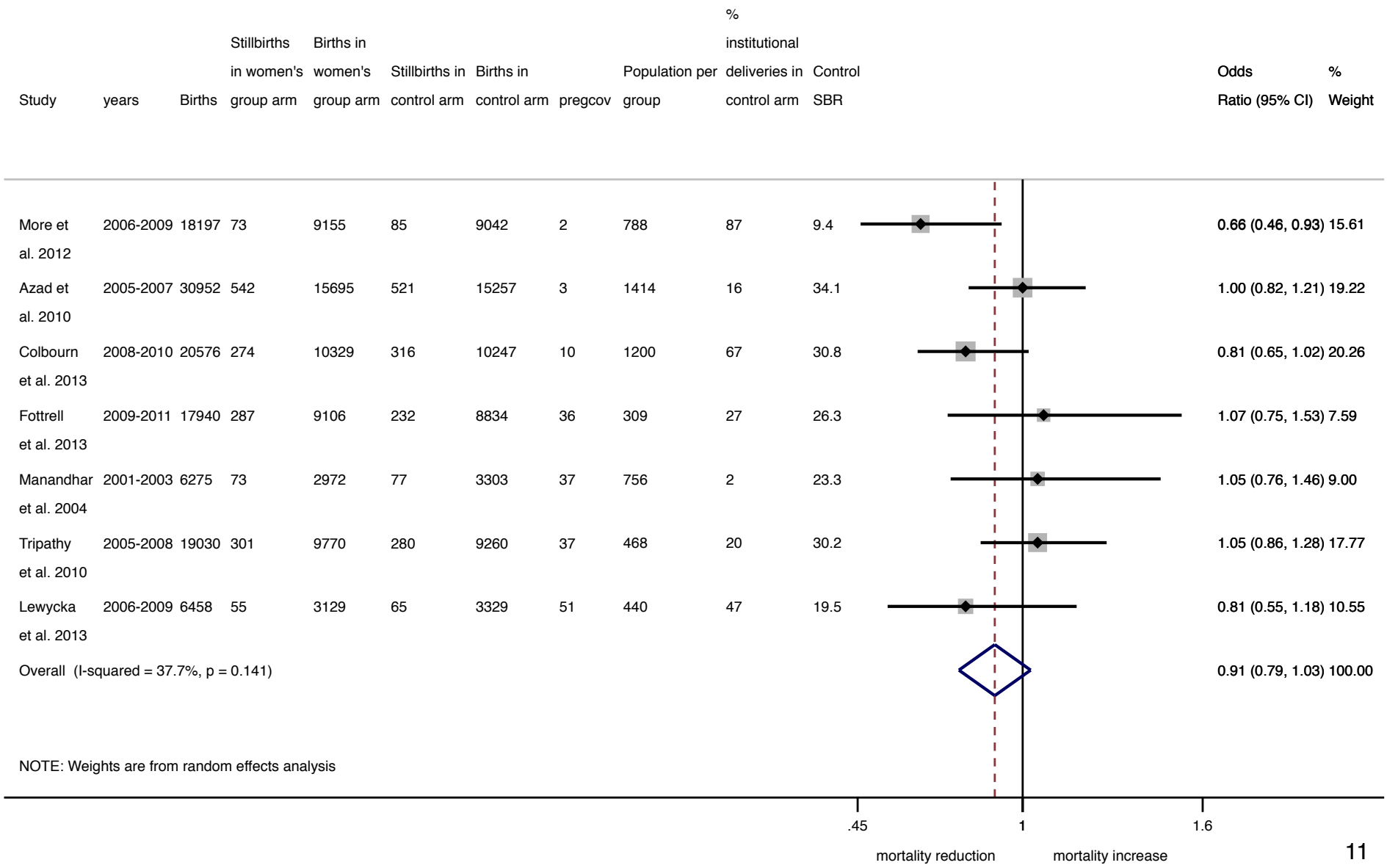
§ Given the settings of these studies the more standard currently used methods of random sequence generation and allocation concealment were not always feasible.

Appendix 5: PRISMA checklist [5]

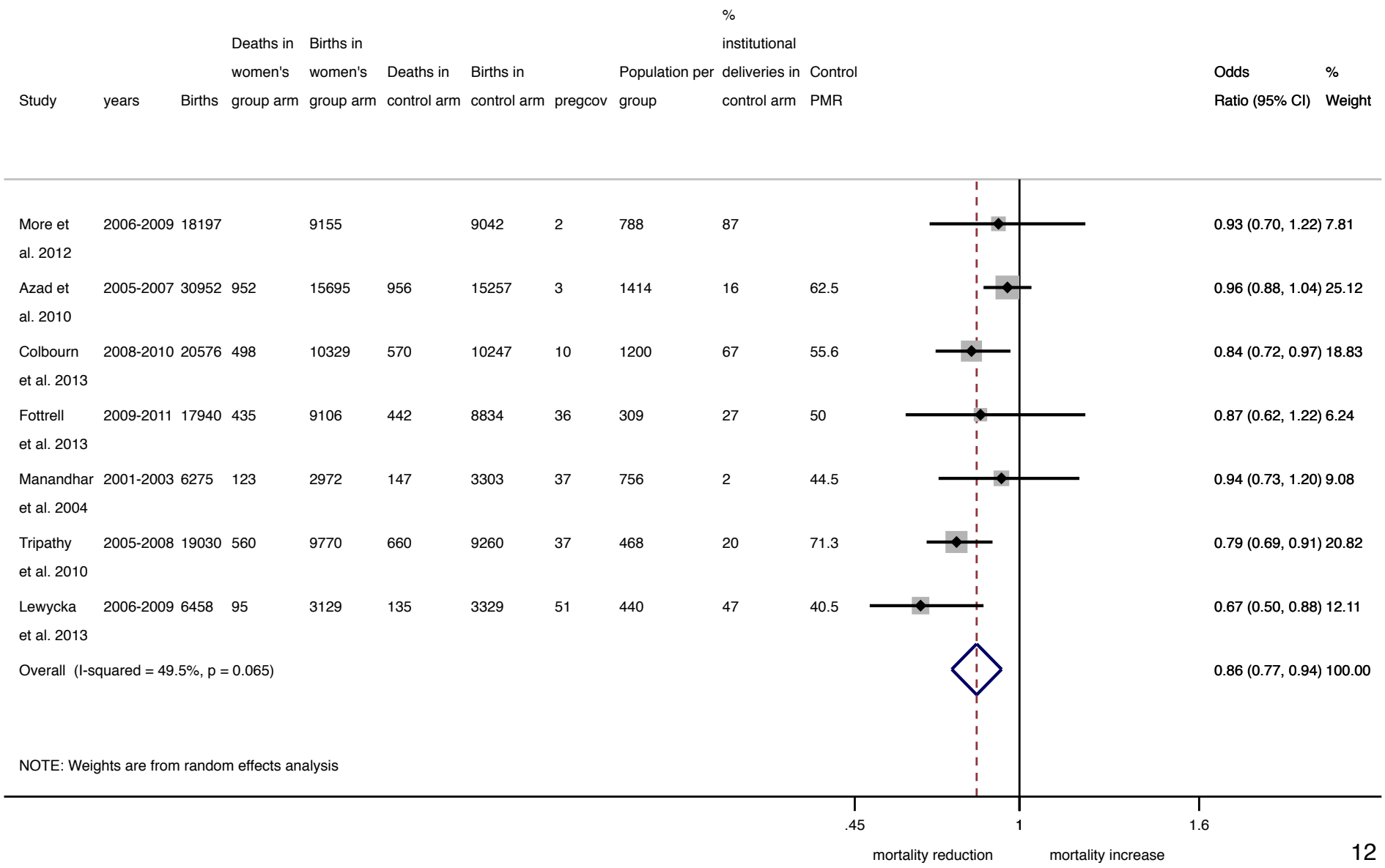
Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2 and Web Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	2 and Figure 1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	2
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	2
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	2 and web appendix
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	2 and all forest plots
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	3

