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BMJ Open Elements of organisation of integrated maternity care and their associations with outcomes: a scoping review protocol

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ABSTRACT

Introduction Integrated care is seen as an enabling strategy in organising healthcare to improve quality, finances, personnel and sustainability. Developments in the organisation of maternity care follow this trend. The way care is organised should support the general aims and outcomes of healthcare systems. Organisation itself consists of a variety of smaller ‘elements of organisation’. Various elements of organisation are implemented in different organisations and networks. We will examine which elements of integrated maternity care are associated with maternal and neonatal health outcomes, experiences of women and professionals, healthcare spending and care processes.

Methods and analysis We will conduct this review using the JBI methodology for scoping reviews and the reporting guideline PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews). We will undertake a systematic search in the databases PubMed, Scopus, Cochrane and PsycINFO. A machine learning tool, ASReview, will be used to select relevant papers. These papers will be analysed and classified thematically using the framework of the Rainbow Model of Integrated Care (RMIC). The Population Concept Context framework for scoping reviews will be used in which ‘Population’ is defined as elements of the organisation of integrated maternity care, ‘Context’ as high-income countries and ‘Concepts’ as outcomes stated in the objective of this review. We will include papers from 2012 onwards, in Dutch or English language, which describe both ‘how the care is organised’ (elements) and ‘outcomes’.

Ethics and dissemination Since this is a scoping review of previously published summary data, ethical approval for this study is not needed. Findings will be published in a peer-reviewed international journal, discussed in a webinar and presented at (inter)national conferences and meetings of professional associations.

The findings of this scoping review will give insight into the nature and effectiveness of elements of integrated care and will generate hypotheses for further research.

INTRODUCTION

Many countries face challenges in organising healthcare in terms of finances, personnel

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ We will use ASReview, an open source, Artificial Intelligence (AI)-aided software, which will allow us to efficiently select the relevant papers from a large amount of literature found in the systematic search.
- ⇒ The Rainbow Model of Integrated Care will be used as an explanatory framework to see what evidence is available on which level of integrated care and subsequently which information is missing.
- ⇒ The members of the research team and expert group working on this scoping review represent different views in maternity care; this ensures a broad scope and reduction of bias.
- ⇒ We will focus on the organisation of integrated maternity care in high-income countries and exclude literature from low-income and middle-income countries; this is a limitation for drawing general, global conclusions.

and sustainability. Integrating different echelons of care is seen as an enabling strategy in this. Developments in maternity care follow this trend. The topic of integrated maternity care is complex, and the literature shows different definitions of integrated care. We adapted the definition from Allana *et al*¹ to integrated maternity care: ‘when the network(s) of multiple professionals and organisations across the maternity care and social care systems provide accessible, comprehensive and coordinated services to women who want to get pregnant, are pregnant and/or are up to 6 weeks after birth’. The way integrated maternity care is organised should support the general aims and outcomes of healthcare systems. Generally accepted goals of healthcare systems are improving population health, enhancing client experiences and reducing costs per person (triple aim).^{2,3} Improving healthcare professionals’ experiences has subsequently

been added as well (quadruple aim).⁴ Healthcare goals can also be formulated in terms of sustainability, that is, seeking the best outcomes for clients and the population against optimal use of resources (time, carbon, use of space; value-based healthcare).⁵ The organisation of integrated maternity care is a means to achieve these goals. However, due to different perspectives, cultures and interests of stakeholders, organising care is complex. The organisation itself consists of a variety of smaller 'organisational elements', including different models of risk selection, group-based antenatal care, continuity of care and different payment systems. Different elements of the organisation of care are implemented in different organisations and networks, while little is known about their effects.⁶ Furthermore, integrated care concerns different levels of the organisation: organisation at client level (guidelines and protocols), between professionals (who does what and when?), within healthcare organisations and healthcare organisations on a systemic level (payment system, legislation, etc). We will use the Rainbow Model of Integrated Care (RMIC) to obtain a systemic understanding of the design, delivery, management and evaluation of the organisation of integrated care.⁷ We will examine 'What makes integrated maternity care work' not only by identifying elements of organisation of integrated care and their associations with outcomes but also by mapping the circumstances and conditions under which integrated maternity care can contribute to the aims and outcomes of care. The aim of this scoping review is therefore to gain a better understanding of the amount and type of evidence on (a) elements of the organisation of integrated maternity care and (b) their association with maternal and neonatal health,^{2 5 8} experiences of women and professionals,⁸ healthcare spending^{2 5} and care processes.⁵ A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted, and no completed ongoing systematic reviews or scoping reviews on the topic were identified.

Review question

Review question: Which elements of the organisation of integrated maternity care are associated with maternal and neonatal health outcomes, experiences of women and professionals, healthcare spending and care processes?

Eligibility criteria

In our scoping review, we will use the population-context-concept framework, recommended in the JBI manual for Scoping Reviews.⁹

Population

The 'Population' in this review consists of the various elements of the organisation of integrated maternity care. We will explore the type and level of evidence found for these elements, their associations with outcomes as well as their distribution on the different levels of the RMIC framework.

Context

The 'Context' is limited to high-income countries because this study is designed to inform practice in high-income countries. In addition, the organisation of care in low-income and middle-income countries is very different. This implies that it would be meaningful to conduct a separate review in these settings.

Concept

The 'Concepts' in this review are maternal and neonatal outcomes,⁵ experiences of clients¹⁰ and professionals,⁸ care delivery processes^{11 12} and healthcare spending.^{2 8}

Types of studies

This scoping review will consider both experimental and quasiexperimental study designs including systematic reviews, meta-analysis, randomised controlled trials, non-randomised controlled trials, before and after studies and interrupted time-series studies. In addition, analytical observational studies including prospective and retrospective cohort studies, case-control studies and cross-sectional studies will be considered for inclusion. We will also consider descriptive observational study designs for inclusion such as case series and cross-sectional studies. Qualitative studies based on, but not limited to, phenomenology, grounded theory, ethnography, action research and feminist research will be considered as well. In addition, policy documents will be considered.

