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Protocol for a scoping review to identify and evaluate the global health personnel considered skilled attendants at birth in low-and-middle income countries between 2000 – 2015

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Protocol for a scoping review to identify and evaluate the global health personnel considered skilled attendants at birth in low-and-middle income countries between 2000 – 2015

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ABSTRACT

Introduction: Despite progress towards the Millennium Development Goals (MDG), maternal mortality remains high in countries where there are shortages of skilled personnel able to manage and provide quality care during pregnancy and childbirth. The “percentage of births attended by skilled health personnel” (SAB) was a key indicator for tracking progress since the MDGs and is part of the Sustainable Development Goal (SDG) agenda. However, due to contextual differences between and within countries on the definition of SAB, a lack of clarity exists around the training, competencies, and skills they are qualified to perform. In this paper, we outline a scoping review protocol that poses to identify, map, and evaluate the health personnel considered SAB in low-to-middle-income-countries (LMIC).

Methods and analysis: A search will be conducted for the years 2000 to 2015 in PubMed/MEDLINE, EMBASE, CINAHL Complete, Cochrane Database of Systematic Reviews, POPLINE and the World Health Organization Global Health Library. A manual search of reference lists from identified studies or systematic reviews and a hand search of the literature from international partner organizations will be done. Studies conducted in LMIC that evaluated health personnel (paid or voluntary) providing interventions during the intrapartum period will be considered for inclusion.

Ethics and dissemination: A scoping review is a secondary analysis of published literature and does not require ethics approval. This scoping review proposes to synthesize data evaluating the training, competency, and skills of identified SAB and expands on other efforts to describe this global health workforce. The results will inform recommendations around improved coverage measurement and reporting of SAB moving forward, allowing for more accurate, consistent, and timely data able to guide decisions and action around planning and implementation of maternal and newborn health programs globally. Data will be disseminated through a peer-reviewed manuscript, conferences, and to key stakeholders within international organizations.

Word count: 300

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This scoping review proposes to identify and map the global health workforce considered skilled attendants at birth (SAB) in low-to-middle income countries. No other review has assessed SAB on a global scale.
- The identified cadres considered SAB will be evaluated against internationally agreed upon criteria as proposed in the 2004 WHO/ICM/FIGO joint statement on the skilled attendant
- The search strategy is broad and comprehensive, including 11 global electronic databases spanning both peer-reviewed and grey literature and does not have language restrictions.
- Due to the broad nature of this review and inherent heterogeneity of data between and within countries, the final data extraction sheet and analysis plan are unable to be defined until after the review is completed.

INTRODUCTION

Despite progress towards Millennium Development Goal (MDG) 4 and Goal 5 which aimed to reduce maternal and child health and survival [1], mortality rates remain high in low- and middle-income countries (LMIC) where there are critical shortages of health personnel who are able to adequately manage and provide quality care during pregnancy and childbirth [2-4]. The Sustainable Development Goal (SDG) agenda highlight the importance of continued momentum towards improving maternal and newborn health by setting, under the SDG goal 3, targets for achieving a global maternal mortality ratio of less than 70 maternal deaths per 100,000 live births, and aiming for all countries to reduce neonatal mortality to at least as low as 12 per 1,000 live births by 2030 [5, 6].

A key progress indicator that is included in the SDG Framework is the “percentage of births delivered by skilled attendant at birth” (SDG Indicator 3.1.2) [6, 7]. It has also been identified as a core coverage indicator by other global monitoring frameworks, such as the Global Strategy for Women’s, Adolescent’s, and Children’s Health [8], Ending Preventable Maternal Mortality (EPMM) initiative [9] and Every Newborn Action Plan (ENAP) [10]. According to the 2004 joint statement by the World Health Organization (WHO), the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO), a skilled attendant at birth (SAB) is defined as: *“A midwife, doctor or nurse — who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns”* [11].

Despite guidance from the 2004 WHO/FIGO/ICM joint statement on the definition of a skilled attendant and its core functions, actual reporting at country level is challenged by lack of clear guidance on measurement standards, heterogeneity in the use of terminology and cadre functions [12, 13]. Many countries have attempted to improve maternal health and survival through task-shifting, by increasing the proportion of births attended by skilled health personnel through training lower-level cadre, or creating new cadres able to provide pregnancy and childbirth care [14]. However, the content and requirements of training programs may not be standardized, evaluated, or publically available. Even when there are practice standards and/or guidelines in place, many countries may lack the capacity and infrastructure needed to adhere to current recommendations for training and education. Thus, there may be confusion over what a SAB is, what they should be able to perform, how they should be trained, and what systems should be in place in order to support them [15].

The skill level and competencies of cadres may vary, and many cadres that are currently considered 'skilled' may not actually meet the internationally agreed upon definition and criteria set in the 2004 WHO/FIGO/ICM joint statement [12, 15]. The inclusion of additional country-level health personnel as skilled in global monitoring frameworks, without verification of training and capabilities, coupled with contextual differences between and within countries on the definition of what constitutes a SAB complicates the accuracy, comparability, and consistency for continued measurement of SAB moving forward.

The aim of this scoping review is to identify, map, and evaluate the training, education, skill set, and/or competency of the various cadres of health personnel that provided pregnancy and childbirth care in LMIC during 2000 – 2015. To our knowledge, no other review has been conducted on this topic previously in the published literature. This information will support the refinement of the definition of what constitutes a SAB in order to harmonize and improve the measurement around the global monitoring of SAB coverage and progress of the SDG targets set for 2030 [6].

METHODS AND ANALYSIS

Study Design

The study methods are based on frameworks developed for the design and conduct of systematic scoping reviews [16-19]. Due to the broad and vast scope of our topic, a scoping review design was chosen in order to identify and map the existing literature. This protocol is conducted in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols (PRISMA-P) guidelines [20]. The final scoping review will follow the PRISMA reporting guidelines for systematic reviews [21].

Research Questions

The objectives of our study are to identify, map, and evaluate the cadres considered SAB in LMIC. The following protocol for a scoping review poses to address the following questions:

1. Who are the cadre of health personnel that are reported as ‘skilled attendants at birth’ as defined by the 2004 WHO/FIGO/ICM joint statement [11] in LMIC?
2. How do these identified cadres differ between and within county in terms of the following:
 - a. Curriculum, duration of training and/or education requirements obtained to be qualified;
 - b. Regulation, accreditation, and/or certification by a professional organization;
 - c. Skills and competency that each cadre are able to perform (i.e. signal functions and/or other key interventions required for the management of childbirth);
 - d. Legislation to perform these signal functions and/or interventions;
 - e. Location of work (urban / rural, hospital / health centre / community-based); and
 - f. Continuing education requirements (curriculum, duration, frequency).

Inclusion Criteria

The aforementioned research questions will be assessed and studies will be selected specific to the following Population, Concept, Study Design and Context criteria presented in Table 1.

Table 1: Inclusion criteria for identifying eligible studies

	Inclusion Criteria
Population	Any health personnel (paid or voluntary) who provide health services within the provision of maternal and newborn health care during pregnancy and childbirth
Concept	Evaluation of the health personnel according to education / training received; accreditation or certification; legislation, skills / competency; and/or continuing education requirements.
Study Design	All observational studies of any study design conducted on human subjects (prospective or retrospective cohort, case control, case series, randomized control trial, other quantitative or qualitative study, including quasi-experimental designs).
Context	Low- and upper-middle-income countries with health facility and/or community-based services offering pregnancy and childbirth care.

All observational studies of any design will be included if it evaluates the education, training, accreditation or certification, legislation, skills, and/or competencies of the skilled health personnel (paid or voluntary) who provide interventions related to the delivery of maternal and newborn health during pregnancy and childbirth (intrapartum). Studies reporting on health personnel providing pregnancy and childbirth care will be included regardless of if the cadre are formally regulated as SAB within a country and/or if they are legislated or not to perform key health interventions. The cadre included will be compared to the 2004 WHO/FIGO/ICM joint statement in order to evaluate whether the cadre is considered skilled against the internationally agreed upon standard definition of a skilled attendant [11]. Studies published inclusive of all languages, any study design, and between the years 2000 to 2015 in LMIC countries will be considered eligible for inclusion.