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	Web appendix
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	3
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Web appendix
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	All forest plots (2A, 2B, 4A, 4B)
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	10
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	9-10
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

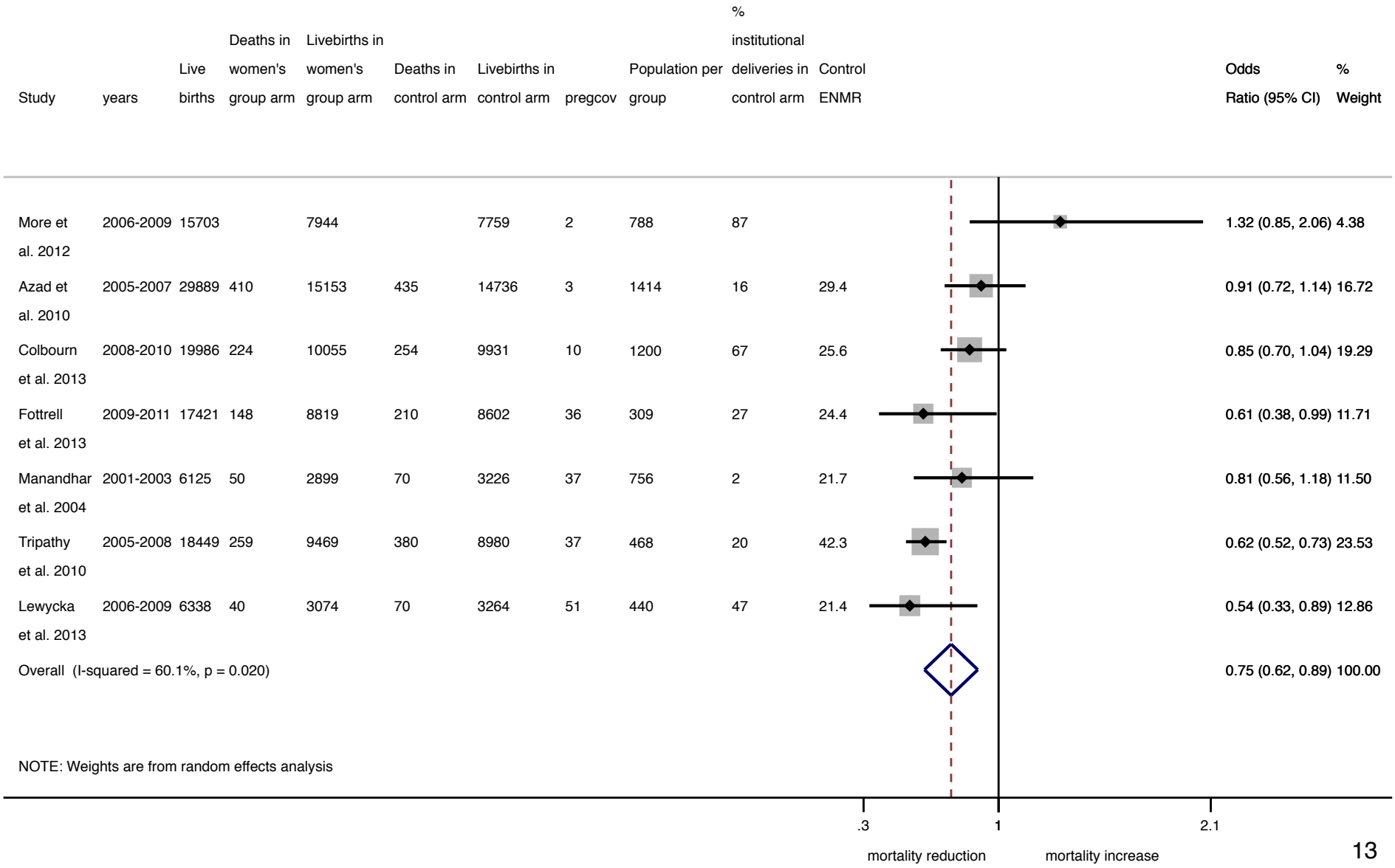
Meta-analysis of the effect of women's group practising participatory learning and action on stillbirths



