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1. Background

1.1 Aims and rationale for review

The Millennium Development Goals (MDGs) have focussed global attention on significantly improving maternal and infant health. In 2008 70% of around 8.8 million under-five deaths occurred during the first year of life (WHO 2010). Estimates suggest that there are around 350,000-500,000 maternal deaths per year (UN Joint Action Plan 2010) with 15 million more women suffering long-lasting injury or illness from preventable pregnancy-related causes and complications (UN Joint Action Plan 2010) and many more suffering related mental morbidities (Hogan *et al.* 2010). These figures represent improvements over the last two decades in some countries but further significant mortality reductions will be required to meet the MDGs targets of reducing under-five mortality by two-thirds from 1990-2015 and reducing maternal deaths by three-quarters (United Nations 2008) in the same timeframe.

The burden of maternal and infant deaths falls disproportionately on low income countries (LICs) and lower middle income countries (LMICs) and among the poorest within these countries. The causes of maternal and infant mortality and morbidity are well established (Ronsmans & Graham 2006) yet knowledge on effective management of conditions has not been translated into significantly improved outcomes because of a lack of effective models of service delivery (Campbell & Graham 2006). Urban populations are often assumed to have better access to health care than those living in rural areas. However, urban health systems in many LICs and LMICs have a weak to non-existent public health structure, a non-uniform implementation of strategies and underdeveloped infrastructures. Although urban women tend to be more likely than rural women to give birth in health facilities, urban inequalities in maternal-newborn health care are huge in many poor countries (Matthews *et al.* 2010), and poor quality of care in many urban facilities plays a significant role in counteracting the positive effects of skilled attendance at birth (More *et al.* 2009). Sub-optimal health outcomes are evident among the urban poor with the lowest access and use of health care facilities.

Establishing evidence-based ways of improving access to and uptake of maternal and infant care models in urban areas is of increasing importance as rapid urbanisation is taking place in many LICs and LMICs and poor urban and peri-urban communities are growing. Systematic reviews offer a robust methodology to identify, evaluate and summarise findings of relevant individual studies to make available evidence more accessible to policy makers. In the absence of any existing published systematic review that focuses specifically on issues affecting urban populations in low income countries, we will seek to undertake a review on the effectiveness of different mechanisms and health system characteristics which may help improve the access and uptake by poor urban-dwelling women in low income countries of effective maternal and infant health interventions known to be beneficial for infants. In drawing together and analysing existing evidence the review will provide important information for policy makers at international, national and sub-national levels.

1.2 Definitional and conceptual issues

1.2.1 Interventions

The review focuses on identifying effective ways of facilitating improving access and uptake of maternal and infant child services of proven effectiveness, delivered within the health sector (public or private). This will include both reforms to health system delivery, financial and governance structures, as well as specific interventions intended to improve engagement with

effective maternal and child health services. One example of the latter, for instance, is the use of lay health workers to encourage the uptake of maternal health services (Lewin *et al.* 2010). The pathway of action or causal mechanisms will not be predetermined but rather papers will be included that involve an explicit evaluation of any health sector intervention for the target population with maternal and infant health services.

In drawing lessons from the review we will separate out *how* different approaches are being used to improve access and uptake, the settings *where* these approaches are being implemented, and *what* types of maternal and infant health service are being promoted. As we have noted, possible approaches to facilitate improved access and uptake of services include measures to reduce financial and non-financial barriers to access, as well as specific community engagement and population targeting strategies. Examples of relevant approaches may include: the reduction of out of pocket payments, provision of financial support, community health posts, community health workers, lay health workers, provision of services in a home setting, community engagement with health facilities, increased availability of district health centres and/or hospitals, marketing initiatives, use of mass media (including information, education and communication), mobile clinics, school-based provision, and working with civil society and peer-led groups. Our review will thus seek to look at the studies which document the role of changes on both the demand-side (e.g. reduction in fees, vouchers, incentives, cash transfers, peer encouragement for service use) and supply-side measures (e.g. changes in type of staffing, greater use of lay or community workers and volunteers, reduction in distance to available facilities) aspects of models of delivery.

1.2.2 Target population

The review will include studies that specify all women of child bearing age and their children up to the age of one in poor urban populations in low income countries based on the following definitions.

Urban: The term 'urban' will essentially be defined as 'non-rural'. This may include the following terms: urban, city, cities, town, peri-urban, informal settlement, slum, shanty town, township and favela¹.

Poor populations: Poverty can be defined and measured in many ways. For this review the definition will not be restricted. Rather, studies will be included if they have explicit reference to models of delivery for poor or socioeconomically disadvantaged groups at the sub-national level.

Low income countries: LICs and LMICs will be defined according to the World Bank Atlas Method. A link to the full list of countries is provided in the inclusion/exclusion criteria in Appendix 2.1.