Exclusion Criteria

Articles will be not be eligible for inclusion in the scoping review if:

1. There is no mention of the individual health personnel (cadre name) that are considered skilled attendants, providing maternal and newborn care during childbirth; and
2. There are no details of at least one of the following key concepts:
 - a. Education and/or training requirements to be considered skilled;
 - b. If the cadre is formally accredited / certified within a standard criteria set by the country;
 - c. Legislation or regulatory requirements; and/or

- d. Specific skills or key interventions / signal functions that the cadre is able to perform, regardless of whether they are legislated or authorised.

Randomized controlled trials investigating a new cadre of health personnel through interventional training programmes that have not been rolled out as part of a country-level health system will be excluded. A manual mapping of the cadres considered SAB within nationally representative household coverage surveys has been previously conducted by reviewing the Demographic Health Surveys (DHS) [22] and Multiple Indicator Cluster Surveys (MICS) [23]. Thus, studies that are a re-analysis of data from DHS or MICS will also be excluded.

Search Strategy

The search strategy will be conducted for all relevant existing literature based on search terms relating to the research questions restricted to the years 2000-2015, using the following online bibliographic databases: PubMed/MEDLINE, EMBASE, CINAHL Complete, the Cochrane Database of Systematic Reviews, POLINE, and the World Health Organization (WHO) Global Health Library (GHL). The WHO GHL contains the following databases: African Index Medicus (AIM/AFRO); Latin American and Caribbean Health Sciences Information (LILACS/AMRO/PAHO); Index Medicus for the Eastern Mediterranean Region (IMEMR/IMRO); the West Pacific Index Medicus (WPIM/WPRO); Index Medicus for the South-East Asian Region (IMSEAR/SEARO) and the World Health Organization Library (WHOLIS).

A manual search of the reference lists of all identified studies or systematic reviews as well as a hand search of the literature from global initiatives for additional data, including UNFPA, WHO, and United Nations Children's Fund (UNICEF), will be done. The search will be inclusive of all languages. In order to address which cadres are considered skilled attendants at birth worldwide and what skills they possess, how they are trained, and how to best support these cadres a search was conducted with specific terms and MESH headings. An example of the full electronic search strategy to be conducted in PubMed/MEDLINE is outlined in **Additional File 1**.

Study Selection

Following the aforementioned comprehensive search strategy, article titles and abstracts will be screened and eligibility for inclusion assessed independently by three reviewers (AJH, ABM, and LCV). Agreement regarding the identified abstracts will be quantified and disagreement resolved by an additional reviewer (DC).

Screened abstracts identified for inclusion will undergo an independent full-text review by three reviewers (AJH, ABM, and LCV). Full text articles that have been excluded at the screening stage will have reasons for exclusion documented. The final chosen full-text studies will again be compared between the reviewers with disagreement being resolved by mutual consensus and with input from all co-authors. Those studies that do not meet the above criteria will be disqualified and removed from consideration. Authors from studies with unavailable or unclear data will be contacted to determine their eligibility for inclusion.

Data Extraction and Analysis

Data will be extracted from full-text journal articles, reports, and other literature, which meets the inclusion criteria as outlined above. Data will be extracted using a Microsoft Excel database. Information retrieved will include study characteristics (country, region, years assessed, study objectives, methodology, and study design). Details about the cadres identified including cadre name, if they are considered skilled (yes or no), education requirements (entry requirements, duration, content), ability to perform signal functions and/or other childbirth interventions (yes or no), and if there are any regulatory bodies or legislation (yes or no) for the cadre named.

Data extracted regarding signal functions will include the seven basic and nine comprehensive services for emergency obstetric care as recommended by the WHO [24, 25]. The seven basic signal functions include: 1) administration of intravenous/intramuscular antibiotics; 2) administration of intravenous/intramuscular uterotonic drugs (i.e. oxytocin); 3) administration of intravenous/intramuscular anticonvulsants; 4) manual removal of the placenta; 5) removal of retained products of conception; 6) perform assisted vaginal delivery; and 7) perform basic neonatal resuscitation [24, 25]. The two additional signal functions that comprise comprehensive services include: 8) perform caesarean section; and 9) perform blood transfusion [24, 25].

The data extraction form will contain additional fields to allow flexibility for the emergence of other themes and/or categories, which will be discussed and developed via consensus from all co-authors. Documentation of all studies that are not to be included in the data extraction, as per consensus by reviewers, will be listed in a separate sheet for tracking purposes. Abstracted qualitative data will be synthesized using narrative description based on themes identified once the data has been extracted.

Quality Assessment

Although not explicitly required for scoping review studies, in order to verify the study quality, two reviewers will independently evaluate the quality and risk of bias using the following for each eligible article according to the STROBE Statement for observational studies [26], Cochrane Collaboration Tool for Assessing Risk of Bias in randomized controlled trials [27], and Quality Appraisal Checklist for Qualitative Studies (Confidence in the Evidence from Reviews of Qualitative Research). These tools will be used to assign each article with an overall assessment of bias as low – high risk. Studies will be included in the scoping review regardless of the results of study quality assessment.

DISSEMINATION AND ETHICS

To our knowledge, no other published work has systematically synthesized the global health workforce in maternal and newborn care in the context of SAB measurement. We aim to provide a broad and comprehensive review of all available literature with the aim of verifying

country-level definitions and functions of SAB in LMIC, specifically related to what their education and training is, what their skills and competencies are and if they are legislated and regulated to perform these functions. It will also identify gaps in the research literature where further academic study is warranted. Once completed, this review will be the foundation for the compilation of a metadata of cadres considered SAB, used to harmonize global measurement of coverage and reporting of this indicator moving forward.

The results from this study will be disseminated through a peer-reviewed publication and will contain supporting documentation on data compiled and analyzed for the scoping review. Since a scoping review collects and examines data from existing available literature, this study does not require ethics approval.

AUTHOR CONTRIBUTIONS

DC is the guarantor of this review. DC, LS and AJH were responsible for the initial conception and design of this study. All authors contributed to the development of the eligibility and data extraction criteria. AJH developed and executed the search strategy. AJH, ABM, LCV, and DC are responsible for abstract and full text screening. AJH drafted and revised the manuscript. All authors contributed and approved the final version of this protocol.

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COMPETING INTERESTS STATEMENT

None declared. The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the funding bodies or institutions with which they are affiliated.

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ADDITIONAL FILE 1: Skilled Attendance at Birth Scoping Review Search Strategy