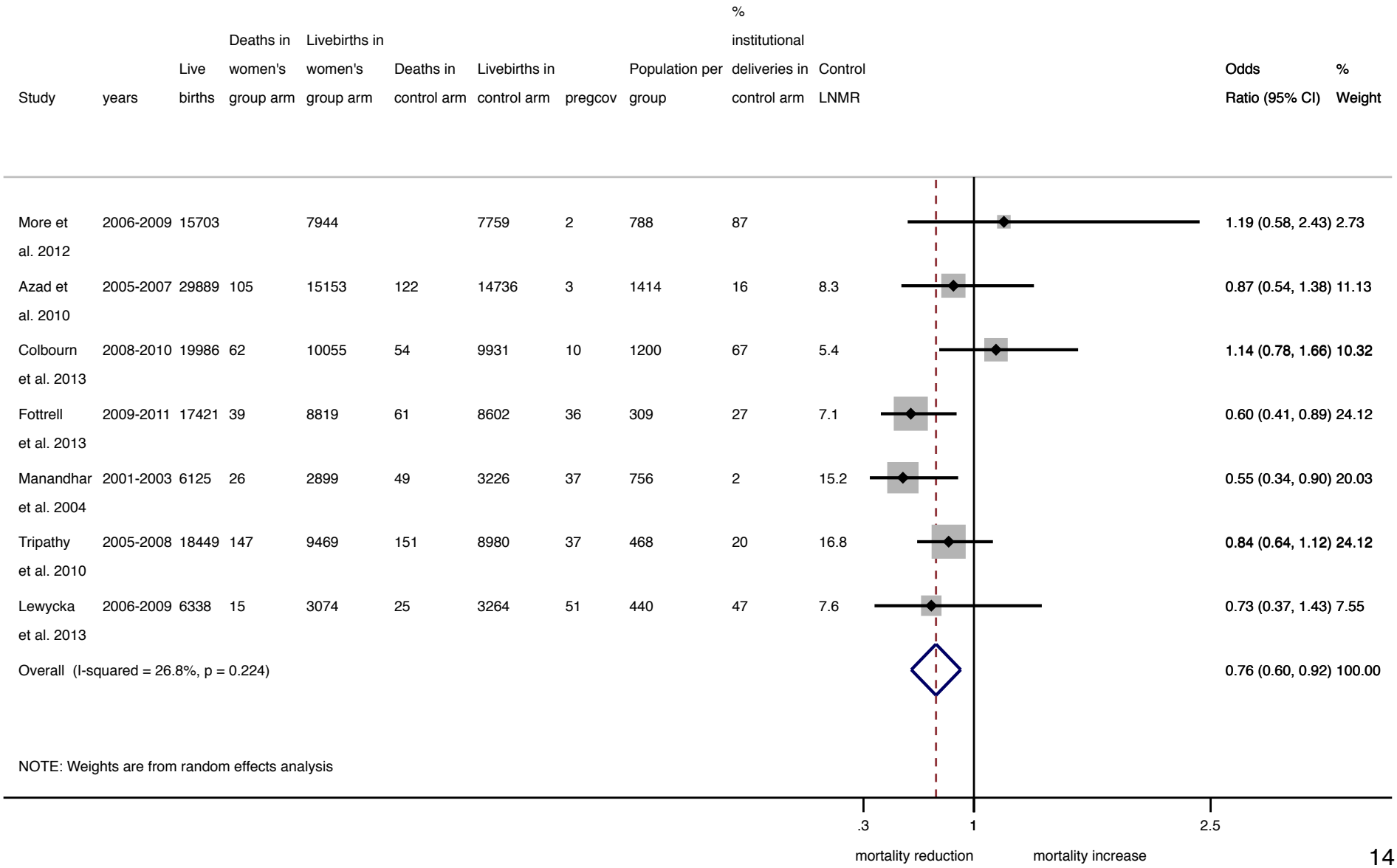
Meta-analysis of the effect of women's groups practising participatory learning and action on perinatal mortality