1.2.3 Maternal and infant health outcomes²

There are many potential indicators of maternal and infant health. Reduction of maternal and infant deaths are key MDG targets (United Nations 2008), which we extend to include later maternal deaths together with maternal deaths. We include severe acute maternal morbidities in our outcomes, defined as "A very ill pregnant or recently delivered woman who would have died had it not been that luck and good care was on her side" (Say *et al.* 2004) because data on severe acute maternal morbidity (SAMM) can highlight health system failures or priorities in maternal health care more rapidly than maternal deaths (Drife 1993). Given that approximately 70% of under-5 deaths occur in the first year (Lawn *et al.* 2005; UN Joint Action Plan 2010), the review will in particular seek to present evidence specifically on neonatal deaths where possible.

¹ Brazilian Portuguese word for a slum.

² Our approach has been guided in part by an informal discussion with DFID (Research & Policy teams).

Table 1: MCH outcomes

Maternal health outcomes	Definition
Maternal death	The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management. The summary indicator to be used is the Maternal Mortality Ratio (MMR) defined as the number of maternal deaths per 100,000 live births.
Late maternal death	Death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy.
Severe acute maternal morbidity ("near miss")	Based on major direct obstetric complications or interventions in low income countries (Prual <i>et al.</i> 2000): Haemorrhage ³ Dystocia ⁴ Hypertension ⁵ Sepsis ⁶ Incomplete abortion C-section / hysterectomy / blood transfusion ⁷
Infant mortality	Number of deaths among under one year olds AND Infant deaths per 1,000 live births.
Neonatal mortality	Number of deaths in the first 28 days of life per 1,000 live births.
Postneonatal mortality	Number of deaths after the first 28 days of life and before 1 st birthday per 1,000 live births.
Perinatal mortality	Number of stillbirths and deaths in the first week of life per 1,000 live births.

1.2.4 Scope of review

To date there is a paucity of systematic reviews in respect of these issues in low income countries. We will collate data from a variety of study types, both qualitative and quantitative which will necessitate a range of methods (see section 2) to appraise data. Data extraction templates will be designed to meet the needs of a wide range of study types.

Understanding the contextual setting for different models of delivery will be vital in synthesising and interpreting findings. Health systems vary considerably across low income countries, for example in the balance of public and private provision, and it is important to recognise key health systems features that underpin effective delivery models. Broad aspects of the health systems will therefore be recorded where available.

The review will be restricted to evaluative studies but both qualitative and quantitative data will be assessed. Given the complexity of evaluating models of delivery, it is important to include a wide range of evidence within the review. Valuable evidence may also be contained in "grey", non-peer-reviewed literature, which the search will endeavour to identify. Full details and specifications of the review are given in section 2.

³ Severe haemorrhage included prepartum, peripartum and postpartum haemorrhage leading to blood transfusion or hospitalization for more than four days or to hysterectomy, caesarean section or death.

⁴ Including obstructed labour or prolonged labour requiring either instrumental foetal extraction or caesarean section, and uterine rupture and other complications of prolonged labour such as laceration of the perineum, pelvic fistulae or death.

⁵ Severe hypertensive disorders of pregnancy included eclampsia, severe pre-eclampsia (clinical diagnoses) and hypertension (diastolic blood pressure > 90 mmHg) leading to hospitalization or death.

⁶ Included septicaemia, peritonitis, odorous vaginal discharge leading to hospitalization in the interest of the mother's safety, or to hysterectomy or death.

⁷ Caesarean sections (e.g. performed for foetal distress or scarred uterus), hysterectomies and/or blood transfusions.

1.3 Policy and practice background

In 2000, the Millennium Declaration ensured that maternal and child health were given international priority (Ronsmans & Graham 2006). The levels of maternal and child death remain unacceptably high, with the vast majority occurring in low income countries (United Nations 2009). Some progress has been made in the last decade in reaching the MDGs of reducing maternal death, however, a recent review highlights that significantly more improvement is needed and that attention must focus on poor and vulnerable groups who suffer disproportionately (United Nations 2010). This review identifies the urban poor within low income countries as one such vulnerable population group. Maternal and infant health outcomes are being increasingly disaggregated by rural/urban categories as a result of increasing standardisation and data collection.

The direct causes of maternal and infant ill-health are well-established and effective management known in the majority of cases. The persistent challenge has been designing and delivering services to meet needs at the population level in resource poor and diverse systems settings. The evidence base, demonstrating that specific interventions packaged within appropriate, effective and efficient models of delivery care lead to improvements in maternal and infant health, is still lacking in these settings. Robust evaluations are often based around small scale or pilot initiatives (Campbell & Graham 2006) but, models of delivery operating at scale are often not evaluated. This review will assess and synthesise the available evidence through a systematic review of literature in order to be able to draw out policy relevant lessons and to identify important gaps within the evidence base.