METHODS

The proposed scoping review will be conducted using the JBI methodology for scoping reviews¹³ and the reporting guideline PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews); see online supplemental file 1 for the PRISMA-ScR checklist.¹⁴ We will analyse the literature using in-depth reading and analysis, in which we will use Valentijn's RMIC as an organising framework for the elements of the organisation of integrated maternity care.⁷ The RMIC is chosen over other frameworks because it offers an open-ended, exploratory, broad view of integrated care that can be applied to various, diverse elements of the organisation of maternity care. This will ensure that consideration will be given to different types of integration (clinical, professional, organisational, system, functional and normative) at multiple levels (micro, meso and macro) and varying degrees (linkage, coordination, full integration).

In our study, the research team will cooperate with a team of experts, members of the VOICE study group, who are involved in different levels of maternity care who will advise on all aspects of the study. To ensure a diversity of perspectives within the expert group, the following representatives will be included: professionals, representatives from national professional associations (ie, client representatives, the Dutch Organisation of Midwives (KNOV), the Dutch Society of Obstetricians (NVOG), the Dutch

Association of Nurses and Carers (V&VN), Knowledge Centre Maternity Care (KCKZ), representatives from health insurance companies, policymakers (ie, Dutch College of Perinatal Care (CPZ)) and professional educational institutes and experts on organisation science, maternity care, epidemiology and economic analysis. The team of experts will be further referred to as the ‘expert group’.

Search strategy

An initial limited search of PubMed was undertaken to identify articles on the topic. The text of titles and abstracts of relevant articles and the keywords used to describe the articles will be used to develop a full search strategy for PubMed, Scopus, PsycINFO and Cochrane Library with the help of an information specialist (see online supplemental file 2). We will consult the expert group to develop the final comprehensive literature search.

The search strategy, including all identified keywords and index terms, will be adapted for each included database and/or information source by the information specialist. The reference list of all included sources of evidence will be screened for additional studies.

Studies published in Dutch and English language will be included as reviewers are fluent in both Dutch and English. We will include papers from 2012 onwards, since this is the year the Member States of the WHO European Region endorsed the European health policy *Health 2020*, acknowledging health system strengthening as one of four priority action areas and calls for people-centred health systems.⁶ This generated attention to the organisation of integrated care.

The databases to be searched include PubMed, Scopus, PsycINFO and Cochrane Library. Sources of unpublished studies and grey literature to be searched include Google Scholar, key websites of interest (ie, WHO, government agencies), hand searches of reference lists of papers and prior and additional knowledge of the expert group.

We will focus on (a) elements of organisation of integrated maternity care; (b) outcomes of maternal and neonatal health, women’s and professionals’ experiences, healthcare processes and healthcare costs; and (c) levels of integrated care (RMIC). Potentially relevant references will further be obtained from the retrieved publications and by consulting the expert group (snowball method).

Identified citations will be collected and uploaded into Endnote 20,¹⁵ and duplicates will be removed. The inclusion and exclusion criteria will be applied based on a priori decisions made by the research team. Reviewers JL and BG will do the selection of relevant papers in two phases.

For the first selection of relevant papers, based on the title and abstract, we will use an open-source machine learning-aided pipeline applying active learning: ASReview,¹⁶ V.1.1. This machine learning tool needs to be ‘trained’ to effectively rank the papers based on possible relevance. ASReview will be trained based on ‘prior knowledge’: papers the research team and expert group

considers to be relevant to the topic at hand. In the active learning cycle, the model incrementally improves its predictions on the remaining unlabelled records, by which relevant records are identified as early in the process as possible.

To determine when to stop screening, we elaborated on the stopping criterion for this screening, based on both knowledge within the research team and heuristic arguments as time and resources available. We will stop screening when a maximum of 400 papers are labelled relevant or 50 papers sequentially are labelled as irrelevant.

In the first stage, titles and abstracts will be screened by two independent reviewers (JL, BG) for assessment against the inclusion criteria for the review (table 1). To ensure inter-reviewer agreement in both title and abstract screening as well as full-text screening, JL and BG discuss uncertainties and specify and adjust the inclusion and exclusion criteria. In phase 2, the full-text screening will be done by JL and BG. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion or with a third reviewer (CV).

After we selected the relevant papers, an export file (.csv) will be extracted out of ASReview and will be presented to the research team and expert group. In these files, both the labelled papers (papers labelled as relevant or irrelevant) and unlabelled papers will be visible. They are put in order of relevance based on the machine learning tool.

When this first selection of relevant papers is finished, full texts and their citation details will be retrieved and imported into ASReview. The full text of selected papers will be assessed in detail against the inclusion and exclusion criteria by two independent reviewers (JL and BG) (table 1). Reasons for exclusion will be recorded and reported in the scoping review. The results of the search and the study inclusion process will be reported in full and presented in line with the PRISMA-ScR flow diagram (figure 1).¹⁴