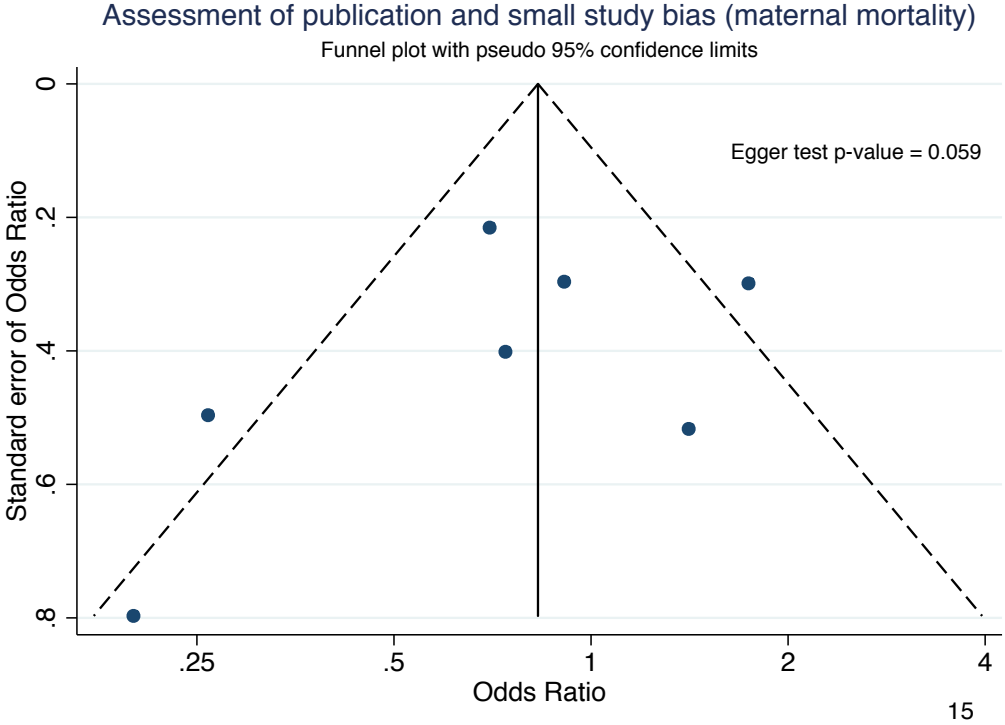


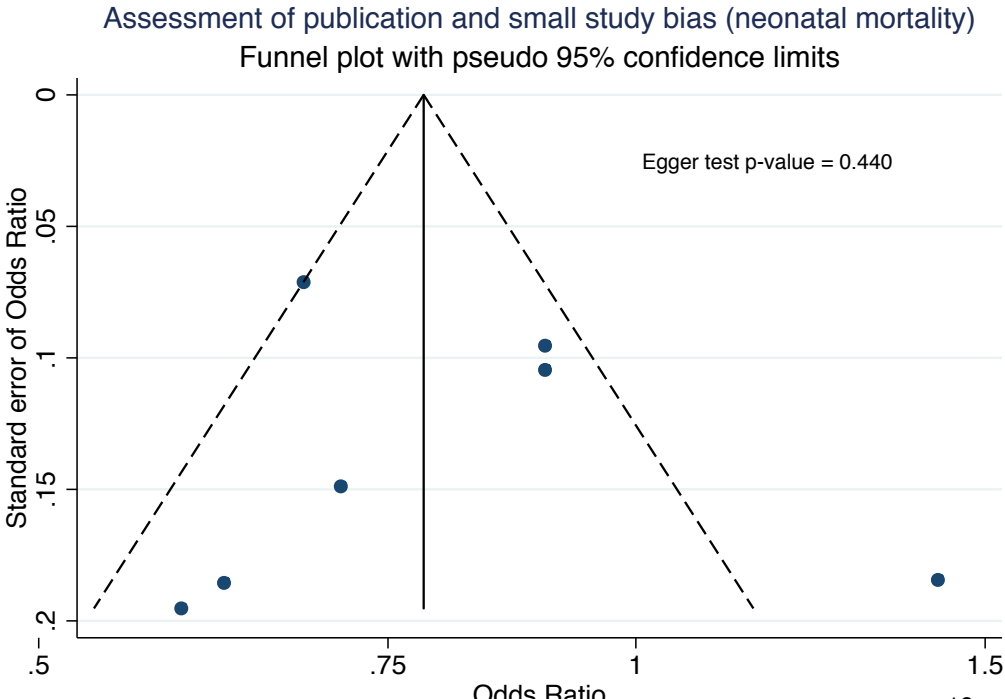
Meta-analysis of the effect of women's groups practising participatory learning and action on early neonatal mortality



Meta-analysis of the effect of women's groups practising participatory learning and action on late neonatal mortality




Assessment of publication and small study bias (maternal mortality)
Funnel plot with pseudo 95% confidence limits
Egger test p-value = 0.059
Standard error of Odds Ratio
0
.2
.4
.6
.8
.25
.5
1
2
4
Odds Ratio


Assessment of publication and small study bias (neonatal mortality)
Funnel plot with pseudo 95% confidence limits
Egger test p-value = 0.440
Standard error of Odds Ratio
0
.05
.1
.15
.2
.5
.75
1
1.5
Odds Ratio

Appendix 11: Meta-regressions of potential predictors of effect for maternal and neonatal mortality (all trials included)

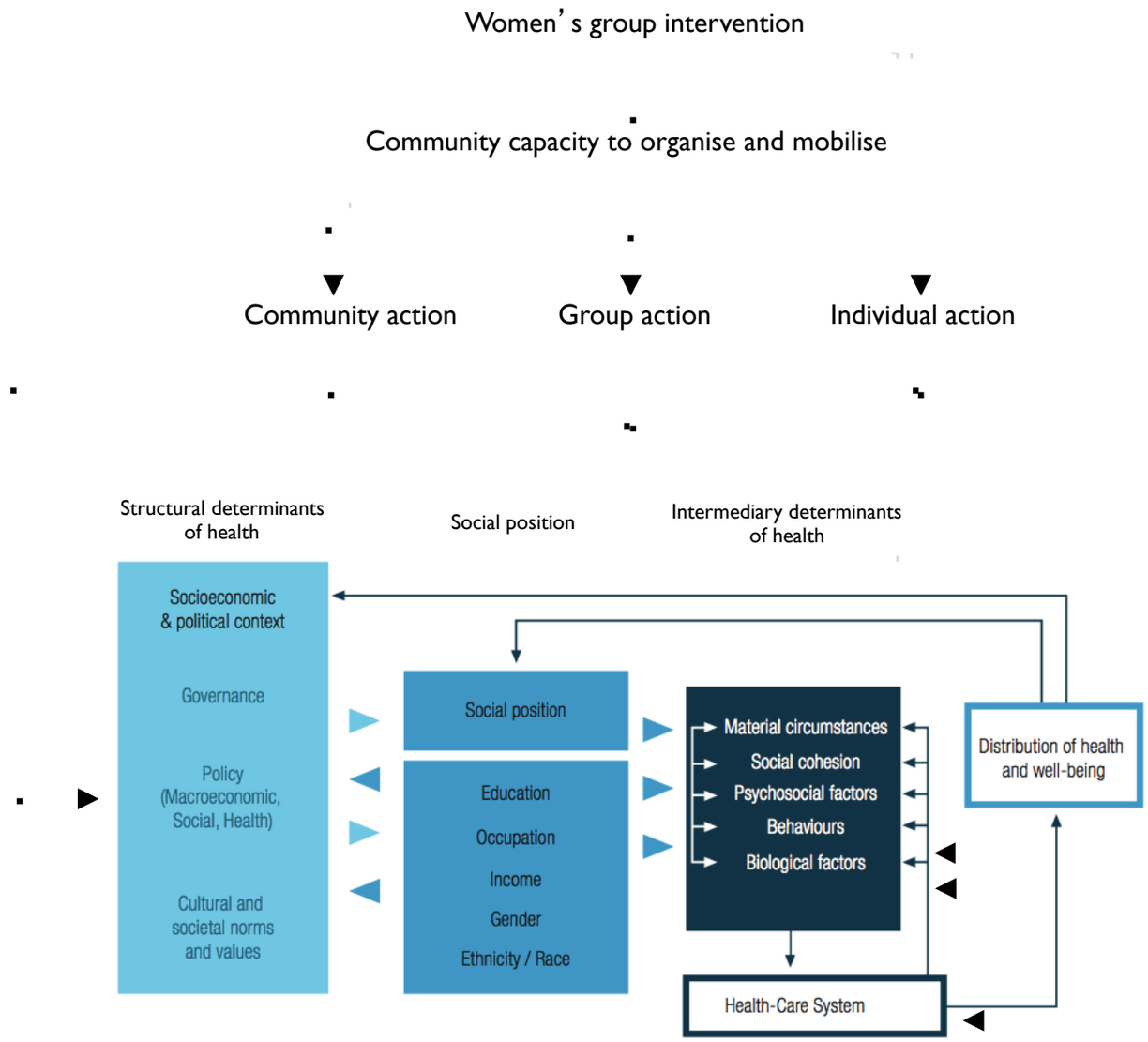
OUTCOME Potential predictor (covariate)	**Coefficient**	**P-value**	**Lower 95%**	**Upper 95%**	**Tau-squared**[a]	**I-squared residual**[b]	**Adjusted R-squared**[c]
MATERNAL MORTALITY							
% of pregnant women participating in groups	- 0.0234	0.026	- 0.0427	- 0.0041	0.0362	40.3%	79.4%
Population per group	0.0008	0.137	- 0.0004	0.0020	0.1219	72.3%	30.5%
% of institutional deliveries in control group	0.0046	0.614	- 0.0174	0.0266	0.2147	77.9%	-22.5%
Mortality rate in control group	- 0.0012	0.229	- 0.0036	0.0011	0.1688	75.9%	3.7%
NEONATAL MORTALITY							
% of pregnant women participating in groups	- 0.0077	0.011	- 0.0127	- 0.0027	0	0%	100%
Population per group	0.0003	0.042	<0.0001	0.0005	0	37.2%	100%
% of institutional deliveries in control group	0.0042	0.220	- 0.0035	0.0120	0.0211	69.0%	- 16.0%
Mortality rate in control group	- 0.0078	0.270	- 0.0239	0.0084	0.0224	65.0%	- 23.6%