Pubmed / MEDLINE Search

#	Section	Search Terms
1	Cadre Name	<p> “Health Personnel”[MeSH] OR Midwifery[MeSH] OR Obstetric Nursing[MeSH] OR “Professional Practice”[MeSH] OR “Emergency Responders”[MeSH] OR “Health Occupations”[Mesh] OR “Allied Health Occupations”[Mesh] OR “Students, Health Occupations”[Mesh] OR “Schools, Health Occupations”[Mesh] OR “Health Manpower”[Mesh] OR “health auxiliary”[TIAB] OR “health care manpower”[TIAB] OR “hospital personnel”[TIAB] OR “medical personnel”[TIAB] OR “health care personnel”[TIAB] OR “nursing home personnel”[TIAB] OR “paramedical personnel”[TIAB] OR “Health care workers”[TIAB] OR “Health care worker”[TIAB] OR “Medical Staff”[TIAB] OR “medical personnel”[TIAB] OR “General Practitioners”[TIAB] OR “General Practitioner”[TIAB] OR Caregiver*[TIAB] OR Nurses[TIAB] OR Nurse[TIAB] OR Midwife[TIAB] OR midwives[TIAB] OR midwife[TIAB] OR “Nursing Staff”[TIAB] OR “nurse midwife”[TIAB] OR “nurse midwives”[TIAB] OR “nurse-midwife”[TIAB] OR “nurse-midwives”[TIAB] OR auxiliary[TIAB] OR “Medical students”[TIAB] OR “Nursing students”[TIAB] OR (health*[TI] AND worker*[TI]) OR “Community Health Workers”[TIAB] OR “Community Health Worker”[TIAB] OR “Dental Staff”[TIAB] OR doctor[TIAB] OR doctors[TIAB] OR obstetrician[TIAB] OR obstetricians[TIAB] OR “skilled health provider”[TIAB] OR “skilled health providers”[TIAB] OR “skilled attendant”[TIAB] OR “skilled attendants”[TIAB] OR “skilled birth attendant”[TIAB] OR “skilled birth attendants”[TIAB] OR “skilled health”[TIAB] OR “skilled assistance”[TIAB] “skilled assistant”[TIAB] OR “skilled assistants”[TIAB] OR “skilled care”[TIAB] OR “skilled manpower”[TIAB] OR “skilled delivery”[TIAB] OR “skilled staff”[TIAB] OR “skilled person”[TIAB] OR “skilled birth personnel”[TIAB] OR “skilled health workers”[TIAB] OR “skilled health care worker”[TIAB] OR “skilled health care workers”[TIAB] OR “assistance at delivery”[TIAB] OR “assistance at birth”[TIAB] OR “attendant”[TIAB] OR “SAB”[TIAB] OR “SBA”[TIAB] or cadre[TIAB]or cadres[TIAB] OR “health care worker”[TIAB] OR “health care person”[TIAB] OR “health person”[TIAB] OR “health care provider”[TIAB] OR “care provider”[TIAB] OR “care providers”[TIAB] OR “health provider”[TIAB] OR “health providers”[TIAB] OR “health aide”[TIAB] OR “health aides”[TIAB] OR “traditional birth attendant”[TIAB] OR “birth attendant”[TIAB] OR “community birth attendant”[TIAB] OR “health assistant”[TIAB] OR “feldsher”[TIAB] OR “clinical officer”[TIAB] OR “clinical officers”[TIAB] OR “medical officer”[TIAB] OR “medical officers”[TIAB] OR “assistant medical officers”[TIAB] OR “Mother and Child Health Aides”[TIAB] OR “Mother and Child Health Aide”[TIAB] OR “MCHA”[TIAB] OR “mid-level provider”[TIAB] OR “mid-level cadre”[TIAB] OR “mid-level cadres”[TIAB] OR “mid-level healthcare workers”[TIAB] OR “mid-level health care workers”[TIAB] OR “mid-level health workers”[TIAB] OR “community-based skilled birth attendants”[TIAB] OR “community-based skilled birth attendant”[TIAB] OR “community based skilled birth attendants”[TIAB] OR “community based skilled birth attendant”[TIAB] OR “health visitor”[TIAB] or (health*[TI] AND worker*[TI]) OR “fieldworker”[TIAB] OR “task shifting”[TIAB] OR “nonphysicians”[TIAB] OR “non-physician clinicians”[TIAB] OR “non-physician”[TIAB] OR “clinician”[TIAB] OR “clinicians”[TIAB] </p>
2	Childbirth	<p> “parturition”[MeSH] OR “Delivery, Obstetric”[MeSH] OR “Perinatal Care”[MeSH] OR “Pregnancy Outcome”[MeSH] OR “Pregnancy Complications”[MeSH] OR “Labor, Obstetric”[MeSH] OR “Obstetrics”[MeSH] OR “Postpartum Period”[MeSH] OR “Maternal </p>