1.4 Research background

The effectiveness of different models of delivery of health care services for maternal and infant health in LICs are beginning to be tested. There is increasing quality of evidence through randomised controlled trials (RCTs) (Jokhio *et al* 2005; Manandhar *et al.* 2004) and systematic reviews (Darmstadt *et al.* 2005). Reviews of perinatal and neonatal interventions highlight the paucity of evidence on the effectiveness of different modes of delivery of care across the MCH continuum (Bhutta *et al.* 2005; Kerber *et al.* 2007).

Overall however, the systematic review evidence base from LICs is limited. For example, just 15 (5%) of 298 Cochrane Reviews related to maternal health include research from LICs. Of these, only six deal with service delivery. Fewer reviews explicitly consider models of delivery for urban poor populations while the process of rapid urbanisation within LICs forces a change in the location of the evidence base. Some evidence is available on specific interventions (Piane 2008) and financing models (Ensor & Ronoh 2005) rather than modes of delivery.

1.5 Objectives

The overall objective of this review is to assess and synthesise evidence of effectiveness of different delivery models in improving maternal and infant health outcomes among the poor in urban areas within low income countries. Specifically, this systematic review will address the question:

What are the effects of different models of delivery for improving maternal and infant health outcomes for poor people in urban areas in low income countries?

The review will directly inform and improve the evidence base from which policy makers at sub-national, national, and international levels can found decisions.

2. Methods used in the review

2.1 User involvement

Working closely with DFID (Research and Policy teams) we will develop a detailed communication plan and a programme of user engagement. We envisage a range of activities, tailored to different audiences.

Scientific communication

Presentations: at appropriate conferences and workshops (e.g. the *Women Deliver*⁸ conference which is attended by development practitioners and professionals alongside academics).

Peer-reviewed journal articles: for maximum impact and equity of access in LICs we plan to publish in open source journals. All academic outputs (both presentations and publications) will be available via open access in LSE Research Online⁹.

Policy makers

Policy briefs: Preparation of one or more policy briefs using a graded-entry format: 1 page summary, 3 page extended summary, and 25 page (max.) briefs. This would be modelled along the lines used by the WHO Health Evidence Network setting out question, background, potential options to be considered, and potential implementation challenges¹⁰.

Seminars: Presentation of findings at London-based seminar to which relevant London-based policy makers would be invited¹¹.

General audience communication¹²

Practical and policy relevant findings will be communicated through different media, including the use of new media such as Twitter, drawing on the expertise of the LSE Press Office to include:

- Press releases for the media,
- Research summaries in key online hubs (including R4D, Eldis, and POPLINE),
- Policy briefs for organisations dealing with service delivery, human resources and logistics in health service provision, and MCH;
- Preparation of short lay summary of review findings,
- Making materials available for free download on the LSE website,
- Participation in ESRC's Social Science Festival,
- Policy briefs and press pack materials for civil society groups (e.g. White Ribbon Alliance), and
- Dissemination of review findings and links to policy briefs and other documents through key mailing lists and online fora of which we are members:
 - PAHO Equidad
 - Health equity network
 - Jiscmail.ac.uk (including REPRODUCTIVE-HEALTH)
 - Wrlpop
 - EADI working group on Gender and Development

⁸ <http://www.womendeliver.org>.

⁹ <http://eprints.lse.ac.uk>.

¹⁰ <http://www.euro.who.int/en/what-we-do/data-and-evidence/health-evidence-network-hen>.

¹¹ Pending resources available, for possible linkage with other DFID-funded Systematic Reviews in the area of MCH, as per discussions with DFID.

¹² Where possible we shall endeavour to produce very brief summaries of our findings in French and Spanish.

- ICM
- FIGO
- Private and PNFP providers (e.g. Agha Khan, Marie Stopes International, IPPF etc)
- Eldis/ID21
- R4D
- Other national development funders (e.g. USAID, NORAD, SIDA etc).

2.2 Identifying and describing studies

The review will be carried out in three stages: the definition, the identification, and the detailed review of relevant studies.

2.1.1 Defining relevant studies: inclusion and exclusion criteria

The review aims to synthesise both quantitative and qualitative information relating to the effectiveness of health systems models to improve MCH outcomes for poor, urban populations in LICs. Studies will be included on the basis of whether they evaluate interventions that aim to affect maternal and infant health as defined above.

We anticipate substantial diversity in methodological approaches to assessing the impact of MCH interventions. This is because research using experimental and quasi-experimental approaches is less well-developed in low income compared with high income countries. Based on the limited number of reviews published to date, we do not expect to find a considerable number of studies that have used a randomised design approach. We will thus include in our review studies that use different study designs, including studies with historic controls and before/after time series studies. We will grade the strength of the evidence from these studies making use of the approach developed by the Centre for Public Health Evidence (National Institute of Health and Clinical Excellence), which addressed issues of internal and external validity. This will help ensure that our analysis is not interpreted in a misleading manner and we will highlight the limitations of different study design methods.

In terms of our effectiveness analysis, we will focus on studies that explicitly discuss the effects, results, outcomes or impacts of interventions on at least one of the selected MCH outcomes. We will only include studies that focus on MCH interventions and clearly distinguish effects from other non targeted health interventions such as the provision of potable water.