[a] Remaining between-study variance in the outcome variable not explained by the covariate
[b] Proportion of residual between-study variation in the outcome variable (i.e. that unexplained by the addition of the covariate to the model) due to heterogeneity, as opposed to sampling variability
[c] Relative reduction in between-study variance of the outcome variable due to the addition of the covariate to the model

Appendix 12: A hypothesised model for how the women's group intervention works

A The intervention mobilises communities (defined as individuals linked by shared concerns) concerned about Maternal and child health (MCH) to take action by organising them into women's groups and facilitating a participatory learning and action cycle.

B Anecdotal evidence suggests that the intervention builds the capacities of communities to better organise themselves, as indicated by the operational domains posited by Laverack. [6] In Mchinji, Malawi, this included communities: where members came together with others in similar circumstances; that identified common concerns and solutions; that had leaders that provide direction; that contained organisational structures that enabled them to come together to socialise and address their concerns; that were able to access necessary resources and use them prudently, that engaged in the development of partnerships, coalitions and alliances; that were critically conscious of the root causes of their problems and solutions to address these; and that were capable of managing programmes and making decisions about issues that affected them. [7]



C

Material circumstances - empirical evidence suggests that the intervention helped groups to take action to improve their material circumstances. In 2009, the 197 women's groups in Mchinji, Malawi, raised a total of £5900 through various income generating activities.. [7]

Social cohesion - anecdotal evidence suggests that the intervention helped individuals and groups to take action to improve their social cohesion. In Mchinji, Malawi, individuals and groups involved in women's groups established a range of new relationship networks within and between communities and with external organisations. [7]

Psychological factors - empirical evidence suggests that the intervention helped individuals to take action to reduce psychosocial stressors. In eastern India, the women's groups reduced moderate maternal depression by 57% in year three of the study. [13*]

Behaviors - empirical evidence suggests that the intervention helped individuals to take action to change their care and care-seeking behaviours (table 3 in main manuscript).

Biological factors - empirical evidence suggests that the women's groups improved biological factors such as health, reproductive and nutritional status. Mothers in Nepal and India reported reduced morbidity in infants. [12-13*]

Health-care system - empirical evidence suggests that the intervention helped groups to take action to improve service accessibility and quality. In Mchinji, Malawi, 34% of groups succeeded in negotiating with their local health facilities for an HSA to be replaced or newly posted nearby. [7]

The evidence shows that: groups were able to fundraise successfully, individuals and groups were able to come together and associate in new ways, individuals were able to feel a greater sense of control in their lives, individuals were able to gain the knowledge, attitudes and social support to change their care and care-seeking behaviours, groups were able to lobby for health service improvements, and that through these factors, individuals and groups were able to indirectly impact on biological factors. We hypothesise that it is the greater organisation of communities, catalysed by the intervention, that enabled individuals and groups to take action to address these intermediary determinants of health, and that by doing so, they mediated the impact of social position on health and wellbeing.

D *Governance* - anecdotal evidence suggests that the intervention helped communities to take action to improve governance, particularly at the local level. In India, women's group members became active and respected advocates for health in their villages. [36*]

Policy - anecdotal evidence suggests that the intervention helped communities to take action to lobby for change in policies at all levels. In Mchinji, Malawi, members of several women's groups in one area joined together to take direct action, including speaking on national radio, to question the efficacy of national bednet distribution strategies. [7]

Norms and values - we have anecdotal evidence that the intervention helped communities to take action to subvert traditional gender norms. For example, in Mchinji, men became more involved in discussions and activities relating to sexual and reproductive health. [7]

The evidence shows that communities had the capabilities to: engage in higher level decision-making, high level advocacy, and to redefine traditional gender roles. We hypothesise that it was the better organisation of communities, catalysed by the intervention, that enabled communities to take action to address these structural determinants of health, and that by doing so, they reduced the stratification of society and its impact on health and wellbeing.

* Reference is located in the main manuscript.

Appendix 13: Quality assessment of economic evaluations included in the review

Item in Referees' checklist	Borghi 2005 [8] (Manandhar et al. 2004)	Tripathy et al. 2010	Fottrell et al. 2013	Lewycka et al. 2013
Study design				
(1) Research question stated	√	√	√	√
(2) Economic importance stated	√	X	X	X
(3) Viewpoint(s) stated and justified	√	√	√	√
(4) Rationale stated	√	√	√	√
(5) Alternatives described	√	√	X	√
(6) Form stated	√	√	√	√
(7) Choice of form justified	X	X	X	X
Data collection				
(8) Source of effectiveness estimates stated	√	√	√	√
(9) Details given	√	√	√	√
(10) Details of meta-analysis given	N/A	N/A	N/A	N/A
(11) Primary outcomes stated	√	√	√	√
(12) Valuation methods stated	√	√	√	√
(13) Subject details given	√	√	√	√
(14) Productivity changes reported separately	N/A	N/A	N/A	N/A
(15) Relevance of productivity changes discussed	N/A	N/A	N/A	N/A
(16) Resource quantities separately reported	X	X	X	X
(17) Unit cost estimation methods described	√	X	√	√
(18) Currency and price data recorded	√	√	√	√
(19) Currency and price adjustment details given	√	√	√	√
(20) Details of any model used given	X	X	X	X
(21) Choice of model and parameters justified	N/A	N/A	N/A	N/A
Analysis and interpretation of results				
(22) Time horizon stated	√	X	X	X
(23) Discount rate(s) stated	√	√	X	X
(24) Choice of rate(s) justified	X	X	X	X
(25) Explanation given if not discounting	N/A	N/A	X	X
(26) Statistical test details and confidence intervals given	√	X	X	X
(27) Sensitivity analysis approach given	√	X	X	X
(28) Sensitivity analysis variables justified	X	X	X	X
(29) Sensitivity analysis ranges stated	√	X	X	X
(30) Relevant alternatives compared	√	√	X	X
(31) Incremental analysis reported	√	√	√	√
(32) Major outcomes reported in disaggregated form	√	√	√	√
(33) Study question answered	√	√	√	√
(34) Conclusions follow from data reported	√	√	√	√
(35) Conclusions accompanied by caveats	√	√	√	√

Appendix 14: Seven countries where most neonatal and maternal lives could be saved

Our estimated impacts are necessarily simplifications, and so we will only use central estimates for the risk ratios of effects and give numbers of lives saved to three significant figures and percentages to two significant figures to avoid a false impression of precision.