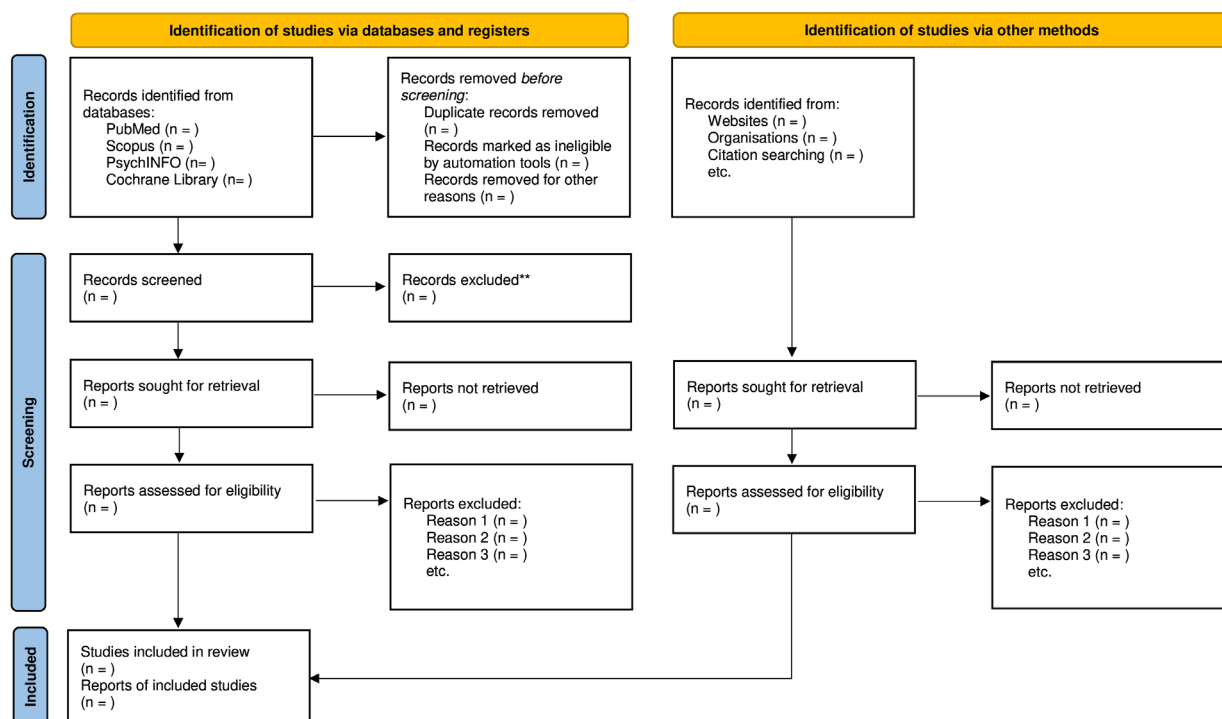
Relevant papers will contain information on elements of the organisation AND one or more of the outcomes of interest.

Data extraction

Data will be extracted from papers included in the scoping review by two independent reviewers (JL and BG) using a data extraction tool developed by the research team. The data extracted include specific details about (a) the elements of the organisation of integrated maternity care in high-income countries; (b) specific details on associations of the elements of the organisation on maternal and neonatal health, experiences of clients and healthcare professionals, care processes and healthcare spending; and (c) the taxonomy provided by the RMIC will be used to extract data on different levels of integrated care according to the RMIC framework.¹⁷ Also, data will

Table 1 Inclusion and exclusion criteria for selecting relevant papers.

Inclusion	Exclusion
Elements of organisation of integrated maternity care	Elements NOT related to the organisation of care, that is, content of care
Network(s) of multiple professionals and organisations across the maternity care and social care systems	
Information on accessible, comprehensive and coordinated services in maternity care	
Midwives, obstetricians, obstetric nurses/nurse midwives, maternity care assistants and their clients/patients (people who want to get pregnant, are pregnant and/or are up to 6 weeks after birth)	Articles in which either midwives or obstetricians play no role at all
Maternal and neonatal health; pregnancy outcomes, morbidity, mortality and complications	
Patient experiences, healthcare professional experiences, well-being, satisfaction	
Healthcare spending; costs, expenditure -> money and assets -> that is, more or fewer healthcare professionals/hours, etc	
Care processes; referral, intervention, transfer, medicalisation	
Peer-reviewed papers, articles in professional journals, policy documents, RCTs, cohort and case-control studies, case studies, qualitative research, editorials, comments	Abstracts of congresses and congress presentations, research protocols
Papers published between 2012 and 2022	Papers published before 2012
Maternity care in high-income countries	Low-income and middle-income countries Healthcare is other than maternity care. Non-regular context -> refugees, war situation, pandemic
Language: English and Dutch	Other languages than English and Dutch



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/register).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

Figure 1 Flow diagram of the study.¹⁹

be categorised based on the methods used in the included papers to analyse the level of evidence per element of organisation.

For the data extraction, we will use a method based on the framework analysis¹⁸ using the framework of RMIC to identify the different elements of organisation of integrated maternity care, their associations with outcomes and the level of integrated care they belong to.

A draft extraction form is provided in online supplemental table 1). The draft data extraction tool will be modified and revised as necessary during the process of extracting data from each included evidence source. Modifications will be detailed in the article with the results of the scoping review

We will follow the same procedure as previously described in the literature selection. The research team and expert group determined the criteria for the data extraction table (online supplemental table 1). Two reviewers (JL and BG) will extract data independently out of three times 20 randomly selected included papers and discuss until they reach a complete agreement. Any disagreements that arise between the reviewers JL and BG will be resolved through discussion or with a third reviewer (CV). Full data extraction will only be started after reviewers have obtained sufficient agreement. If appropriate, authors of papers will be contacted to request missing or additional data, where required.

Data analysis and presentation

Data will be presented initially in a regular table based on the data extraction form (table 1). Depending on the nature of emerging associations, we plan to use a range of graphical solutions to illustrate the findings.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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Collaborators In addition to the authors of this scoping review, the VOICE study group comprises Irene de Graaf, Puck van Heemstra, Hester Rippen, Jeroen Struijs, Susanne Zuidhof, Inge Boesveld, Anouk Kaiser, Mirjam Fransen, Durk Berks, Pauline Haga, Katarzyna Burzynska, Joland Vermolen, Lucienne Bakker, Mariëtte Hoogsteder, Lillian Peters, Conny Vreugdehil, Suzanne Thompson, Aimée Sparendam-Brujininx, Betty de Vries, Elle Struijf, Lillianne van der Velde, Bert Horlings, Marianne Nieuwenhuijze, Marc Roosenboom and Simone Plaizier.

Contributors JL, BG, PPV, JJE, GB, RB, EFdV, SD, ADJ and CJMV contributed to the development of this study protocol. JL, ADJ and CJMV conceptualised the research question, designed the study and prepared the first draft of the study protocol. BG, SD, JJE, ADJ and CJMV provided methodological expertise. PV provided expertise on the Rainbow Model of Integrated Care. RB and EFdV provide expertise in funding, research and organisation of integrated maternity care. GB is an information specialist at Amsterdam UMC and contributes his expertise in the systematic search and reporting according to PRISMA-ScR. All authors have contributed to the study design and revising the protocol. All authors have approved the final manuscript. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The VOICE study group was part of the conceptualisation of the VOICE study grant proposal.