In addition to studies looking at the effectiveness of interventions, we will also review qualitative studies. Qualitative studies can play an important role in helping to determine the contexts in which interventions can be delivered, as well as helping to understand in the context of community engagement and health promoting interventions the reasons why individuals do or do not make use of health services (Petticrew & Roberts 2003). Such information may be helpful in further design of interventions and in considering whether approaches may be transferred to different contexts and settings.

The studies will be grouped by modes of delivery of maternal and infant services. These will include: central hospitals, outreach clinics, fixed clinics, satellite clinics, primary care centres, community based programmes, homecare, and traditional birth attendants (TBA). Some of these categories will be further split into integrated HIV/AIDS and MCH services, family planning (FP), and MCH integrated or isolated service in addition to private versus public.

The geographic scope is limited to low income and selected lower middle income (LMCs) countries using the World Bank (Atlas method) classification¹³. MCH interventions in urban settings address heterogeneous sub-populations and we will exclude studies that deal only with rural sub-populations or only non-poor urban populations.

The temporal scope is limited to empirical studies published from 1987 onwards, the year of the Nairobi Conference on Safe Motherhood (Cohen, 1987). We will only consider studies for which title and abstract are available in English, and will attempt to find studies in other languages (English, French, Italian, and Spanish), both published and unpublished (e.g. theses, conference papers, technical reports etc). We will record and categorise studies in other languages with English language abstracts, but we will not seek to obtain full papers. Whilst English is the dominant language of science, this approach will exclude publications not published with an abstract in English. We recognise this as a non-scientific limitation and justification for our approach, but is based on what is practicable for the systematic review.

In the initial screening phase, all research designs will be included and decisions will be based on titles and abstracts (or study/book chapter synopses) alone. Ideally we would then limit studies for inclusion to experimental designs with randomisation. However, preliminary searches show a very limited body of evidence using this research design within our geographic scope. Thus, we would expect to include a range of research designs: meta-analyses and individual studies included in relevant systematic reviews, experimental designs with or without concurrent control groups, including randomised and cluster randomised control trials, non randomised controlled trials, cohort studies, case control studies, and surveys. In addition we shall look at any economic evaluations and modelling studies that are identified. We will look at secondary analyses of quantitative data (e.g. regression analyses of household surveys that control for potential endogeneity). In addition we will look at qualitative studies to seek contextual issues such as the appropriateness of interventions to potential service users.

We will consider studies based on quantitative, qualitative or mixed methods of analyses fulfilling key requirements, and select studies meeting the following criteria:

- Report specific intervention(s) intended to promote improved uptake and/or access to maternal and infant health services. These interventions focus on the individual, peer, household, family, group, institution or community;
- Are conducted in a specified list of countries (Draft Stage 2 in Appendix 2.1), and
- Include relevant MCH outcome variables (Table 1).

We will include non-systematic review papers only for the purpose of checking their reference lists for empirical studies. Studies that use qualitative analyses will be included because of their role in providing information about the context of health systems implementation. Studies that are entirely context specific will not be excluded, but will be stored separately in order to inform any discussions arising from the review about challenges in the implementation of effective interventions.

Mixed-methods studies including both quantitative and qualitative components will be considered. Both components will be subject to the same inclusion criteria as single methods studies. Mixed-methods studies will only be included when both sets of inclusion criteria are met and record kept for those studies where only one component meets the inclusion criteria.

The following study types will be excluded:

- editorial, commentaries or book reviews;

¹³ <http://data.worldbank.org/about/country-classifications/country-and-lending-groups>.

- surveys solely on the prevalence or incidence of the MCH outcomes,
- non-evaluated interventions,
- studies that are only theoretical or methodological.

Two researchers will evaluate results of searches independently. When there is disagreement on inclusion, the researchers will consult with each other until consensus is reached. If consensus cannot be reached, this will be resolved by discussion by the team as a whole. The process will err on the side of inclusion (see Appendix 2.1).

Examples of studies that would be excluded:

De Brouwere V, Tonglet R and Van W (2001). Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialized West? *Tropical Medicine and International health* 3(10):771-782.

This paper would be excluded as it does not refer to a specific intervention.

Costello A, Osrin D and Manandhar D (2004). Reducing maternal and neonatal mortality in the poorest communities. *BMJ* 329:1166-8.

This article would be excluded as it does not refer to urban models and it only describes of an overview of an intervention rather than specifying what the intervention was.

Examples of studies that would be included:

Richard F, Ouedraogo C and De Brouwere V (2008). Quality caesarean delivery in Ouagadougou, Burkina Faso: a comprehensive approach. *International Journal of Gynecology and Obstetrics* 103:283-90.

The study would be included as it refers to a specific intervention which measures its impact on maternal mortality reduction. It also refers to a model of delivery in an urban area.