The meta-analysis risk ratios corresponding to the reported odds ratios are 0.68 (NMR), 0.45 (MMR). In presenting the potential number of lives saved in tables A14.1 and A14.2 below, we have used the lower bound estimates where we assumed 30% loss of effectiveness at scale. If higher effectiveness was achieved, then clearly the anticipated gains would be greater. The seven countries where most neonatal lives would be saved are:

Table A14.1 - Seven countdown countries where the participatory action cycle intervention could have the most impact on neonatal deaths. Note that we assume that the intervention only impacts on non-SBA deliveries in rural regions (see detailed methods in the appendix 2).

Seven countries where the greatest number of neonatal lives would be saved: total number saved per year (% of total)	**Seven countries where the greatest number of neonatal lives would be saved as a proportion of total neonatal deaths for that country: total number saved per year (% of total)**
India: 116 000 (10%)	Ethiopia: 23 800 (19%)
Nigeria: 27 200 (10%)	Niger: 5 800 (18%)
Ethiopia: 23 800 (19%)	Nepal: 4 090 (17%)
Bangladesh: 13 700 (13%)	Afghanistan: 4 580 (14%)
Niger: 5 800 (18%)	Bangladesh: 13 700 (13%)
Democratic Republic of Congo: 5 690 (5%)	Sudan: 5 650 (12%)
Pakistan: 5 660 (3%)	Uganda: 5 370 (12%)

We additionally note that there are 15 countries where estimated impact on all neonatal deaths is larger than 10%, even assuming 30% loss of effectiveness at scale.

Table A14.2 - Seven countdown countries where the participatory action cycle intervention could have the most impact on maternal deaths. Note that we assume that the intervention only impacts on non-SBA deliveries in rural regions (see detailed methods in the appendix 2).

Seven countries where the greatest number of maternal lives would be saved: total number saved per year (% of total)	Seven countries where the greatest number of maternal lives would be saved as a proportion of total maternal deaths for that country: total number saved per year (% of total)
India: 9 370 (17%)	Ethiopia: 3 320 (36%)
Nigeria: 5 980 (15%)	Niger: 1 300 (28%)
Ethiopia: 3 320 (36%)	Bangladesh: 2 050 (28%)
Sudan: 2 120 (20%)	Nepal: 331 (27%)
Bangladesh: 2 050 (28%)	Sudan: 2 120 (20%)
United Republic of Tanzania: 1 390 (16%)	Uganda: 950 (20%)
Niger: 1 300 (28%)	Yemen: 377 (20%)

We additionally note that there are 41 countries where estimated impact on all maternal deaths is larger than 10% and 21 where it is larger than 15%, even assuming 30% loss of effectiveness at scale.

Appendix 15: Estimates of effect of women's group intervention in rural areas of individual Countdown countries