1		Health Services"[MeSH] OR "Women's Health Services"[Mesh] OR "Reproductive Health
2		Services"[Mesh] OR "Pregnant Women"[Mesh] OR "Pregnancy"[Mesh] OR "Maternal
3		Death"[Mesh] OR "Maternal-Fetal Relations"[Mesh] OR "Maternal Exposure"[Mesh] OR
4		"Maternal Mortality"[Mesh] OR "Maternal Behavior"[Mesh] OR "pregnant"[TIAB] OR
5		"pregnancy"[TIAB] OR "Maternity"[TIAB] OR "perinatal"[TIAB] OR "peri-natal"[TIAB] OR
6		"peri natal"[TIAB] OR "Postnatal"[TIAB] OR "post natal"[TIAB] OR "post-natal"[TIAB] OR
7		"ante natal"[TIAB] OR "antenatal"[TIAB] OR "ante-natal"[TIAB] OR "Postpartum"[TIAB]
8		OR "Post partum"[TIAB] "Post-partum"[TIAB] OR "puerperium"[TIAB] OR "childbirth
9		care"[TIAB] OR "childbirth"[TIAB] OR "birth"[TIAB] OR "intrapartum"[TIAB] OR (labour[TI
10		AND delivery[TI]) OR (labor[TI] AND delivery[TI]) OR "maternal health"[TIAB] OR
11		"maternal and child health"[TIAB] OR "maternity care"[TIAB] OR "c-section"[TIAB] OR
12		"caesarean"[TIAB] OR "cesarean"[TIAB] OR "caesarean section"[TIAB] OR "cesarean
13		section"[TIAB] OR "obstetric surgery"[TIAB] OR "signal functions"[TIAB] OR "obstetric
14		interventions"[TIAB] OR "emergency obstetric care"[TIAB] OR "emergency
15		obstetric"[TIAB] OR "emergency obstetrics"[TIAB] OR "EmOC"[TIAB] OR "emergency
16		newborn care"[TIAB] OR "essential obstetric care"[TIAB] OR "vaginal delivery"[TIAB] OR
17		"home birth"[TIAB] or "home births"[TIAB] OR "delivery"[TIAB] OR "deliveries"[TIAB] or
18		"normal delivery"[TIAB]
19		
20		
21		
22		
23	3	LMIC –
24		Cochrane
25		Filter
26		((((((((Developing Countries[Mesh:noexp] OR Africa[Mesh:noexp] OR Africa,
27		Northern[Mesh:noexp] OR Africa South of the Sahara[Mesh:noexp] OR Africa,
28		Central[Mesh:noexp] OR Africa, Eastern[Mesh:noexp] OR Africa, Southern[Mesh:noexp]
29		OR Africa, Western[Mesh:noexp] OR Asia[Mesh:noexp] OR Asia, Central[Mesh:noexp] OR
30		Asia, Southeastern[Mesh:noexp] OR Asia, Western[Mesh:noexp] OR Caribbean
31		Region[Mesh:noexp] OR West Indies[Mesh:noexp] OR South America[Mesh:noexp] OR
32		Latin America[Mesh:noexp] OR Central America[Mesh:noexp] OR
33		Afghanistan[Mesh:noexp] OR Albania[Mesh:noexp] OR Algeria[Mesh:noexp] OR
34		American Samoa[Mesh:noexp] OR Angola[Mesh:noexp] OR "Antigua and
35		Barbuda"[Mesh:noexp] OR Argentina[Mesh:noexp] OR Armenia[Mesh:noexp] OR
36		Azerbaijan[Mesh:noexp] OR Bahrain[Mesh:noexp] OR Bangladesh[Mesh:noexp] OR
37		Barbados[Mesh:noexp] OR Benin[Mesh:noexp] OR Byelarus[Mesh:noexp] OR
38		Belize[Mesh:noexp] OR Bhutan[Mesh:noexp] OR Bolivia[Mesh:noexp] OR Bosnia-
39		Herzegovina[Mesh:noexp] OR Botswana[Mesh:noexp] OR Brazil[Mesh:noexp] OR
40		Bulgaria[Mesh:noexp] OR Burkina Faso[Mesh:noexp] OR Burundi[Mesh:noexp] OR
41		Cambodia[Mesh:noexp] OR Cameroon[Mesh:noexp] OR Cape Verde[Mesh:noexp] OR
42		Central African Republic[Mesh:noexp] OR Chad[Mesh:noexp] OR Chile[Mesh:noexp] OR
43		China[Mesh:noexp] OR Colombia[Mesh:noexp] OR Comoros[Mesh:noexp] OR
44		Congo[Mesh:noexp] OR Costa Rica[Mesh:noexp] OR Cote d'Ivoire[Mesh:noexp] OR
45		Croatia[Mesh:noexp] OR Cuba[Mesh:noexp] OR Cyprus[Mesh:noexp] OR
46		Czechoslovakia[Mesh:noexp] OR Czech Republic[Mesh:noexp] OR Slovakia[Mesh:noexp]
47		OR Djibouti[Mesh:noexp] OR "Democratic Republic of the Congo"[Mesh:noexp] OR
48		Dominica[Mesh:noexp] OR Dominican Republic[Mesh:noexp] OR East Timor[Mesh:noexp]
49		OR Ecuador[Mesh:noexp] OR Egypt[Mesh:noexp] OR El Salvador[Mesh:noexp] OR
50		Eritrea[Mesh:noexp] OR Estonia[Mesh:noexp] OR Ethiopia[Mesh:noexp] OR
51		Fiji[Mesh:noexp] OR Gabon[Mesh:noexp] OR Gambia[Mesh:noexp] OR "Georgia
52		(Republic)"[Mesh:noexp] OR Ghana[Mesh:noexp] OR Greece[Mesh:noexp] OR
53		Grenada[Mesh:noexp] OR Guatemala[Mesh:noexp] OR Guinea[Mesh:noexp] OR Guinea-
54		Bissau[Mesh:noexp] OR Guam[Mesh:noexp] OR Guyana[Mesh:noexp] OR
55		Haiti[Mesh:noexp] OR Honduras[Mesh:noexp] OR Hungary[Mesh:noexp] OR
56		India[Mesh:noexp] OR Indonesia[Mesh:noexp] OR Iran[Mesh:noexp] OR
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Iraq[Mesh:noexp] OR Jamaica[Mesh:noexp] OR Jordan[Mesh:noexp] OR
 Kazakhstan[Mesh:noexp] OR Kenya[Mesh:noexp] OR Korea[Mesh:noexp] OR
 Kosovo[Mesh:noexp] OR Kyrgyzstan[Mesh:noexp] OR Laos[Mesh:noexp] OR
 Latvia[Mesh:noexp] OR Lebanon[Mesh:noexp] OR Lesotho[Mesh:noexp] OR
 Liberia[Mesh:noexp] OR Libya[Mesh:noexp] OR Lithuania[Mesh:noexp] OR
 Macedonia[Mesh:noexp] OR Madagascar[Mesh:noexp] OR Malaysia[Mesh:noexp] OR
 Malawi[Mesh:noexp] OR Mali[Mesh:noexp] OR Malta[Mesh:noexp] OR
 Mauritania[Mesh:noexp] OR Mauritius[Mesh:noexp] OR Mexico[Mesh:noexp] OR
 Micronesia[Mesh:noexp] OR Middle East[Mesh:noexp] OR Moldova[Mesh:noexp] OR
 Mongolia[Mesh:noexp] OR Montenegro[Mesh:noexp] OR Morocco[Mesh:noexp] OR
 Mozambique[Mesh:noexp] OR Myanmar[Mesh:noexp] OR Namibia[Mesh:noexp] OR
 Nepal[Mesh:noexp] OR Netherlands Antilles[Mesh:noexp] OR New
 Caledonia[Mesh:noexp] OR Nicaragua[Mesh:noexp] OR Niger[Mesh:noexp] OR
 Nigeria[Mesh:noexp] OR Oman[Mesh:noexp] OR Pakistan[Mesh:noexp] OR
 Palau[Mesh:noexp] OR Panama[Mesh:noexp] OR Papua New Guinea[Mesh:noexp] OR
 Paraguay[Mesh:noexp] OR Peru[Mesh:noexp] OR Philippines[Mesh:noexp] OR
 Poland[Mesh:noexp] OR Portugal[Mesh:noexp] OR Puerto Rico[Mesh:noexp] OR
 Romania[Mesh:noexp] OR Russia[Mesh:noexp] OR "Russia (Pre-1917)"[Mesh:noexp] OR
 Rwanda[Mesh:noexp] OR "Saint Kitts and Nevis"[Mesh:noexp] OR Saint
 Lucia[Mesh:noexp] OR "Saint Vincent and the Grenadines"[Mesh:noexp] OR
 Samoa[Mesh:noexp] OR Saudi Arabia[Mesh:noexp] OR Senegal[Mesh:noexp] OR
 Serbia[Mesh:noexp] OR Montenegro[Mesh:noexp] OR Seychelles[Mesh:noexp] OR Sierra
 Leone[Mesh:noexp] OR Slovenia[Mesh:noexp] OR Sri Lanka[Mesh:noexp] OR
 Somalia[Mesh:noexp] OR South Africa[Mesh:noexp] OR Sudan[Mesh:noexp] OR
 Suriname[Mesh:noexp] OR Swaziland[Mesh:noexp] OR Syria[Mesh:noexp] OR
 Tajikistan[Mesh:noexp] OR Tanzania[Mesh:noexp] OR Thailand[Mesh:noexp] OR
 Togo[Mesh:noexp] OR Tonga[Mesh:noexp] OR "Trinidad and Tobago"[Mesh:noexp] OR
 Tunisia[Mesh:noexp] OR Turkey[Mesh:noexp] OR Turkmenistan[Mesh:noexp] OR
 Uganda[Mesh:noexp] OR Ukraine[Mesh:noexp] OR Uruguay[Mesh:noexp] OR
 USSR[Mesh:noexp] OR Uzbekistan[Mesh:noexp] OR Vanuatu[Mesh:noexp] OR
 Venezuela[Mesh:noexp] OR Vietnam[Mesh:noexp] OR Yemen[Mesh:noexp] OR
 Yugoslavia[Mesh:noexp] OR Zambia[Mesh:noexp] OR Zimbabwe[Mesh:noexp])) OR
 (Macedonia[ot] OR Madagascar[ot] OR Malagasy Republic[ot] OR Malaysia[ot] OR
 Malaya[ot] OR Malay[ot] OR Sabah[ot] OR Sarawak[ot] OR Malawi[ot] OR Nyasaland[ot]
 OR Mali[ot] OR Malta[ot] OR Marshall Islands[ot] OR Mauritania[ot] OR Mauritius[ot] OR
 Agalega Islands[ot] OR Mexico[ot] OR Micronesia[ot] OR Middle East[ot] OR Moldova[ot]
 OR Moldavia[ot] OR Moldovan[ot] OR Mongolia[ot] OR Montenegro[ot] OR Morocco[ot]
 OR Ifni[ot] OR Mozambique[ot] OR Myanmar[ot] OR Myanma[ot] OR Burma[ot] OR
 Namibia[ot] OR Nepal[ot] OR Netherlands Antilles[ot] OR New Caledonia[ot] OR
 Nicaragua[ot] OR Niger[ot] OR Nigeria[ot] OR Northern Mariana Islands[ot] OR Oman[ot]
 OR Muscat[ot] OR Pakistan[ot] OR Palau[ot] OR Palestine[ot] OR Panama[ot] OR
 Paraguay[ot] OR Peru[ot] OR Philippines[ot] OR Philipines[ot] OR Phillipines[ot] OR
 Phillippines[ot] OR Poland[ot] OR Portugal[ot] OR Puerto Rico[ot] OR Romania[ot] OR
 Rumania[ot] OR Roumania[ot] OR Russia[ot] OR Russian[ot] OR Rwanda[ot] OR
 Ruanda[ot] OR Saint Kitts[ot] OR St Kitts[ot] OR Nevis[ot] OR Saint Lucia[ot] OR St
 Lucia[ot] OR Saint Vincent[ot] OR St Vincent[ot] OR Grenadines[ot] OR Samoa[ot] OR
 Samoan Islands[ot] OR Navigator Island[ot] OR Navigator Islands[ot] OR Sao Tome[ot] OR
 Saudi Arabia[ot] OR Senegal[ot] OR Serbia[ot] OR Montenegro[ot] OR Seychelles[ot] OR
 Sierra Leone[ot] OR Slovenia[ot] OR Sri Lanka[ot] OR Ceylon[ot] OR Solomon Islands[ot]