Kwast BE (1996). Reduction of maternal and perinatal mortality in rural and peri-urban settings: what works? *European Journal of Obstetrics & Gynecology and Reproductive Biology* 69(1):47-53.

This study would be included as it considers models for delivery in peri-urban areas.

2.2.2 Identification of potential studies: Search strategy

Our search protocol includes a number of different elements to identify studies: search of bibliographic databases, handsearch of relevant journals and books, and search of key websites.

A time limited search of a range of bibliographic databases will be conducted (see Appendix 2.2 for full list of databases and core search strategy). A common search strategy, adapted to the specificities of each database will be used. This will combine terms to cover the range of MCH outcomes identified as being relevant to this review with urban settings in low and lower middle income countries and/or terms connected with socio-economic status. While requiring a relevant geographical and/or income related term in our strategy may mean that we will miss some studies, this is necessary to manage the yield of studies obtained. An alternative approach would be to

include a detailed list of terms related to relevant health system organisation, financing and governance strategies, as well as a range of engagement intervention terms. Given that the range of potential interventions here is also very broad such a list would also be likely to miss relevant studies. In compiling our list of terms to include in the search strategy we have been mindful of recall rates for potential terms, particularly those that can have many spurious non-topic related meanings (e.g. labour). Where spellings differ between British and American English, we will search for both. We will use a thesaurus to identify and include synonyms, alternative spellings, singular/plural forms etc. We will establish automatic updates for those databases where this is possible (e.g. PubMed), so that any new articles generated from our search strategies will be automatically sent to the review team.

This will be complemented by a handsearch of a number of journals, where possible we will search these journals electronically so as to pick up papers that have been accepted for publication that are available on-line but not yet in print (see Appendix 2.2); a handsearch of relevant book shelves references at the British Library of Political and Economic Science; a reference snowballing, including bibliographic back-referencing and citation tracking of included studies; a search of websites of key government departments both in donor countries and in some LICs and LMCs where language skills permit (e.g. DFID, USAID, EuropeAid, EU Development, SIDA, NORAD, AFD, COOPITA, SDC), websites of key international organisations and agencies (e.g. PMNCH, WHO, WB, UNFPA, UNICEF, UNDP), websites of academic centres of excellence in the field of MCH (e.g. IMMPACT, ICH). We will also search for non-journal published work, using grey literature databases (e.g. Open SIGLE), as well as trials registries (e.g. WHO International Trial Registry portal). In addition, we will contact key researchers identified both as a result of personal contacts and through electronic means. We will also conduct a limited structured search for combinations of key phrases in Google to identify additional potential sources of information.

All records will initially be stored into a first Endnote bibliographic database to allow for the elimination of duplicate records and to determine then whether records based on our analysis of titles and abstracts appear to meet our inclusion criteria.

2.2.3 Screening studies: applying inclusion and exclusion criteria

We will examine all records from stage 1 in our bibliographic database to determine whether or not they appear to meet our inclusion criteria. This judgement will largely be based on analysis of titles, abstracts and chapter/report synopses, as well as for full reports where these have already been obtained (e.g. as a result of the search of the publications page of an academic website). Pairs of reviewers will independently go through all records. Where there is disagreement between reviewers on inclusion this will be resolved by discussion by the team as a whole.

Inclusion and exclusion criteria will be applied successively to (i) titles and abstracts and (ii) full text. Full text will be obtained for those studies that appear to meet our inclusion criteria in stage 1 of our review or where we have insufficient information to be sure. These records will be imported into a second Endnote database¹⁴. The inclusion and exclusion criteria will be re-applied to the full texts and those that do not meet these initial criteria will be excluded. Those records that meet our inclusion criteria will then be imported into a third EPPI-Reviewer database where they will be fully coded and categorised. Records will be kept of studies that do not meet these initial criteria. Excluded references that could provide useful contextual information on the implementation of interventions will be stored separately and summarised. Relevant websites will be managed using a bookmarking tool (Delicious)¹⁵.

¹⁴ <http://www.endnote.com>.

¹⁵ <http://delicious.com>.

Characterising included studies

We followed the approach devised by the Evidence for Policy and Practice Information (EPPI) Coordinating Centre, Institute of Education, London to characterise studies that have met our inclusion criteria (Gough & Elbourne 2002)¹⁶. We will map the research evidence on MCH in low and lower middle income countries for the urban poor. The map describes each paper meeting our inclusion criteria in our EPPI-Reviewer database by assigning a range of keywords and codes that characterise content, setting, date of publication, and methodological approach. By storing information in this fashion it becomes possible to undertake additional analysis, for instance allowing us to identify both those topics that are well searched and others that are not. Our preliminary coding tool is set out in Appendix 2.4. In addition to this coding tool, we will make use of previously validated economic evaluation quality checklist to code any economic studies of that type (Evers *et al* 2005), plus guideline regarding economic modelling studies (Philips *et al* 2004).