Countdown Country	Notes on data sources	% rural population	Estimate for % of RURAL SBA deliveries	Estimate for RURAL current NMR / 1000 livebirths	Estimate for current MMR / 1000000 livebirths	Estimated total neonatal deaths per year (no intervention)	Estimated number of **neonatal** lives saved per year (% of total deaths) **Assuming NO loss of effectiveness at scale**	Estimated number of **neonatal** lives saved per year (% of total deaths) **Assuming 30% loss of effectiveness at scale**	Estimated total maternal deaths per year (no intervention)	Estimated number of **maternal** lives saved per year (% of total deaths) **Assuming NO loss of effectiveness at scale**	Estimated number of **maternal** lives saved per year (% of total deaths) **Assuming 30% loss of effectiveness at scale**
Afghanistan	Used special report 2010. No rural SBA rate available so used overall SBA rate.	77	24	30	234	33,000	6550 (20%)	4580 (14%)	3,330	874 (26%)	612 (18%)
Angola	DHS 2011	41	26	28	450	22,200	2760 (12%)	1930 (9%)	3,710	760 (20%)	532 (14%)
Azerbaijan	DHS 2006	48	80	22	43	4,390	124 (3%)	87 (2%)	80	4 (5%)	3 (4%)
Bangladesh	DHS 2007. Applied urban/rural ratio to recent overall totals for CBR and NMR.	71	22	27.5	240	105,000	19600 (19%)	13700 (13%)	7,220	2920 (40%)	2050 (28%)
Benin	DHS 2006.	58	69	32	350	11,300	720 (6%)	504 (4%)	1,270	135 (11%)	94 (7%)
Bolivia	DHS 2008. Applied urban/rural ratio to recent overall total for NMR.	33	51	30.7	190	5,730	451 (8%)	316 (6%)	498	48 (10%)	34 (7%)
Botswana	DHS 1998. Applied urban/rural ratio to recent overall totals for CBR and NMR.	38	90	11	160	536	8 (1%)	5 (1%)	78	0 (2%)	0 (2%)
Brazil	DHS 1996. Applied urban/rural ratio to recent overall totals for CBR and NMR.	13	94	12	56	29,500	101 (0%)	71 (0%)	1,650	8 (0%)	6 (0%)
Burkina Faso	DHS 2010	73	51	35	300	23,400	3000 (13%)	2100 (9%)	2,190	440 (20%)	308 (14%)
Burundi	DHS 2010	89	58	38	800	13,900	1770 (13%)	1240 (9%)	2,330	638 (27%)	447 (19%)
Cambodia	DHS 2010	80	67	35	250	10,600	1070 (10%)	747 (7%)	787	130 (17%)	91 (12%)
Cameroon	DHS 2004	41	46	37	690	25,900	2120 (8%)	1480 (6%)	4,980	676 (14%)	473 (10%)
Central African Republic	DHS 1996. Applied urban/rural ratio to recent overall totals for CBR and NMR.	61	26	52	890	7,220	1270 (18%)	892 (12%)	1,400	373 (27%)	261 (19%)
Chad	DHS 2004	72	60	50	1100	23,600	2400 (10%)	1680 (7%)	5,710	903 (16%)	632 (11%)
China	No DHS available. Used overall totals for NMR and CBR.	52	99	9	37	146,000	244 (0%)	170 (0%)	5,980	17 (0%)	12 (0%)
Comoros	DHS 1996. Applied urban/rural ratio to recent overall totals for CBR and NMR.	72	57	33	280	917	98 (11%)	69 (7%)	80	14 (18%)	10 (12%)
Congo	Preliminary DHS 2011 (rural CBR) and DHS 2005 (rural NMR)	37	73	35	560	6,110	204 (3%)	143 (2%)	811	56 (7%)	39 (5%)
Congo, Democratic Republic of the	DHS 2007	64	73	46	540	123,000	8130 (7%)	5690 (5%)	15,700	1630 (10%)	1140 (7%)
Côte d'Ivoire	Preliminary DHS 2011 (rural CBR) and DHS 1999 rural/urban ratio applied to most recent overall NMR.	49	40	46	400	28,100	3510 (12%)	2450 (9%)	2,740	522 (19%)	365 (13%)
Djibouti	No DHS available. Used overall totals for NMR and CBR.	24	40	33	200	867	39 (5%)	28 (3%)	53	4 (8%)	3 (5%)
Egypt	DHS 2008	56	72	17.4	66	38,300	2100 (5%)	1470 (4%)	1,250	137 (11%)	96 (8%)
Equatorial Guinea	No DHS available. Used overall totals for NMR and CBR.	60	49	37	240	986	97 (10%)	68 (7%)	64	11 (17%)	8 (12%)
Eritrea	DHS 2002 Applied urban/rural ratio to recent overall totals for CBR and NMR.	78	44	22.5	240	4,090	641 (16%)	449 (11%)	468	117 (25%)	82 (18%)
Ethiopia	DHS 2011	83	3	43	350	125,000	34100 (27%)	23800 (19%)	9,190	4750 (52%)	3320 (36%)
Gabon	DHS 2000 Applied urban/rural ratio to recent overall totals for CBR and NMR.	14	67	22	230	994	13 (1%)	9 (1%)	95	2 (2%)	2 (2%)
Gambia, The	No DHS available. Used overall totals for NMR and CBR.	41	43	34	360	2,290	171 (7%)	120 (5%)	243	31 (13%)	22 (9%)
Ghana	DHS 2008	48	41	34		24,200	2580 (11%)	1810 (7%)	2,800	455 (16%)	319 (11%)
Guatemala	DHS 1999 Applied urban/rural ratio to recent overall totals for CBR and NMR.	50	37	15	120	7,080	774 (11%)	542 (8%)	567	106 (19%)	74 (13%)
Guinea	DHS 2005 Applied urban/rural ratio to recent overall total for NMR only.	64	31	42.1	610	15,200	2480 (16%)	1730 (11%)	2,430	614 (25%)	430 (18%)
Guinea-Bissau	No DHS available. Used overall totals for NMR and CBR. No rural SBA rate available so used overall SBA rate.	70	44	44	790	2,590	324 (13%)	227 (9%)	464	100 (21%)	70 (15%)
Haiti	Preliminary DHS 2012 (rural CBR) and DHS 2005 ratio applied to most recent overall NMR.	46	15	32	350	6,830	1200 (18%)	840 (12%)	957	225 (23%)	157 (16%)
India	DHS 2005	70	44	42.5	200	1,110,000	166000 (15%)	116000 (10%)	54,600	13400 (25%)	9370 (17%)
Indonesia	DHS 2007 Applied urban/rural ratio to recent overall total for NMR only.	55	76	16.9	220	76,500	3770 (5%)	2640 (3%)	9,600	840 (9%)	588 (6%)
Iraq	DHS not available, used overall CBR and NMR	34	71	20	63	22,900	733 (3%)	513 (2%)	720	40 (5%)	28 (4%)
Kenya	DHS 2009	77	37	33	360	47,300	7610 (16%)	5330 (11%)	5,690	1420 (25%)	995 (17%)
Korea, Democratic People's Republic of	DHS not available, used overall CBR and NMR	40	100	17	81	5,820	0 (0%)	0 (0%)	277	0 (0%)	0 (0%)
Kyrgyzstan	DHS 1997 Applied urban/rural ratio to recent overall totals for CBR and NMR. No rural SBA rate available so used overall SBA rate.	65	99	16.9	71	2,070	8 (0%)	5 (0%)	92	0 (1%)	0 (0%)
Lao People's Democratic Republic	No DHS available. Used overall totals for NMR and CBR.	66	99	17	470	2,460	8 (0%)	5 (0%)	680	4 (1%)	3 (0%)
Lesotho	DHS 2009	72	54	44	620	2,550	282 (11%)	198 (8%)	381	68 (18%)	48 (13%)
Liberia	DHS 2007 Applied urban/rural ratio to recent overall total for NMR only.	52	32	29.3	770	4,120	550 (13%)	385 (9%)	1,240	248 (20%)	173 (14%)
Madagascar	DHS 2009	69	39	24	240	16,600	2400 (15%)	1680 (10%)	1,790	412 (23%)	288 (16%)
Malawi	DHS 2010	80	50	34	460	20,100	2690 (13%)	1880 (9%)	3,110	622 (20%)	435 (14%)
Mali	DHS 2006	63	38	61	540	39,400	5710 (14%)	3990 (10%)	3,930	865 (22%)	605 (15%)
Mauritania	DHS 2000 Applied urban/rural ratio to recent overall totals for CBR and NMR.	58	39	41	510	4,820	562 (12%)	393 (8%)	614	120 (19%)	84 (14%)