1	OR Somalia[ot] OR Sudan[ot] OR Suriname[ot] OR Surinam[ot] OR Swaziland[ot] OR
2	Syria[ot] OR Tajikistan[ot] OR Tadzhiestan[ot] OR Tadjikistan[ot] OR Tadzhi[ot] OR
3	Tanzania[ot] OR Thailand[ot] OR Togo[ot] OR Togolese Republic[ot] OR Tonga[ot] OR
4	Trinidad[ot] OR Tobago[ot] OR Tunisia[ot] OR Turkey[ot] OR Turkmenistan[ot] OR
5	Turkmen[ot] OR Uganda[ot] OR Ukraine[ot] OR Uruguay[ot] OR USSR[ot] OR Soviet
6	Union[ot] OR Union of Soviet Socialist Republics[ot] OR Uzbekistan[ot] OR Uzbek OR
7	Vanuatu[ot] OR New Hebrides[ot] OR Venezuela[ot] OR Vietnam[ot] OR Viet Nam[ot] OR
8	West Bank[ot] OR Yemen[ot] OR Yugoslavia[ot] OR Zambia[ot] OR Zimbabwe[ot] OR
9	Rhodesia[ot])) OR (Africa[ot] OR Asia[ot] OR Caribbean[ot] OR West Indies[ot] OR South
10	America[ot] OR Latin America[ot] OR Central America[ot] OR Afghanistan[ot] OR
11	Albania[ot] OR Algeria[ot] OR Angola[ot] OR Antigua[ot] OR Barbuda[ot] OR Argentina[ot]
12	OR Armenia[ot] OR Armenian[ot] OR Aruba[ot] OR Azerbaijan[ot] OR Bahrain[ot] OR
13	Bangladesh[ot] OR Barbados[ot] OR Benin[ot] OR Byelarus[ot] OR Byelorussian[ot] OR
14	Belarus[ot] OR Belorussian[ot] OR Belorussia[ot] OR Belize[ot] OR Bhutan[ot] OR
15	Bolivia[ot] OR Bosnia[ot] OR Herzegovina[ot] OR Hercegovina[ot] OR Botswana[ot] OR
16	Brasil[ot] OR Brazil[ot] OR Bulgaria[ot] OR Burkina Faso[ot] OR Burkina Fasso[ot] OR
17	Upper Volta[ot] OR Burundi[ot] OR Urundi[ot] OR Cambodia[ot] OR Khmer Republic[ot]
18	OR Kampuchea[ot] OR Cameroon[ot] OR Cameroons[ot] OR Cameron[ot] OR
19	Camerons[ot] OR Cape Verde[ot] OR Central African Republic[ot] OR Chad[ot] OR
20	Chile[ot] OR China[ot] OR Colombia[ot] OR Comoros[ot] OR Comoro Islands[ot] OR
21	Comores[ot] OR Mayotte[ot] OR Congo[ot] OR Zaire[ot] OR Costa Rica[ot] OR Cote
22	d'Ivoire[ot] OR Ivory Coast[ot] OR Croatia[ot] OR Cuba[ot] OR Cyprus[ot] OR
23	Czechoslovakia[ot] OR Czech Republic[ot] OR Slovakia[ot] OR Slovak Republic[ot] OR
24	Djibouti[ot] OR French Somaliland[ot] OR Dominica[ot] OR Dominican Republic[ot] OR
25	East Timor[ot] OR East Timur[ot] OR Timor Leste[ot] OR Ecuador[ot] OR Egypt[ot] OR
26	United Arab Republic[ot] OR El Salvador[ot] OR Eritrea[ot] OR Estonia[ot] OR Ethiopia[ot]
27	OR Fiji[ot] OR Gabon[ot] OR Gabonese Republic[ot] OR Gambia[ot] OR Gaza[ot] OR
28	"Georgia Republic"[ot] OR "Georgian Republic"[ot] OR Ghana[ot] OR Gold Coast[ot] OR
29	Greece[ot] OR Grenada[ot] OR Guatemala[ot] OR Guinea[ot] OR Guam[ot] OR Guiana[ot]
30	OR Guyana[ot] OR Haiti[ot] OR Honduras[ot] OR Hungary[ot] OR India[ot] OR
31	Maldives[ot] OR Indonesia[ot] OR Iran[ot] OR Iraq[ot] OR Isle of Man[ot] OR Jamaica[ot]
32	OR Jordan[ot] OR Kazakhstan[ot] OR Kazakh[ot] OR Kenya[ot] OR Kiribati[ot] OR Korea[ot]
33	OR Kosovo[ot] OR Kyrgyzstan[ot] OR Kirghizia[ot] OR Kyrgyz Republic[ot] OR Kirghiz[ot]
34	OR Kirgizstan[ot] OR "Lao PDR"[ot] OR Laos[ot] OR Latvia[ot] OR Lebanon[ot] OR
35	Lesotho[ot] OR Basutoland[ot] OR Liberia[ot] OR Libya[ot] OR Lithuania[ot])) OR
36	(Macedonia[tiab] OR Madagascar[tiab] OR Malagasy Republic[tiab] OR Malaysia[tiab] OR
37	Malaya[tiab] OR Malay[tiab] OR Sabah[tiab] OR Sarawak[tiab] OR Malawi[tiab] OR
38	Nyasaland[tiab] OR Mali[tiab] OR Malta[tiab] OR Marshall Islands[tiab] OR
39	Mauritania[tiab] OR Mauritius[tiab] OR Agalega Islands[tiab] OR Mexico[tiab] OR
40	Micronesia[tiab] OR Middle East[tiab] OR Moldova[tiab] OR Moldovia[tiab] OR
41	Moldovian[tiab] OR Mongolia[tiab] OR Montenegro[tiab] OR Morocco[tiab] OR Ifni[tiab]
42	OR Mozambique[tiab] OR Myanmar[tiab] OR Myanma[tiab] OR Burma[tiab] OR
43	Namibia[tiab] OR Nepal[tiab] OR Netherlands Antilles[tiab] OR New Caledonia[tiab] OR
44	Nicaragua[tiab] OR Niger[tiab] OR Nigeria[tiab] OR Northern Mariana Islands[tiab] OR
45	Oman[tiab] OR Muscat[tiab] OR Pakistan[tiab] OR Palau[tiab] OR Palestine[tiab] OR
46	Panama[tiab] OR Paraguay[tiab] OR Peru[tiab] OR Philippines[tiab] OR Philipines[tiab] OR
47	Phillipines[tiab] OR Phillippines[tiab] OR Poland[tiab] OR Portugal[tiab] OR Puerto
48	Rico[tiab] OR Romania[tiab] OR Rumania[tiab] OR Roumania[tiab] OR Russia[tiab] OR
49	Russian[tiab] OR Rwanda[tiab] OR Ruanda[tiab] OR Saint Kitts[tiab] OR St Kitts[tiab] OR
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Nevis[tiab] OR Saint Lucia[tiab] OR St Lucia[tiab] OR Saint Vincent[tiab] OR St Vincent[tiab] OR Grenadines[tiab] OR Samoa[tiab] OR Samoan Islands[tiab] OR Navigator Island[tiab] OR Navigator Islands[tiab] OR Sao Tome[tiab] OR Saudi Arabia[tiab] OR Senegal[tiab] OR Serbia[tiab] OR Montenegro[tiab] OR Seychelles[tiab] OR Sierra Leone[tiab] OR Slovenia[tiab] OR Sri Lanka[tiab] OR Ceylon[tiab] OR Solomon Islands[tiab] OR Somalia[tiab] OR Sudan[tiab] OR Suriname[tiab] OR Surinam[tiab] OR Swaziland[tiab] OR Syria[tiab] OR Tajikistan[tiab] OR Tadzhikistan[tiab] OR Tadjikistan[tiab] OR Tadjik[tiab] OR Tanzania[tiab] OR Thailand[tiab] OR Togo[tiab] OR Togolese Republic[tiab] OR Tonga[tiab] OR Trinidad[tiab] OR Tobago[tiab] OR Tunisia[tiab] OR Turkey[tiab] OR Turkmenistan[tiab] OR Turkmen[tiab] OR Uganda[tiab] OR Ukraine[tiab] OR Uruguay[tiab] OR USSR[tiab] OR Soviet Union[tiab] OR Union of Soviet Socialist Republics[tiab] OR Uzbekistan[tiab] OR Uzbek OR Vanuatu[tiab] OR New Hebrides[tiab] OR Venezuela[tiab] OR Vietnam[tiab] OR Viet Nam[tiab] OR West Bank[tiab] OR Yemen[tiab] OR Yugoslavia[tiab] OR Zambia[tiab] OR Zimbabwe[tiab] OR Rhodesia[tiab])) OR (Africa[tiab] OR Asia[tiab] OR Caribbean[tiab] OR West Indies[tiab] OR South America[tiab] OR Latin America[tiab] OR Central America[tiab] OR Afghanistan[tiab] OR Albania[tiab] OR Algeria[tiab] OR Angola[tiab] OR Antigua[tiab] OR Barbuda[tiab] OR Argentina[tiab] OR Armenia[tiab] OR Armenian[tiab] OR Aruba[tiab] OR Azerbaijan[tiab] OR Bahrain[tiab] OR Bangladesh[tiab] OR Barbados[tiab] OR Benin[tiab] OR Byelarus[tiab] OR Byelorussian[tiab] OR Belarus[tiab] OR Belorussian[tiab] OR Belorussia[tiab] OR Belize[tiab] OR Bhutan[tiab] OR Bolivia[tiab] OR Bosnia[tiab] OR Herzegovina[tiab] OR Hercegovina[tiab] OR Botswana[tiab] OR Brasil[tiab] OR Brazil[tiab] OR Bulgaria[tiab] OR Burkina Faso[tiab] OR Burkina Fasso[tiab] OR Upper Volta[tiab] OR Burundi[tiab] OR Urundi[tiab] OR Cambodia[tiab] OR Khmer Republic[tiab] OR Kampuchea[tiab] OR Cameroon[tiab] OR Cameroons[tiab] OR Cameron[tiab] OR Camerons[tiab] OR Cape Verde[tiab] OR Central African Republic[tiab] OR Chad[tiab] OR Chile[tiab] OR China[tiab] OR Colombia[tiab] OR Comoros[tiab] OR Comoro Islands[tiab] OR Comores[tiab] OR Mayotte[tiab] OR Congo[tiab] OR Zaire[tiab] OR Costa Rica[tiab] OR Cote d'Ivoire[tiab] OR Ivory Coast[tiab] OR Croatia[tiab] OR Cuba[tiab] OR Cyprus[tiab] OR Czechoslovakia[tiab] OR Czech Republic[tiab] OR Slovakia[tiab] OR Slovak Republic[tiab] OR Djibouti[tiab] OR French Somaliland[tiab] OR Dominica[tiab] OR Dominican Republic[tiab] OR East Timor[tiab] OR East Timur[tiab] OR Timor Leste[tiab] OR Ecuador[tiab] OR Egypt[tiab] OR United Arab Republic[tiab] OR El Salvador[tiab] OR Eritrea[tiab] OR Estonia[tiab] OR Ethiopia[tiab] OR Fiji[tiab] OR Gabon[tiab] OR Gabonese Republic[tiab] OR Gambia[tiab] OR Gaza[tiab] OR Georgia Republic[tiab] OR Georgian Republic[tiab] OR Ghana[tiab] OR Gold Coast[tiab] OR Greece[tiab] OR Grenada[tiab] OR Guatemala[tiab] OR Guinea[tiab] OR Guam[tiab] OR Guiana[tiab] OR Guyana[tiab] OR Haiti[tiab] OR Honduras[tiab] OR Hungary[tiab] OR India[tiab] OR Maldives[tiab] OR Indonesia[tiab] OR Iran[tiab] OR Iraq[tiab] OR Isle of Man[tiab] OR Jamaica[tiab] OR Jordan[tiab] OR Kazakhstan[tiab] OR Kazakh[tiab] OR Kenya[tiab] OR Kiribati[tiab] OR Korea[tiab] OR Kosovo[tiab] OR Kyrgyzstan[tiab] OR Kirghizia[tiab] OR Kyrgyz Republic[tiab] OR Kirghiz[tiab] OR Kirgizstan[tiab] OR "Lao PDR"[tiab] OR Laos[tiab] OR Latvia[tiab] OR Lebanon[tiab] OR Lesotho[tiab] OR Basutoland[tiab] OR Liberia[tiab] OR Libya[tiab] OR Lithuania[tiab])) OR (Macedonia[pl] OR Madagascar[pl] OR Malagasy Republic[pl] OR Malaysia[pl] OR Malaya[pl] OR Malay[pl] OR Sabah[pl] OR Sarawak[pl] OR Malawi[pl] OR Nyasaland[pl] OR Mali[pl] OR Malta[pl] OR Marshall Islands[pl] OR Mauritania[pl] OR Mauritius[pl] OR Agalega Islands[pl] OR Mexico[pl] OR Micronesia[pl] OR Middle East[pl] OR Moldova[pl] OR Moldovia[pl] OR Moldovian[pl] OR Mongolia[pl] OR Montenegro[pl] OR Morocco[pl] OR Ifni[pl] OR Mozambique[pl] OR Myanmar[pl] OR Myanma[pl] OR Burma[pl] OR