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Competing interests None declared.

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1 (title page)
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5-6
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Not applicable (this is the protocol)
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6, + table 1 (p10)
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Supplementary File 1; Search Strategy
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	9-10
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	12, + Supplementary Table 1; Draft data extraction
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	11



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not done
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	12
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Not applicable – study protocol
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not applicable – study protocol
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not applicable – study protocol
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not applicable – study protocol
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not applicable – study protocol
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not applicable – study protocol
Limitations	20	Discuss the limitations of the scoping review process.	Not applicable – study protocol
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not applicable – study protocol
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	13

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).



From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA ScR): Checklist and Explanation. *Ann Intern Med*. 2018;169:467–473. doi: [10.7326/M18-0850](https://doi.org/10.7326/M18-0850).



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Liebrechts search strategies 4 August 2022

Search Strategy for PubMed (4 August 2022)

Search	Query	Results
#6	#4 NOT ("Developing Countries"[Mesh] OR "developing countr*" [tiab] OR "developing nation*" [tiab] OR "developing population*" [tiab] OR "developing econom*" [tiab] OR "undeveloped countr*" [tiab] OR "undeveloped nation*" [tiab] OR "undeveloped economy" [tiab] OR "undeveloped economies" [tiab] OR "least developed countr*" [tiab] OR "least developed nation*" [tiab] OR "least developed economy" [tiab] OR "least developed economies" [tiab] OR "less-developed countr*" [tiab] OR "less-developed nation*" [tiab] OR "less-developed population" [tiab] OR "less-developed populations" [tiab] OR "less-developed econom*" [tiab] OR "lesser developed countr*" [tiab] OR "lesser developed nation*" [tiab] OR "lesser developed population" [tiab] OR "lesser developed populations" [tiab] OR "lesser developed economy" [tiab] OR "lesser developed economies" [tiab] OR "under-developed countr*" [tiab] OR "underdeveloped nation*" [tiab] OR "underdeveloped countr*" [tiab] OR "underdeveloped nation*" [tiab] OR "underdeveloped population*" [tiab] OR "underdeveloped econom*" [tiab] OR "low income countr*" [tiab] OR "middle income countr*" [tiab] OR "low income nation*" [tiab] OR "middle income nation*" [tiab] OR "low income population*" [tiab] OR "middle income population*" [tiab] OR "low income econom*" [tiab] OR "middle income econom*" [tiab] OR "lower income countr*" [tiab] OR "lower income nation*" [tiab] OR "lower income population*" [tiab] OR "lower income economy" [tiab] OR "lower income economies" [tiab] OR "resource limited" [tiab] OR "low resource countr*" [tiab] OR "lower resource countr*" [tiab] OR "low resource nation*" [tiab] OR "low resource population*" [tiab] OR "low resource economy" [tiab] OR "low resource economies" [tiab] OR "underserved countr*" [tiab] OR "underserved nation*" [tiab] OR "underserved population*" [tiab] OR "underserved economy" [tiab] OR "underserved economies" [tiab] OR "under-served country" [tiab] OR "under-served countries" [tiab] OR "under-served nation" [tiab] OR "under-served nations" [tiab] OR "under-served population" [tiab] OR "under-served populations" [tiab] OR "underserved economy" [tiab] OR "underserved economies" [tiab] OR "deprived countr*" [tiab] OR "deprived nation" [tiab] OR "deprived nations" [tiab] OR "deprived population*" [tiab] OR "deprived economy" [tiab] OR "deprived economies" [tiab] OR "poor countr*" [tiab] OR "poor nation*" [tiab] OR "poor population*" [tiab] OR "poor econom*" [tiab] OR "poorer countr*" [tiab] OR "poorer nation*" [tiab] OR "poorer population*" [tiab] OR "poorer econom*" [tiab] OR "lami" [tiab] OR "lamics" [tiab] OR "lami" [tiab] OR "transitional countr*" [tiab] OR "transitional nation" [tiab] OR "transitional nations" [tiab] OR "transitional econom*" [tiab] OR "transition countr*" [tiab] OR "transition nation*" [tiab] OR "transition econom*" [tiab] OR "low resource setting*" [tiab] OR "lower resource setting*" [tiab] OR "middle resource setting*" [tiab] OR "Third World*" [tiab]) Filters: from 2012 - 2022	28,250