Identifying and describing studies: quality assurance process

In the first instance, application of the inclusion and exclusion criteria and subsequent coding of included literature will be conducted by pairs of review group members working independently. The decisions will then be compared to reach a consensus. Opinion of the group as whole will be sought where consensus cannot be achieved.

2.3 Methods for synthesis

2.3.1 Assessing quality of studies

For each study included in the review we will make use of existing tools to help in the assessment of the overall methodological quality of studies. We intend to make use of a set of tools that have been collated together by the National Institute of Health and Clinical Excellence (NICE 2009) for use in evaluating public health interventions. Quality assessment tools will be specific to the method (e.g. randomised controlled trial or pre-post test) and data (e.g. quantitative or qualitative) reported in each study. In our overall assessment of quality we will also include an assessment of whether the study obtained formal ethical approval.

2.3.2 Overall approach to and process of synthesis

The nature of the evidence base will determine the methods of synthesis (statistical or non-statistical). While we do not anticipate a substantial number of high-quality studies using a randomised design approach, we might expect high-quality studies using quasi-experimental and other approaches (with the caveat that study design and quality are not a given).

We anticipate that narrative synthesis is likely to be the principal approach that we will have to use. Odds ratio (for categorical outcome data) or standardised mean differences (for continuous data) and their 95% confidence intervals will be calculated from the data generated by included experimental and randomised studies. Where appropriate with available data, results from comparable groups of studies will be pooled into statistical meta-analyses using EPPI-Reviewer. Statistical tests for heterogeneity will be applied where appropriate. Funnel plots and correlation ranking will be used to judge the level of statistical bias.

¹⁶ <http://eppi.ioe.ac.uk/cms>.

Where possible we will analyse the data using EPPI-Reviewer and generate odds ratios with 95% confidence interval for the dichotomous outcomes. We will use fixed-effect meta-analysis for combining data where trials are examining the same intervention, and the trials' populations and methods were judged sufficiently similar. Where we suspect clinical or methodological heterogeneity between studies sufficient to suggest that treatment effects may differ between trials, we use random-effects meta-analysis. If substantial heterogeneity is identified in a fixed-effect meta-analysis this will be noted and the analysis repeated using a random-effects method. Regression models will include information on whether estimates are adjusted or unadjusted for confounders and where possible key covariates groups will be included.

Most systematic reviews focus on synthesising evidence on effectiveness from quantitative research. We want to develop the contribution that can be made by different types of evidence, including that involving qualitative data, particularly as community engagement and health promoting interventions can be complex in nature. The methods and approaches for synthesising qualitative evidence are less well-developed than those for quantitative evidence. Our review of qualitative evidence will be informed by a "Realist Review" approach (Pawson 2006). This approach can interrogate qualitative analysis in an attempt to provide an analysis of how and why complex interventions can work (Lewin *et al* 2010). We anticipate qualitative findings to be reported alongside quantitative findings and, at times, to be used as the sole evaluation method. The latter will be considered as outlined above to aid in determining contextual factors relevant to service uptake. Such studies will be entered into the results matrix as short summaries of findings, rather than as changes in rates/outcomes as we expect to find a variety of measurements. We will also use the qualitative findings to identify unmeasured factors and other reasons that might help to explain heterogeneity in results.

2.3.2.1 Selection of studies for synthesis

We anticipate that all studies identified as meeting the inclusion criteria will be included in our narrative synthesis. Meta-analysis may only be feasible for a sub-group of studies that use a common experimental design, with the same interventions and common outcome measures.

2.3.2.2 Process used to combine /synthesise data

Data extraction tables will be developed and used to facilitate the greatest possible synthesis across studies. Data will be summarised in the following categories:

- Focus,
- Methods,
- Sample,
- Analytical approach (including use of statistical methods),
- Limitations,
- Findings, and
- Quality.

2.4 Deriving conclusions and implications

To determine the generalisability and policy relevance of delivery models identified in different low income and lower middle income country contexts and settings, we will develop a bespoke context checklist. Such context checklists have been used in public health to flag up differences in

infrastructure, acceptability of interventions, and different strategies used to promote better engagement and uptake of services (Heller *et al.* 2008). We will also be mindful of material excluded from our review of effectiveness studies, which has been coded as being relevant to context and implementation issues.

We will also make use of an approach developed by one of the applicants (McDaid) to record information relevant to the cost effectiveness and equity implications of different interventions (McDaid & Sassi 2010). This will produce information that can aid in determining whether interventions can help in tackling inequalities, for example recording specific population group targeted (or those that have been excluded) or the extent to which out-of-pocket payments are required to use services. Given the severe resource constraints in low income and lower middle income countries and the need to promote service sustainability we will also flag up information that we have identified in the review both in terms of budgetary impact and the need for investment.

We will use *Interactive Deliberative Dialogues*, an approach used successfully by McDaid elsewhere (McDaid & Sassi 2010) in order to discuss the preliminary conclusions of our report with key stakeholders. This is an approach that engages with policymakers and other stakeholders under the Chatham House Rule, and incorporates feedback into the final report. In terms of future research priorities, our approach to mapping of the literature should also enable us to identify those areas where the evidence base is particularly weak and further empirical research may be merited.