1		Namibia[pl] OR Nepal[pl] OR Netherlands Antilles[pl] OR New Caledonia[pl] OR
2		Nicaragua[pl] OR Niger[pl] OR Nigeria[pl] OR Northern Mariana Islands[pl] OR Oman[pl]
3		OR Muscat[pl] OR Pakistan[pl] OR Palau[pl] OR Palestine[pl] OR Panama[pl] OR
4		Paraguay[pl] OR Peru[pl] OR Philippines[pl] OR Philipines[pl] OR Phillipines[pl] OR
5		Phillippines[pl] OR Poland[pl] OR Portugal[pl] OR Puerto Rico[pl] OR Romania[pl] OR
6		Rumania[pl] OR Roumania[pl] OR Russia[pl] OR Russian[pl] OR Rwanda[pl] OR Ruanda[pl]
7		OR Saint Kitts[pl] OR St Kitts[pl] OR Nevis[pl] OR Saint Lucia[pl] OR St Lucia[pl] OR Saint
8		Vincent[pl] OR St Vincent[pl] OR Grenadines[pl] OR Samoa[pl] OR Samoan Islands[pl] OR
9		Navigator Island[pl] OR Navigator Islands[pl] OR Sao Tome[pl] OR Saudi Arabia[pl] OR
10		Senegal[pl] OR Serbia[pl] OR Montenegro[pl] OR Seychelles[pl] OR Sierra Leone[pl] OR
11		Slovenia[pl] OR Sri Lanka[pl] OR Ceylon[pl] OR Solomon Islands[pl] OR Somalia[pl] OR
12		South Africa[pl] OR Sudan[pl] OR Suriname[pl] OR Surinam[pl] OR Swaziland[pl] OR
13		Syria[pl] OR Tajikistan[pl] OR Tadzhikistan[pl] OR Tadjikistan[pl] OR Tadjhik[pl] OR
14		Tanzania[pl] OR Thailand[pl] OR Togo[pl] OR Togolese Republic[pl] OR Tonga[pl] OR
15		Trinidad[pl] OR Tobago[pl] OR Tunisia[pl] OR Turkey[pl] OR Turkmenistan[pl] OR
16		Turkmen[pl] OR Uganda[pl] OR Ukraine[pl] OR Uruguay[pl] OR USSR[pl] OR Soviet
17		Union[pl] OR Union of Soviet Socialist Republics[pl] OR Uzbekistan[pl] OR Uzbek OR
18		Vanuatu[pl] OR New Hebrides[pl] OR Venezuela[pl] OR Vietnam[pl] OR Viet Nam[pl] OR
19		West Bank[pl] OR Yemen[pl] OR Yugoslavia[pl] OR Zambia[pl] OR Zimbabwe[pl] OR
20		Rhodesia[pl])) OR (Africa[pl] OR Asia[pl] OR Caribbean[pl] OR West Indies[pl] OR South
21		America[pl] OR Latin America[pl] OR Central America[pl] OR Afghanistan[pl] OR
22		Albania[pl] OR Algeria[pl] OR Angola[pl] OR Antigua[pl] OR Barbuda[pl] OR Argentina[pl]
23		OR Armenia[pl] OR Armenian[pl] OR Aruba[pl] OR Azerbaijan[pl] OR Bahrain[pl] OR
24		Bangladesh[pl] OR Barbados[pl] OR Benin[pl] OR Byelarus[pl] OR Byelorussian[pl] OR
25		Belarus[pl] OR Belorussian[pl] OR Belorussia[pl] OR Belize[pl] OR Bhutan[pl] OR Bolivia[pl]
26		OR Bosnia[pl] OR Herzegovina[pl] OR Hercegovina[pl] OR Botswana[pl] OR Brasil[pl] OR
27		Brazil[pl] OR Bulgaria[pl] OR Burkina Faso[pl] OR Burkina Fasso[pl] OR Upper Volta[pl] OR
28		Burundi[pl] OR Urundi[pl] OR Cambodia[pl] OR Khmer Republic[pl] OR Kampuchea[pl] OR
29		Cameroon[pl] OR Cameroons[pl] OR Cameron[pl] OR Camerons[pl] OR Cape Verde[pl] OR
30		Central African Republic[pl] OR Chad[pl] OR Chile[pl] OR China[pl] OR Colombia[pl] OR
31		Comoros[pl] OR Comoro Islands[pl] OR Comores[pl] OR Mayotte[pl] OR Congo[pl] OR
32		Zaire[pl] OR Costa Rica[pl] OR Cote d'Ivoire[pl] OR Ivory Coast[pl] OR Croatia[pl] OR
33		Cuba[pl] OR Cyprus[pl] OR Czechoslovakia[pl] OR Czech Republic[pl] OR Slovakia[pl] OR
34		Slovak Republic[pl] OR Djibouti[pl] OR French Somaliland[pl] OR Dominica[pl] OR
35		Dominican Republic[pl] OR East Timor[pl] OR East Timur[pl] OR Timor Leste[pl] OR
36		Ecuador[pl] OR Egypt[pl] OR United Arab Republic[pl] OR El Salvador[pl] OR Eritrea[pl] OR
37		Estonia[pl] OR Ethiopia[pl] OR Fiji[pl] OR Gabon[pl] OR Gabonese Republic[pl] OR
38		Gambia[pl] OR Gaza[pl] OR Georgia Republic[pl] OR Georgian Republic[pl] OR Ghana[pl]
39		OR Gold Coast[pl] OR Greece[pl] OR Grenada[pl] OR Guatemala[pl] OR Guinea[pl] OR
40		Guam[pl] OR Guiana[pl] OR Guyana[pl] OR Haiti[pl] OR Honduras[pl] OR Hungary[pl] OR
41		India[pl] OR Maldives[pl] OR Indonesia[pl] OR Iran[pl] OR Iraq[pl] OR Isle of Man[pl] OR
42		Jamaica[pl] OR Jordan[pl] OR Kazakhstan[pl] OR Kazakh[pl] OR Kenya[pl] OR Kiribati[pl]
43		OR Korea[pl] OR Kosovo[pl] OR Kyrgyzstan[pl] OR Kirghizia[pl] OR Kyrgyz Republic[pl] OR
44		Kirghiz[pl] OR Kirgizstan[pl] OR "Lao PDR"[pl] OR Laos[pl] OR Latvia[pl] OR Lebanon[pl] OR
45		Lesotho[pl] OR Basutoland[pl] OR Liberia[pl] OR Libya[pl] OR Lithuania[pl])) OR
46		("developing country"[ot] OR "developing countries"[ot] OR "developing nation"[ot] OR
47		"developing nations"[ot] OR "developing population"[ot] OR "developing populations"[ot]
48		OR "developing world"[ot] OR "less developed country"[ot] OR "less developed
49		countries"[ot] OR "less developed nation"[ot] OR "less developed nations"[ot] OR "less
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4	1 AND 2 AND 3 AND Filter: Publication date from 2000/01/01 to 2015/12/31