#5	#4 NOT ("Developing Countries"[Mesh] OR "developing countr**"[tiab] OR "developing nation**"[tiab] OR "developing population**"[tiab] OR "developing econom**"[tiab] OR "undeveloped countr**"[tiab] OR "undeveloped nation**"[tiab] OR "undeveloped economy"[tiab] OR "undeveloped economies"[tiab] OR "least developed countr**"[tiab] OR "least developed nation**"[tiab] OR "least developed economy"[tiab] OR "least developed economies"[tiab] OR "less-developed countr**"[tiab] OR "less-developed nation**"[tiab] OR "less-developed population**"[tiab] OR "less-developed populations**"[tiab] OR "less-developed econom**"[tiab] OR "lesser developed countr**"[tiab] OR "lesser developed nation**"[tiab] OR "lesser developed population**"[tiab] OR "lesser developed populations**"[tiab] OR "lesser developed economy"[tiab] OR "lesser developed economies"[tiab] OR "under-developed countr**"[tiab] OR "under-developed nation**"[tiab] OR "underdeveloped countr**"[tiab] OR "underdeveloped nation**"[tiab] OR "underdeveloped population**"[tiab] OR "underdeveloped econom**"[tiab] OR "low income countr**"[tiab] OR "middle income countr**"[tiab] OR "low income nation**"[tiab] OR "middle income nation**"[tiab] OR "low income population**"[tiab] OR "middle income population**"[tiab] OR "low income econom**"[tiab] OR "middle income econom**"[tiab] OR "lower income countr**"[tiab] OR "lower income nation**"[tiab] OR "lower income population**"[tiab] OR "lower income economy"[tiab] OR "lower income economies"[tiab] OR "resource limited"[tiab] OR "low resource countr**"[tiab] OR "low resource nation**"[tiab] OR "low resource population**"[tiab] OR "low resource economy"[tiab] OR "low resource economies"[tiab] OR "underserved countr**"[tiab] OR "underserved nation**"[tiab] OR "underserved population**"[tiab] OR "underserved economy"[tiab] OR "underserved economies"[tiab] OR "under-served country"[tiab] OR "under-served countries"[tiab] OR "under-served nation"[tiab] OR "under-served nations"[tiab] OR "under-served population"[tiab] OR "under-served populations"[tiab] OR "underserved economy"[tiab] OR "underserved economies"[tiab] OR "deprived countr**"[tiab] OR "deprived nation**"[tiab] OR "deprived nations"[tiab] OR "deprived population**"[tiab] OR "deprived economy"[tiab] OR "deprived economies"[tiab] OR "poor countr**"[tiab] OR "poor nation**"[tiab] OR "poor population**"[tiab] OR "poor econom**"[tiab] OR "poorer countr**"[tiab] OR "poorer nation**"[tiab] OR "poorer population**"[tiab] OR "poorer econom**"[tiab] OR "lami**"[tiab] OR "lami**"[tiab] OR "lami**"[tiab] OR "transitional countr**"[tiab] OR "transitional nation**"[tiab] OR "transitional nations"[tiab] OR "transitional econom**"[tiab] OR "transition countr**"[tiab] OR "transition nation**"[tiab] OR "transition econom**"[tiab] OR "low resource setting**"[tiab] OR "lower resource setting**"[tiab] OR "middle resource setting**"[tiab] OR "Third World**"[tiab])	58,807
#4	#1 AND #2 AND #3	63,047
#3	"preconception care"[MeSH Terms] OR "prenatal care"[MeSH Terms] OR "Pregnancy"[MeSH] OR "pregnant women"[MeSH Terms] OR "perinatal care"[MeSH Terms] OR "postnatal care"[MeSH Terms] OR "obstetrics"[MeSH Terms] OR "Midwifery"[Mesh] OR "prenatal care"[tiab] OR Antenatal[tiab] OR Preconception*[tiab] OR Maternal*[tiab] OR Maternity[tiab] OR postnat*[tiab] OR Postpartum[tiab] OR perinat*[tiab] OR Prenatal*[tiab] OR "birth care**"[tiab] OR Pregnant*[tiab] OR Midwife*[tiab] OR midwifery[tiab] OR obstetri*[tiab] OR Neonat*[tiab] OR Newborn*[tiab] OR "New born**"[tiab] OR "birth attendant**"[tiab] OR gynaecolog*[tiab] OR gynecolog*[tiab] OR "natal care**"[tiab]	1,724,086

#2	"maternal health"[MeSH Terms] OR "Pregnancy Outcome"[MeSH] OR "Pregnancy Complications"[Mesh] OR "infant health"[MeSH Terms] OR "Infant Mortality"[Mesh] OR "Morbidity"[Mesh] OR "Mortality"[Mesh] OR "Obstetric Labor Complications"[Mesh] OR "maternal health"[tiab] OR "infant health"[tiab] OR "neonatal health"[tiab] OR "neonate health"[tiab] OR "complications"[sb] OR "complicat*"[tiab] OR "adverse effects"[sb] OR "adverse effect*"[tiab] OR "adverse affect*"[tiab] OR "adversely affect*"[tiab] OR "side effect*"[tiab] OR "side affect*"[tiab] OR "adverse event*"[tiab] OR morbid*[tiab] OR death*[tiab] OR mortalit*[tiab] OR injur*[tiab] OR "adverse outcome*"[tiab] OR "Patient Satisfaction"[MeSH] OR ((Patient*[tiab] OR client*[tiab] OR "Women"[Mesh] OR Woman*[tiab] OR Women*[tiab]) AND (experience*[tiab] OR satisfaction*[tiab])) OR (("health personnel"[MeSH Terms] OR "Nurse Midwives"[Mesh] OR "Obstetrics"[Mesh] OR midwife*[tiab] OR midwiv*[tiab] OR Nurse*[tiab] OR "birth attendant*"[tiab] OR Obstetrician*[tiab] OR gynaecolog*[tiab] OR gynecolog*[tiab] Caregiver*[tiab] OR "care giver*"[tiab] OR Provider*[tiab] OR "health personnel"[tiab] OR "personnel health"[tiab]) AND (experience*[tiab] OR satisfaction*)) OR spending*[tiab] OR expenditure*[tiab] OR cost*[tiab] OR "Referral and Consultation"[Mesh] OR "patient transfer"[MeSH Terms] OR "Medicalization"[Mesh] OR Referral*[tiab] OR Intervention*[tiab] OR Transfer*[tiab] OR medicalization*[tiab] OR medicalisation*[tiab]	7,660,615
#1	"Intersectoral Collaboration"[Mesh] OR "Models, Organizational"[Mesh] OR "Delivery of Health Care, Integrated"[Mesh] OR "Organization and Administration"[Mesh] OR "integrated care*"[tiab] OR "integrated maternity care*"[tiab] OR "integration of care*"[tiab] OR "Integration of maternity care"[tiab] OR "transmural care"[tiab] OR "continuity of care"[tiab] OR "continuum of care"[tiab] OR "model of care*"[tiab] OR "models of care*"[tiab] OR "care model*"[tiab] OR "care system*"[tiab] OR "risk selection*"[tiab] OR "Shared care"[tiab] OR "Joint care"[tiab] OR "Collaborative care"[tiab] OR Interprofessional*[tiab] OR "Inter professional*"[tiab] OR Collaboration*[tiab] OR Interdisciplinair*[tiab] OR Multidisciplinair[tiab] OR Cooperat*[tiab] OR "co oporat*"[tiab]	1,952,242

Search Strategy for Elsevier/Scopus (4 August 2022)