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Appendix 1.1: Authorship of this report

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Project management statement: The review team is led by David McDaid, with day-to-day supervision of Research Assistants (Hirose and Lemmi) by McDaid, Coast and Leone.

¹⁷ From 12th August 2010 : Head of Information Literacy, City University. Participation in this review remains unchanged.

Appendix 2.1: Inclusion and exclusion criteria

Draft Stage 1 screening tool:

1. Is it a study in a country included in the WB LIC and LMIC lists?
Yes / no / unclear
2. Does the study include poor, urban populations?
Yes / no / unclear
3. Is it a study dealing with evaluation of MCH interventions?
Yes / no / unclear
4. Do the data deal with access to, utilisation of, or effectiveness of MCH interventions?
Yes / no / unclear

Decision to include = all questions answered *Yes* or *Unclear*.

Decision to exclude = at least one question answered *No*.

Draft Stage 2 inclusion / exclusion tool

Criterion	Inclusion	Exclusion
Geography	Study based in at least one country from: <ul style="list-style-type: none"> - WB low income countries¹⁸ - WB lower middle income countries from Africa, Asia, Latin America and Caribbean 	Study does not include evidence from: <ul style="list-style-type: none"> - WB low income countries - WB lower middle income countries from Africa, Asia, Latin America and Caribbean
Language	English title and abstract	No English abstract
Population groups	Studies including: <ul style="list-style-type: none"> - urban populations (including peri-urban) - urban-rural comparisons - rural-urban migrants 	Studies that include only: <ul style="list-style-type: none"> - rural populations - non-poor urban populations
Type of studies	<ul style="list-style-type: none"> - experimental primary studies (RCTs) - non-experimental primary studies, including interrupted time series (pre-/post-test) - qualitative primary studies - mixed methods studies - quantitative secondary studies - economic evaluations - systematic reviews - meta-analyses 	<ul style="list-style-type: none"> - editorial, commentaries or book reviews - surveys solely on the prevalence or incidence of the MCH outcomes - non-evaluated interventions - studies that are only theoretical or methodological - studies that only evaluate the process of an intervention (rather than its outcome) - policy analyses - qualitative secondary analyses
Outcomes	Studies which have one or more of the following indicators as outcomes: <ul style="list-style-type: none"> - maternal mortality, including: <ul style="list-style-type: none"> - late maternal death - severe acute maternal morbidity (near miss) - infant mortality, including: <ul style="list-style-type: none"> - neonate mortality - infant mortality 	<ul style="list-style-type: none"> - where definition of outcomes in the inclusion criteria are not provided - non-fatal infant health outcomes

¹⁸ <http://data.worldbank.org/about/country-classifications/country-and-lending-groups>

-
- perinatal mortality
 - post neonatal mortality
-

Time

Studies published from 1987 onwards

Studies published before 1987

Appendix 2.2: Search strategy for electronic resources

The following electronic databases and websites will be included in the review. The team includes two information specialists (Macrae-Gibson and Secker) who will provide specialist informational retrieval advice and support.

Table 2.2.1 Databases (alphabetical order)

AfricaBib	IBSS (International Bibliography of the Social Sciences)
African Index Medicus (AIM)	IMEMR (Index Medicus of the Eastern Mediterranean Region)
African Journals Online (AJOL)	IMSEAR (Index Medicus of the South-East Asian Region)
African Studies Centre (Leiden)	Index to Theses
ASSIA (Applied Social Sciences Index and Abstracts)	IndMed
BLDS	JOLIS
CAB Direct (former Rural Development Abstract)	LAMICs database
Campbell reviews	LEYES
CRR (Centre for Reviews and Dissemination HTA)	LILACS
Database at the University of York	MedCarib
Cochrane and Campbell Reviews	MEDLINE
Cross searcher	OPENSIGLE
DARE (Database of Abstracts of Reviews of Effects, University of York)	PAIS (Public Affairs Information Services)
Database of African Theses and Dissertations (DATAD)	POPLINE
EconLit	Proquest Dissertations & Theses
ELDIS	PsycINFO
EMBASE	Quarterly index of African periodical literature
ERIC	R4D (Research 4 Development)
EthOS	Repidisca
GeoBase	Scopus
Global Health	Social Care Online (former Care Data)
Google Scholar	SocIndex
Google Search (Advanced)	South Africa Medical Database (SAMED)
Healthevidence.ca	Web of Knowledge (including ISI citation Indices and Conference Proceedings Citation Index)
	Western Pacific Region Index Medicus (WPRIM)

Table 2.2.2 Websites (in alphabetical order)

Google advanced searching will be used within specific domain names in order to apply consistent search strategies across websites with different structures. We will as standard look at the research publications pages of all websites examined.