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page Number(s)
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	Page 1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not applicable
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Page 1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Page 9
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Not applicable
Support:			
Sources	5a	Indicate sources of financial or other support for the review	Page 9
Sponsor	5b	Provide name for the review funder and/or sponsor	Page 9
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Page 9
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	Page 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Page 5-6
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Page 5-7
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	Page 7
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Additional File 1.doc

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Page 8
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Page 8
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Page 8
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Page 8
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Page 8
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Page 8
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Not applicable
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	Not applicable
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Page 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Page 8

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

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Protocol for a scoping review to identify and map the global health personnel considered skilled attendants at birth in low-and-middle income countries between 2000 – 2015

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Protocol for a scoping review to identify and map the global health personnel considered skilled attendants at birth in low-and-middle income countries between 2000 – 2015

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Keywords: health personnel; maternal health; newborn health; intrapartum; health workforce

ABSTRACT

Introduction: Despite progress towards the Millennium Development Goals (MDG), maternal mortality remains high in countries where there are shortages of skilled personnel able to manage and provide quality care during pregnancy and childbirth. The “percentage of births attended by skilled health personnel” (SAB) was a key indicator for tracking progress since the MDGs and is part of the Sustainable Development Goal (SDG) agenda. However, due to contextual differences between and within countries on the definition of SAB, a lack of clarity exists around the training, competencies, and skills they are qualified to perform. In this paper, we outline a scoping review protocol that poses to identify and map the health personnel considered SAB in low-to-middle-income-countries (LMIC).

Methods and analysis: A search will be conducted for the years 2000 to 2015 in PubMed/MEDLINE, EMBASE, CINAHL Complete, Cochrane Database of Systematic Reviews, POPLINE and the World Health Organization Global Health Library. A manual search of reference lists from identified studies or systematic reviews and a hand search of the literature from international partner organizations will be done. Original studies conducted in LMIC that assessed health personnel (paid or voluntary) providing interventions during the intrapartum period will be considered for inclusion.

Ethics and dissemination: A scoping review is a secondary analysis of published literature and does not require ethics approval. This scoping review proposes to synthesize data on the training, competency, and skills of identified SAB and expands on other efforts to describe this global health workforce. The results will inform recommendations around improved coverage measurement and reporting of SAB moving forward, allowing for more accurate, consistent, and timely data able to guide decisions and action around planning and implementation of maternal and newborn health programs globally. Data will be disseminated through a peer-reviewed manuscript, conferences, and to key stakeholders within international organizations.

Word count: 300

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STRENGTHS AND LIMITATIONS OF THIS STUDY

- This scoping review proposes to identify and map the global health workforce considered skilled attendants at birth (SAB) in low-to-middle income countries. No other review has assessed SAB on a global scale.
- The identified cadres considered SAB will be compared against internationally agreed upon criteria as proposed in the 2004 WHO/ICM/FIGO joint statement on the skilled attendant
- The search strategy is broad and comprehensive, including 11 global electronic databases spanning both peer-reviewed and grey literature and does not have language restrictions.
- Due to the broad nature of this review and inherent heterogeneity of data between and within countries, the final data extraction sheet and analysis plan are unable to be defined until after the review is completed.

INTRODUCTION

Despite progress towards Millennium Development Goal (MDG) 4 and Goal 5 which aimed to reduce maternal and child health and survival [1], mortality rates remain high in low- and middle-income countries (LMIC) where there are critical shortages of health personnel who are able to adequately manage and provide quality care during pregnancy and childbirth [2-4]. The Sustainable Development Goal (SDG) agenda highlights the importance of continued momentum towards improving maternal and newborn health by setting, under the SDG goal 3, targets for achieving a global maternal mortality ratio of less than 70 maternal deaths per 100,000 live births, and aiming for all countries to reduce neonatal mortality to at least as low as 12 per 1,000 live births by 2030 [5, 6].

A key progress indicator that is included in the SDG Framework is the “percentage of births delivered by skilled attendant at birth” (SDG Indicator 3.1.2) [6, 7]. It has also been identified as a core coverage indicator by other global monitoring frameworks, such as the Global Strategy for Women’s, Adolescent’s, and Children’s Health [8], Ending Preventable Maternal Mortality (EPMM) initiative [9] and Every Newborn Action Plan (ENAP) [10]. According to the 2004 joint statement by the World Health Organization (WHO), the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO), a skilled attendant at birth (SAB) is defined as: “A midwife, doctor or nurse — who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns” [11].

Despite guidance from the 2004 WHO/FIGO/ICM joint statement on the definition of a skilled attendant and its core functions, actual reporting at country level is challenged by lack of clear guidance on measurement standards, heterogeneity in the use of terminology and cadre functions [12, 13]. Many countries have attempted to improve maternal health and survival through task-shifting, by increasing the proportion of births attended by skilled health personnel through training lower-level cadre, or creating new cadres able to provide pregnancy and childbirth care [14]. However, the content and requirements of training programs may not be standardized, evaluated, or publically available. Even when there are practice standards and/or guidelines in place, many countries may lack the capacity and infrastructure needed to adhere to current recommendations for training and education. Thus, there may be confusion over what a SAB is, what they should be able to perform, how they should be trained, and what systems should be in place in order to support them [15].

The skill level and competencies of cadres may vary, and many cadres that are currently considered 'skilled' may not actually meet the internationally agreed upon definition and criteria set in the 2004 WHO/FIGO/ICM joint statement [12, 15]. The inclusion of additional country-level health personnel as skilled in global monitoring frameworks, without verification of training and capabilities, coupled with contextual differences between and within countries on the definition of what constitutes a SAB complicates the accuracy, comparability, and consistency for continued measurement of SAB moving forward.

The aim of this scoping review is to identify and map the training, education, skill set, and/or competency of the various cadres of health personnel that provided pregnancy and childbirth care in LMIC during 2000 – 2015. To our knowledge, no other review has been conducted on this topic previously in the published literature. This information will support the refinement of the definition of what constitutes a SAB in order to harmonize and improve the measurement around the global monitoring of SAB coverage and progress of the SDG targets set for 2030 [6].

METHODS AND ANALYSIS

Study Design

The study methods are based on frameworks developed for the design and conduct of systematic scoping reviews [16-19]. Due to the broad and vast scope of our topic, a scoping review design was chosen in order to identify and map the existing literature. This protocol is conducted in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols (PRISMA-P) guidelines [20]. The final scoping review will follow the PRISMA reporting guidelines for systematic reviews [21].