Search	Query	Results
#7	#6 AND 2012-2022	13,145
#6	#5 NOT (conference paper OR conference review)	22,153
#5	#4 NOT TITLE-ABS-KEY ("developing countr*" OR "developing nation*" OR "developing population*" OR "developing econom*" OR "undeveloped countr*" OR "undeveloped nation*" OR "undeveloped economy" OR "undeveloped economies" OR "least developed countr*" OR "least developed nation*" OR "least developed economy" OR "least developed economies" OR "less-developed countr*" OR "less-developed nation*" OR "less-developed population" OR "less-developed populations" OR "less-developed econom*" OR "lesser developed countr*" OR "lesser developed nation*" OR "lesser developed population" OR "lesser developed populations" OR "lesser developed economy" OR "lesser developed economies" OR "under-developed countr*" OR "under-developed nation*" OR "underdeveloped countr*" OR "underdeveloped nation*" OR "underdeveloped population*" OR "underdeveloped econom*" OR "low income countr*" OR "middle income countr*" OR "low income nation*" OR "middle income nation*" OR "low income population*" OR "middle income population*" OR "low income econom*" OR "middle income econom*" OR "lower income countr*" OR "lower income	22,727

	nation*" OR "lower income population*" OR "lower income economy" OR "lower income economies" OR "resource limited" OR "low resource countr*" OR "lower resource countr*" OR "low resource nation*" OR "low resource population*" OR "low resource economy" OR "low resource economies" OR "underserved countr*" OR "underserved nation*" OR "underserved population*" OR "underserved economy" OR "underserved economies" OR "under-served country" OR "under-served countries" OR "under-served nation" OR "under-served nations" OR "under-served population" OR "under-served populations" OR "underserved economy" OR "underserved economies" OR "deprived countr*" OR "deprived nation" OR "deprived nations" OR "deprived population*" OR "deprived economy" OR "deprived economies" OR "poor countr*" OR "poor nation*" OR "poor population*" OR "poor econom*" OR "poorer countr*" OR "poorer nation*" OR "poorer population*" OR "poorer econom*" OR "lamic" OR "lamic*" OR "lami" OR "transitional countr*" OR "transitional nation" OR "transitional nations" OR "transitional econom*" OR "transition countr*" OR "transition nation*" OR "transition econom*" OR "low resource setting*" OR "lower resource setting*" OR "middle resource setting*" OR "Third World*")	
#4	#1 AND #2 AND #3	427,512
#3	TITLE-ABS-KEY ("prenatal care" OR Antenatal OR Preconception* OR Maternal* OR Maternity OR postnat* OR Postpartum OR perinat* OR Prenatal* OR "birth care*" OR Pregnant* OR Midwife* OR midwifery OR obstetri* OR Neonat* OR Newborn* OR "New born*" OR "birth attendant*" OR gynaecolog* OR gynecolog* OR "natal care*")	25,753
#2	TITLE-ABS-KEY ("maternal health" OR "infant health" OR "neonatal health" OR "neonate health" OR "complicat*" OR "adverse effect*" OR "adverse affect*" OR "adversely affect*" OR "side effect*" OR "side affect*" OR "adverse event*" OR morbid* OR death* OR mortalit* OR injur* OR "adverse outcome*" OR ((Patient* OR client* OR Woman* OR Women*) AND (experience* OR satisfaction*)) OR ((midwife* OR midwiv* OR Nurse* OR "birth attendant*" OR Obstetrician* OR gynaecolog* OR gynecolog* Caregiver* OR "care giver*" OR Provider* OR "health personnel" OR "personnel health") AND (experience* OR satisfaction*)) OR spending* OR expenditure* OR cost* OR Referral* OR Intervention* OR Transfer* OR medicalization* OR medicalisation*)	2,516,011
#1	TITLE-ABS-KEY ("integrated care*" OR "integrated maternity care*" OR "integration of care*" OR "Integration of maternity care" OR "transmural care" OR "continuity of care" OR "continuum of care" OR "model of care*" OR "models of care*" OR "care model*" OR "care system*" OR "risk selection*" OR "Shared care" OR "Joint care" OR "Collaborative care" OR Interprofessional* OR "Inter professional*" OR Collaboration* OR Interdisciplinair* OR Multidisciplinair OR Cooperat* OR "co oporat*")	15,178,910

Search Strategy for Ebsco/APA PsycINFO (4 August 2022)

Search	Query	Results
#5	S4 NOT (DE "Developing Countries" OR TI("developing countr*" OR "developing nation*" OR "developing population*" OR "developing econom*" OR "undeveloped countr*" OR "undeveloped nation*" OR "undeveloped economy" OR "undeveloped economies" OR "least developed countr*" OR "least developed nation*" OR "least developed economy" OR "least developed economies" OR "less-developed countr*" OR "less-developed nation*" OR "less-developed population" OR "less-developed populations" OR "less-developed econom*" OR "lesser developed countr*" OR "lesser developed nation*" OR "lesser developed population" OR "lesser developed populations" OR "lesser developed economy" OR "lesser developed economies" OR	1,019