Database	Address
AFD (Agence Française de Développement)	http://www.afd.fr/
APHRC	http://www.aphrc.org/
Center for International Health and Development	http://www.ucl.ac.uk/cihd/
Cochrane LMIC	http://epocoslo.cochrane.org/lmic-databases
COOPITA (Cooperazione Italiana allo Sviluppo)	http://www.cooperazioneallosviluppo.esteri.it/
DFID (UK Department for International Development)	http://www.dfid.gov.uk/
EADI	http://www.eadi.org/ http://www.unrisd.org/
ELDIS	http://www.eldis.org/
EU Development (European Commission Development and Relations with African Caribbean and Pacific States)	http://ec.europa.eu/development

EU Humanitarian Aid & Civil Protection (European Commission Humanitarian Aid & Civil Protection)	http://ec.europa.eu/echo
EuropeAid (European Commission Cooperation Office)	http://ec.europa.eu/europeaid
Irish Aid	http://www.irishaid.gov.ie/
LSHTM library	www.lshtm.ac.uk
NORAD (Norwegian Agency for Development Cooperation)	http://www.norad.no/
Pan American Health Organisation Library	http://www.paho.org/english/dd/ikm/li/Library.htm
PMNCH (Partnership for Maternal, Newborn & Child Health)	http://www.who.int/pmnch/en/
R4D (Research 4 Development)	http://www.research4development.info/SearchResearchDatabase.asp
SDC (Swiss Agency for Development and Cooperation)	http://www.sdc.admin.ch/
SIDA (Swedish International Development Cooperation Agency)	http://sidapublications.citat.se/
UNDP (United Nations Development Programme)	http://www.undp.org
UNFPA (United Nations Population Fund)	http://www.unfpa.org/public/
UNHCR (United Nations High Commissioner for Refugees)	http://www.unhcr.org
UNICEF (United Nations Children's Fund)	http://www.unicef.org
USAID (United States Agency for International Development)	http://library.info.usaid.gov/
WB (World Bank)	http://www-wds.worldbank.org
WHO (World Health Organization)	http://www.who.int/

Table 2.2.3: Search terms

Infant	Maternal	Urban	Poor	Countries
Newborn	mother*	urban*	poor*	Individual country names:
neonat*	matern*	sub-urban	povert*	- All WB low income countries ¹⁹
perinat*	pregnan*	peri-urban	hardship	- All WB lower middle income
"post neonat**"	gravida	city	destitut*	countries from Africa, Asia, Latin
"post-neonat**"	gestat*	cities	socio-	America and Caribbean ²⁰
baby	parity	town	economic*	"developing countries"
babies	primipar*	township	socioeconomic*	"low-income countries"
toddler*infan*	multipar*	slum*	SES	"low income countries"
"early age"	fetal	"informal	wealth	"least developed"
"before first	foetal	settlement"	asset	"less developed"
birthday"	birth*	shantytown		"third world"
"before 1 st	labour	"shanty town"		Africa
birthday"" <1 year"	labor	"squatter		"Sub-Saharan Africa"
	C-section	settlement"		"Sub Saharan Africa"
	"C section"	favella		"Asia"
	caesarean	neighbourhood		"Oceania"
	cesarean	neighbourhoods		"Latin America*"
	peripart*	neighborhood		"South America"
	prepart*	neighborhoods		"Central America"
	intrapart*			"Caribbean"
	postpart*			SSA
	"severe acute			LAC
	maternal morbidity"			
	SAMM			
	sepsis			
	eclampsia*			
	dystocia			
	hysterectomy			
	"pelvic fistula"			
	"pelvic fistulae"			
	episiotomy			
	"laceration of the			
	perineum"			
	"uterine rupture"			
	"abruptio			
	placentae"			
	"placental			
	abruption"			
	"still-birth"			
	"near miss"			
	near-miss			
	abortion			
	"post-abortion care"			
	"post abortion care"			
	PAC			
	natal*			
	perinatal			
	prenatal			
	antenatal			
	postnatal			
	breastfeed*			

¹⁹ <http://data.worldbank.org/about/country-classifications/country-and-lending-groups>.

²⁰ <http://data.worldbank.org/about/country-classifications/country-and-lending-groups>.

Appendix 2.3: Journals to be handsearched

This is a preliminary listing of sources of journals to be handsearched. They have been identified on the basis of their non-inclusion in major citation indices. It is anticipated that this listing will be developed during the review. Our strategy includes the snowballing of references lists and citations of included studies, which will be handsearched for further references. The electronic handsearch will be supplemented by a shelf search at the British Library of Politics and Economic Science.

Table 2.3.1 Journals for handsearching (in alphabetical order)

Bulletin of the World Health Organisation
BMC (BioMed Central)
- pregnancy and childbirth
- health services research
- public health
women's health
BMJ
Globalization and health
Health Policy and Planning
Health Research Policy & Systems
Journal of Tropical Pediatrics
PLOS (Public Library of Science)
SSM (Social Science and Medicine)