Mexico	DHS 1987 Applied urban/rural ratio to recent overall totals for CBR and NMR.	22	87	9	50	16,100	308 (2%)	216 (1%)	1,150	29 (3%)	21 (2%)
Morocco	DHS 2004 Applied urban/rural ratio to recent overall total for NMR only.	41	40	22.6	100	12,300	1410 (12%)	990 (8%)	645	107 (17%)	75 (12%)
Mozambique	Preliminary DHS 2011 (rural CBR) and DHS 2003 ratio applied to most recent overall NMR.	61	46	39	490	30,900	4270 (14%)	2990 (10%)	4,460	918 (21%)	643 (14%)
Myanmar	No DHS available. Used overall totals for NMR and CBR.	66	58	30	200	24,700	3250 (13%)	2280 (9%)	1,640	371 (23%)	260 (16%)
Nepal	DHS 2011	81	14	36	170	23,700	5850 (25%)	4090 (17%)	1,240	473 (38%)	331 (27%)
Niger	DHS 2006	83	8	45	590	31,500	8280 (26%)	5800 (18%)	4,650	1860 (40%)	1300 (28%)
Nigeria	DHS 2008	49	28	49	630	282,000	38800 (14%)	27200 (10%)	40,900	8540 (21%)	5980 (15%)
Pakistan	DHS 2007 Applied urban/rural ratio to recent overall total for NMR only.	16	30	40	260	172,000	8080 (5%)	5660 (3%)	12,400	899 (7%)	630 (5%)
Papua New Guinea	No DHS available. Used overall totals for NMR and CBR.	38	47	23	230	4,840	309 (6%)	216 (4%)	484	53 (11%)	37 (8%)
Peru	DHS 2011	51	64	13	67	5,980	509 (9%)	356 (6%)	394	45 (11%)	31 (8%)
Philippines	DHS 2008 Applied urban/rural ratio to recent overall total for NMR only.	51	48	14.5	99	27,500	2880 (11%)	2020 (7%)	2,350	337 (14%)	236 (10%)
Rwanda	DHS 2010	81	67	31	340	10,900	1010 (9%)	706 (6%)	1,530	189 (12%)	133 (9%)
São Tomé and Príncipe	DHS 2009	37	75	22	70	119	4 (3%)	3 (2%)	4	0 (6%)	0 (4%)
Senegal	DHS 2011	57	33	35	370	15,600	2280 (15%)	1600 (10%)	1,750	413 (24%)	289 (17%)
Sierra Leone	DHS 2008	61	33	49	890	9,120	1290 (14%)	901 (10%)	2,080	400 (19%)	280 (13%)
Solomon Islands	No DHS available. Used overall totals for NMR and CBR.	81	67	10	93	177	15 (8%)	11 (6%)	17	2 (15%)	2 (10%)
Somalia	No DHS available. Used overall totals for NMR and CBR.	62	15	50	1000	21,000	3580 (17%)	2500 (12%)	4,210	1220 (29%)	857 (20%)
South Africa	DHS 2003 Applied urban/rural ratio to recent overall totals for CBR and NMR.	38	85	18		20,100	317 (2%)	222 (1%)	3,180	90 (3%)	63 (2%)
Sudan	DHS 1990 Applied urban/rural ratio to recent overall totals for CBR and NMR. No rural SBA rate available so used overall SBA rate.	59	23	33.4	730	45,700	8080 (18%)	5650 (12%)	10,800	3020 (28%)	2120 (20%)
Swaziland	DHS 2007	79	80	23	320	847	44 (5%)	31 (4%)	112	11 (9%)	7 (7%)
Tajikistan	No DHS available. Used overall totals for NMR and CBR. No rural SBA rate available so used overall SBA rate.	74	88	25	65	4,880	138 (3%)	97 (2%)	127	6 (5%)	4 (3%)
Tanzania, United Republic of	DHS 2010	73	40	27	460	49,100	6810 (14%)	4770 (10%)	8,720	1990 (23%)	1390 (16%)
Togo	DHS 1998 Applied urban/rural ratio to recent overall totals for CBR and NMR. No rural SBA rate available so used overall SBA rate.	56	60	36.8	300	7,090	592 (8%)	415 (6%)	591	83 (14%)	58 (10%)
Turkmenistan	DHS 2000 Applied urban/rural ratio to recent overall totals for CBR and NMR.	50	99	22.7	67	2,470	4 (0%)	3 (0%)	75	0 (0%)	0 (0%)
Uganda	DHS 2011	87	37	30	310	43,800	7670 (18%)	5370 (12%)	4,810	1360 (28%)	950 (20%)
Uzbekistan	DHS 1996. Applied urban/rural ratio to recent overall totals for CBR and NMR.	64	100	14.5	28	8,740	2 (0%)	1 (0%)	163	0 (0%)	0 (0%)
Vietnam	DHS 2002 Applied urban/rural ratio to recent overall totals for CBR and NMR.	69	85	14.3	59	18,100	796 (4%)	558 (3%)	891	56 (6%)	39 (4%)
Yemen	DHS 1997 Applied urban/rural ratio to recent overall totals for CBR and NMR.	68	26	33.4	200	30,200	5250 (17%)	3680 (12%)	1,880	538 (29%)	377 (20%)
Zambia	DHS 2007 Applied urban/rural ratio to recent overall total for NMR only.	64	31	27.8	440	16,700	2510 (15%)	1760 (11%)	2,730	680 (25%)	476 (17%)
Zimbabwe	DHS 2011	61	58	28	570	12,100	1000 (8%)	702 (6%)	2,110	350 (17%)	245 (12%)
TOTAL						**3,150,000**	**404,000 (13%)**	**283,000 (9%)**	**278,000**	**58,800 (21%)**	**41,100 (15%)**

References (web appendix):

1. World Health Organization, UNICEF. Countdown to 2015: Building a Future for Women and Children, The 2012 Report [Internet]. 2012 [accessed 2012 Dec 3]. Available from: http://www.countdown2015mnch.org/reports-and-articles/2012-report

2. Afghan Public Health Institute, Central Statistics Organization, Kabul, ICF Macro, Indian Institute of Health Management Research, World Health Organization. Afghanistan mortality survery 2010 [Internet]. 2010 [accessed 2012 Dec 3]. Available from: http://www.measuredhs.com/pubs/pdf/FR248/FR248.pdf

3. Campbell MK, Elbourne DR, Altman DG, for the CONSORT Group. CONSORT statement: extension to cluster randomised trials. *BMJ* 2004; **328:** 702–08.

4. Higgins JP, Altman DG, Gotzsche PC, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ* 2011; **343:** d5928.

5. Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(6): e1000097. doi:10.1371/journal.pmed1000097

6. Laverack G. Addressing the contradiction between discourse and practice in health promotion. PhD thesis. Deakin University, 1999.

7. Rosato M. How does community mobilisation through MaiMwana women's groups work? Addressing the social determinants of mother and child health in rural Malawi. PhD thesis. University College London, 2012. http://discovery.ucl.ac. uk/1365989/ (accessed Feb 21 2013).

8. Borghi J, Thapa B, Osrin D. Economic assessment of a women's group intervention to improve birth outcomes in rural Nepal. *Lancet* 2005; **366:** 1882–84.