	<p>"under-developed countr*" OR "under-developed nation*" OR "underdeveloped countr*" OR "underdeveloped nation*" OR "underdeveloped population*" OR "underdeveloped econom*" OR "low income countr*" OR "middle income countr*" OR "low income nation*" OR "middle income nation*" OR "low income population*" OR "middle income population*" OR "low income econom*" OR "middle income econom*" OR "lower income countr*" OR "lower income nation*" OR "lower income population*" OR "lower income economy" OR "lower income economies" OR "resource limited" OR "low resource countr*" OR "lower resource countr*" OR "low resource nation*" OR "low resource population*" OR "low resource economy" OR "low resource economies" OR "underserved countr*" OR "underserved nation*" OR "underserved population*" OR "underserved economy" OR "underserved economies" OR "under-served country" OR "under-served countries" OR "under-served nation" OR "under-served nations" OR "under-served population" OR "under-served populations" OR "underserved economy" OR "underserved economies" OR "deprived countr*" OR "deprived nation" OR "deprived nations" OR "deprived population*" OR "deprived economy" OR "deprived economies" OR "poor countr*" OR "poor nation*" OR "poor population*" OR "poor econom*" OR "poorer countr*" OR "poorer nation*" OR "poorer population*" OR "poorer econom*" OR "Imic" OR "Imics" OR "lami" OR "transitional countr*" OR "transitional nation" OR "transitional nations" OR "transitional econom*" OR "transition countr*" OR "transition nation*" OR "transition econom*" OR "low resource setting*" OR "lower resource setting*" OR "middle resource setting*" OR "Third World*") OR AB("developing countr*" OR "developing nation*" OR "developing population*" OR "developing econom*" OR "undeveloped countr*" OR "undeveloped nation*" OR "undeveloped economy" OR "undeveloped economies" OR "least developed countr*" OR "least developed nation*" OR "least developed economy" OR "least developed economies" OR "less-developed countr*" OR "less-developed nation*" OR "less-developed population" OR "less-developed populations" OR "less-developed econom*" OR "lesser developed countr*" OR "lesser developed nation*" OR "lesser developed population" OR "lesser developed populations" OR "lesser developed economy" OR "lesser developed economies" OR "under-developed countr*" OR "under-developed nation*" OR "underdeveloped countr*" OR "underdeveloped nation*" OR "underdeveloped population*" OR "underdeveloped econom*" OR "low income countr*" OR "middle income countr*" OR "low income nation*" OR "middle income nation*" OR "low income population*" OR "middle income population*" OR "low income econom*" OR "middle income econom*" OR "lower income countr*" OR "lower income nation*" OR "lower income population*" OR "lower income economy" OR "lower income economies" OR "resource limited" OR "low resource countr*" OR "lower resource countr*" OR "low resource nation*" OR "low resource population*" OR "low resource economy" OR "low resource economies" OR "underserved countr*" OR "underserved nation*" OR "underserved population*" OR "underserved economy" OR "underserved economies" OR "under-served country" OR "under-served countries" OR "under-served nation" OR "under-served nations" OR "under-served population" OR "under-served populations" OR "underserved economy" OR "underserved economies" OR "deprived countr*" OR "deprived nation" OR "deprived nations" OR "deprived population*" OR "deprived economy" OR "deprived economies" OR "poor countr*" OR "poor nation*" OR "poor population*" OR "poor econom*" OR "poorer countr*" OR "poorer nation*" OR "poorer population*" OR "poorer econom*" OR "Imic" OR "Imics" OR "lami" OR "transitional countr*" OR "transitional nation" OR "transitional nations" OR "transitional econom*" OR "transition countr*" OR "transition nation*" OR</p>	
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	"transition econom*" OR "low resource setting*" OR "lower resource setting*" OR "middle resource setting*" OR "Third World*") OR KW("developing countr*" OR "developing nation*" OR "developing population*" OR "developing econom*" OR "undeveloped countr*" OR "undeveloped nation*" OR "undeveloped economy" OR "undeveloped economies" OR "least developed countr*" OR "least developed nation*" OR "least developed economy" OR "least developed economies" OR "less-developed countr*" OR "less-developed nation*" OR "less-developed population" OR "less-developed populations" OR "less-developed econom*" OR "lesser developed countr*" OR "lesser developed nation*" OR "lesser developed population" OR "lesser developed populations" OR "lesser developed economy" OR "lesser developed economies" OR "under-developed countr*" OR "under-developed nation*" OR "underdeveloped countr*" OR "underdeveloped nation*" OR "underdeveloped population" OR "underdeveloped econom*" OR "low income countr*" OR "middle income countr*" OR "low income nation*" OR "middle income nation*" OR "low income population" OR "middle income population" OR "low income econom*" OR "middle income econom*" OR "lower income countr*" OR "lower income nation*" OR "lower income population" OR "lower income economy" OR "lower income economies" OR "resource limited" OR "low resource countr*" OR "lower resource countr*" OR "low resource nation*" OR "low resource population" OR "low resource economy" OR "low resource economies" OR "underserved countr*" OR "underserved nation*" OR "underserved population" OR "underserved economy" OR "underserved economies" OR "under-served country" OR "under-served countries" OR "under-served nation" OR "under-served nations" OR "under-served population" OR "under-served populations" OR "underserved economy" OR "underserved economies" OR "deprived countr*" OR "deprived nation" OR "deprived nations" OR "deprived population*" OR "deprived economy" OR "deprived economies" OR "poor countr*" OR "poor nation*" OR "poor population*" OR "poor econom*" OR "poorer countr*" OR "poorer nation*" OR "poorer population*" OR "poorer econom*" OR "Imic" OR "Imics" OR "Iami" OR "transitional countr*" OR "transitional nation" OR "transitional nations" OR "transitional econom*" OR "transition countr*" OR "transition nation*" OR "transition econom*" OR "low resource setting*" OR "lower resource setting*" OR "middle resource setting*" OR "Third World*"))	
#4	#1 AND #2 AND #3	1,695
#3	DE "Prenatal Care" OR DE "Childbirth Training" OR DE "Pregnancy" OR DE "Adolescent Pregnancy" OR OR DE "Primipara" OR DE "Perinatal Period" OR DE "Postnatal Period" OR DE "Obstetrics" OR DE "Caesarean Birth" OR DE "Midwifery" OR TI("prenatal care" OR Antenatal OR Preconception* OR Maternal* OR Maternity OR postnat* OR Postpartum OR perinat* OR Prenatal* OR "birth care*" OR Pregnant* OR Midwife* OR midwifery OR obstetri* OR Neonat* OR Newborn* OR "New born*" OR "birth attendant*" OR gynaecolog* OR gynecolog* OR "natal care*") OR AB("prenatal care" OR Antenatal OR Preconception* OR Maternal* OR Maternity OR postnat* OR Postpartum OR perinat* OR Prenatal* OR "birth care*" OR Pregnant* OR Midwife* OR midwifery OR obstetri* OR Neonat* OR Newborn* OR "New born*" OR "birth attendant*" OR gynaecolog* OR gynecolog* OR "natal care*") OR KW("prenatal care" OR Antenatal OR Preconception* OR Maternal* OR Maternity OR postnat* OR Postpartum OR perinat* OR Prenatal* OR "birth care*" OR Pregnant* OR Midwife* OR midwifery OR obstetri* OR Neonat* OR Newborn* OR "New born*" OR "birth attendant*" OR gynaecolog* OR gynecolog* OR "natal care*"))	169,395

#2	<p>DE "Pregnancy Outcomes" OR DE "Birth" OR DE "Induced Abortion" OR DE "Obstetrical Complications" OR DE "Spontaneous Abortion" OR DE "Morbidity" OR DE "Premorbidity" OR DE "Mortality Rate" OR DE "Mortality Risk" OR DE "Client Satisfaction" OR DE "Client Transfer" OR (("Women"[Mesh] OR "health personnel"[MeSH Terms] OR "Nurse Midwives"[Mesh] OR "Obstetrics"[Mesh]) AND TI(experience* OR satisfaction*) OR AB(experience* OR satisfaction*) OR KW(experience* OR satisfaction*)) OR TI("maternal health" OR "infant health" OR "neonatal health" OR "neonate health" OR "complicat*" OR OR "adverse effect*" OR "adverse affect*" OR "adversely affect*" OR "side effect*" OR "side affect*" OR "adverse event*" OR morbid* OR death* OR mortalit* OR injur* OR "adverse outcome*" OR spending* OR expenditure* OR cost* OR Referral* OR Intervention* OR Transfer* OR medicalization* OR medicalisation*) OR AB("maternal health" OR "infant health" OR "neonatal health" OR "neonate health" OR "complicat*" OR OR "adverse effect*" OR "adverse affect*" OR "adversely affect*" OR "side effect*" OR "side affect*" OR "adverse event*" OR morbid* OR death* OR mortalit* OR injur* OR "adverse outcome*" OR spending* OR expenditure* OR cost* OR Referral* OR Intervention* OR Transfer* OR medicalization* OR medicalisation*) OR KW("maternal health" OR "infant health" OR "neonatal health" OR "neonate health" OR "complicat*" OR OR "adverse effect*" OR "adverse affect*" OR "adversely affect*" OR "side effect*" OR "side affect*" OR "adverse event*" OR morbid* OR death* OR mortalit* OR injur* OR "adverse outcome*" OR spending* OR expenditure* OR cost* OR Referral* OR Intervention* OR Transfer* OR medicalization* OR medicalisation*) OR TI((Patient* OR client* OR OR Woman* OR Women* OR midwife* OR midwiv* OR Nurse* OR "birth attendant*" OR Obstetrician* OR gynaecolog* OR gynecolog* Caregiver* OR "care giver*" OR Provider* OR "health personnel" OR "personnel health") N3 (experience* OR satisfaction*)) OR AB((Patient* OR client* OR OR Woman* OR Women* OR midwife* OR midwiv* OR Nurse* OR "birth attendant*" OR Obstetrician* OR gynaecolog* OR gynecolog* Caregiver* OR "care giver*" OR Provider* OR "health personnel" OR "personnel health") N3 (experience* OR satisfaction*)) OR KW((Patient* OR client* OR OR Woman* OR Women* OR midwife* OR midwiv* OR Nurse* OR "birth attendant*" OR Obstetrician* OR gynaecolog* OR gynecolog* Caregiver* OR "care giver*" OR Provider* OR "health personnel" OR "personnel health") N3 (experience* OR satisfaction*))</p>	965,418
#1	<p>DE "Integrated Services" OR TI("integrated care*" OR "integrated maternity care*" OR "integration of care*" OR "Integration of maternity care" OR "transmural care" OR "continuity of care" OR "continuum of care" OR "model of care*" OR "models of care*" OR "care model*" OR "care system*" OR "risk selection*" OR "Shared care" OR "Joint care" OR "Collaborative care" OR Interprofessional* OR "Inter professional*" OR Collaboration* OR Interdisciplinair* OR Multidisciplinair OR Cooperat* OR "co oporat*") OR AB("integrated care*" OR "integrated maternity care*" OR "integration of care*" OR "Integration of maternity care" OR "transmural care" OR "continuity of care" OR "continuum of care" OR "model of care*" OR "models of care*" OR "care model*" OR "care system*" OR "risk selection*" OR "Shared care" OR "Joint care" OR "Collaborative care" OR Interprofessional* OR "Inter professional*" OR Collaboration* OR Interdisciplinair* OR Multidisciplinair OR Cooperat* OR "co oporat*") OR KW("integrated care*" OR "integrated maternity care*" OR "integration of care*" OR "Integration of maternity care" OR "transmural care" OR "continuity of care" OR "continuum of care" OR "model of care*" OR "models of care*" OR "care model*" OR "care system*" OR "risk selection*" OR "Shared care" OR "Joint care" OR "Collaborative care"</p>	129,901

	spending* OR expenditure* OR cost* OR Referral* OR Intervention* OR Transfer* OR medicalization* OR medicalisation*):ti,ab,kw	
#1	("integrated care*" OR "integrated maternity care*" OR "integration of care*" OR "Integration of maternity care" OR "transmural care" OR "continuity of care" OR "continuum of care" OR "model of care*" OR "models of care*" OR "care model*" OR "care system*" OR "risk selection*" OR "Shared care" OR "Joint care" OR "Collaborative care" OR Interprofessional* OR "Inter professional*" OR Collaboration* OR Interdisciplinair* OR Multidisciplinair OR Cooperat* OR "co oporat*"):ti,ab,kw	31,496

Supplementary Table 1. Draft Data Extraction Table.

Element of integrated maternity care	Outcomes					<u>Levels RMIC</u>								<u>Level of evidence</u>
						<u>Vertical – Horizontal organization:</u>	<u>Degree of integration</u>	<u>Clinical integration</u>	<u>Professional integration</u>	<u>Organizational integration:</u>	<u>System Integration</u>	<u>Functional enablers:</u>	<u>Normative enablers:</u>	
e.g. mother council														
e.g. multidisciplinary consultation														