Research Questions

The objectives of our study are to identify and map cadres considered SAB in relation to education, training, accreditation, certification, legislation, skills/competency; and/or continuing education requirements in LMIC. The following protocol for a scoping review poses to address the following questions:

1. Who are the cadre of health personnel that are reported as ‘skilled attendants at birth’ as defined by the 2004 WHO/FIGO/ICM joint statement [11] in LMIC?
2. How do these identified cadres differ between and within county in terms of the following?
 - a. Curriculum, duration of training and/or education requirements obtained to be qualified;
 - b. Regulation, accreditation, and/or certification by a professional organization;
 - c. Skills and competency that each cadre are able to perform (i.e. signal functions and/or other key interventions required for the management of childbirth);
 - d. Legislation to perform these signal functions and/or interventions;
 - e. Location of work (urban / rural, hospital / health centre / community-based); and
 - f. Continuing education requirements (curriculum, duration, frequency).

Inclusion Criteria

The aforementioned research questions will be assessed and studies will be selected specific to the following Population, Concept, Study Design and Context criteria presented in Table 1.

Table 1: Inclusion criteria for identifying eligible studies

Inclusion Criteria	
Population	Any health personnel (paid or voluntary) who provide health services within the provision of maternal and newborn health care during pregnancy and childbirth
Concept	Mapping of the health personnel according to education / training received; accreditation or certification; legislation, skills / competency; and/or continuing education requirements.
Study Design	Primary source research of any study design conducted on human subjects (observational studies including prospective or retrospective cohort, case control, and case series; and quasi-experimental; experimental, randomized control trials; and qualitative study designs).
Context	Low- and upper-middle-income countries with health facility and/or community-based services offering pregnancy and childbirth care.

All primary source study designs reporting on original human studies research will be included if it provides or compares the education and/or training received, accreditation or certification requirements, legislation, skills, and/or competencies of the health personnel in order to be considered skilled attendants (paid or voluntary) who provide interventions related to the delivery of maternal and newborn health during pregnancy and childbirth (intrapartum). Secondary source data including systematic reviews and other study designs such as case reports, commentaries, editorials, letters, or other opinion pieces will be excluded. Research articles reporting on health personnel providing pregnancy and childbirth care will be included regardless of if the cadre are formally regulated as SAB within a country and/or if they are legislated or not to perform key health interventions. The cadre included will be compared to the 2004 WHO/FIGO/ICM joint statement in order to assess whether the cadre is considered skilled against the internationally agreed upon standard definition of a skilled attendant [11]. Studies published inclusive of all languages, any study design, and between the years 2000 to 2015 in LMIC countries will be considered eligible for inclusion.

Exclusion Criteria

Articles will be not be eligible for inclusion in the scoping review if:

1. There is no mention of the individual health personnel (cadre name) that are considered skilled attendants, providing maternal and newborn care during childbirth; and
2. There are no details of at least one of the following key concepts:

- a. Education and/or training requirements that the cadre has received to be considered a skilled attendant;
- b. If the cadre is formally accredited / certified within standard criteria set by the country;
- c. Legislation or regulatory requirements; and/or
- d. Specific skills or key interventions / signal functions that the cadre is able to perform, regardless of whether they are legislated or authorised.

Personnel who provide supportive care during labour to the woman or act as a birth assistant, such as e.g. doulas, will not be considered skilled attendants for inclusion in this review.

Any study designs evaluating or comparing interventional training programmes will be excluded as the intent of our review is to map the training received by the cadre, not the content of new or existing training programs.

A manual mapping of the cadres considered SAB within nationally representative household coverage surveys has been previously conducted by reviewing the Demographic Health Surveys (DHS) [22] and Multiple Indicator Cluster Surveys (MICS) [23] as part of a harmonized UNICEF and WHO joint database on skilled attendants at birth [24] and has been conducted previously [25]. Thus, studies that are a re-analysis of data from DHS or MICS will also be excluded.

Search Strategy

The search strategy will be conducted for all relevant existing literature without language restrictions based on search terms relating to the research questions restricted to the years 2000-2015, using the following online bibliographic databases: PubMed/MEDLINE, EMBASE, CINAHL Complete, the Cochrane Database of Systematic Reviews, POLINE, and the World Health Organization (WHO) Global Health Library (GHL). The WHO GHL contains the following databases: African Index Medicus (AIM/AFRO); Latin American and Caribbean Health Sciences Information (LILACS/AMRO/PAHO); Index Medicus for the Eastern Mediterranean Region (IMEMR/IMRO); the West Pacific Index Medicus (WPIM/WPRO); Index Medicus for the South-East Asian Region (IMSEAR/SEARO) and the World Health Organization Library (WHOLIS).

A manual search of the reference lists of all identified studies or systematic reviews as well as a hand search of the literature from global initiatives for additional data, including UNFPA, WHO, and United Nations Children's Fund (UNICEF), will be done. In order to address which cadres are considered skilled attendants at birth worldwide and what skills they possess, how they are trained, and how to best support these cadres a search was conducted with specific terms and MESH headings. An example of the full electronic search strategy to be conducted in PubMed/MEDLINE is outlined in **Additional File 1**.

Study Selection

Following the aforementioned comprehensive search strategy, article titles and abstracts will be screened and eligibility for inclusion assessed independently by three reviewers (AJH, ABM, and LCV). Agreement regarding the identified abstracts will be quantified using the κ statistic [26] and disagreement resolved by an additional reviewer (DC).

Screened abstracts identified for inclusion will undergo an independent full-text review by three reviewers (AJH, ABM, and LCV). Identified non-English language full-text articles will be screened by native/advanced speakers to assess whether they meet our criteria for inclusion. Full text articles that have been excluded at the screening stage will have reasons for exclusion documented. The final chosen full-text studies will again be compared between the reviewers with disagreement being resolved by mutual consensus and with input from all co-authors. Those studies that do not meet the above criteria will be disqualified and removed from consideration. Authors from studies with unavailable or unclear data will be contacted to determine their eligibility for inclusion.

Data Extraction and Analysis

Data will be extracted from full-text journal articles, reports, and other literature, which meets the inclusion criteria as outlined above. Data will be extracted using a Microsoft Excel database. Information retrieved will include study characteristics (country, region, years assessed, study objectives, methodology, and study design). Details about the cadres identified including cadre name, if they are considered skilled (yes or no), education requirements (entry requirements, duration, content), continuing education (duration, content, frequency), ability to perform signal functions and/or other childbirth interventions (yes or no), number of normal or complicated deliveries performed over a defined time period, and if there are any regulatory bodies or legislation (yes or no) for the cadre named.

Data extracted regarding signal functions will include the seven basic and nine comprehensive services for emergency obstetric care as recommended by the WHO [27, 28]. The seven basic signal functions include: 1) administration of intravenous/intramuscular antibiotics; 2) administration of intravenous/intramuscular uterotonic drugs (i.e. oxytocin); 3) administration of intravenous/intramuscular anticonvulsants; 4) manual removal of the placenta; 5) removal of retained products of conception; 6) perform assisted vaginal delivery; and 7) perform basic neonatal resuscitation [27, 28]. The two additional signal functions that comprise comprehensive services include: 8) perform cesarean section; and 9) perform blood transfusion [27, 28].

The data extraction form will contain additional fields to allow flexibility for the emergence of other themes and/or categories, which will be discussed and developed via consensus from all co-authors. Resultantly, the final data extraction sheet and analysis plan are unable to be finalized until after the review is completed. Documentation of all studies that are not to be included in the data extraction, as per consensus by reviewers, will be listed in a separate sheet for tracking purposes. Abstracted qualitative data will be synthesized using narrative description based on themes identified once the data has been extracted.

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277 Assessment of study quality is not required for scoping reviews [19] and studies will included
278 regardless of study quality.

279
280 **DISSEMINATION AND ETHICS**

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282 To our knowledge, no other published work has systematically synthesized the global health
283 workforce in maternal and newborn care in the context of SAB measurement. We aim to
284 provide a broad and comprehensive review of all available literature with the aim of verifying
285 country-level definitions and functions of SAB in LMIC, specifically related to what their
286 education and training is, what their skills and competencies are and if they are legislated and
287 regulated to perform these functions. It will also identify gaps in the research literature where
288 further academic study is warranted. Once completed, this review will be the foundation for
289 the compilation of a metadata of cadres considered SAB, used to harmonize global
290 measurement of coverage and reporting of this indicator moving forward.

291
292 The results from this study will be disseminated through a peer-reviewed publication and will
293 contain supporting documentation on data compiled and analyzed for the scoping review. Since
294 a scoping review collects and examines data from existing available literature, this study does
295 not require ethics approval.

296
297 **AUTHOR CONTRIBUTIONS**

298 DC is the guarantor of this review. DC, LS and AJH were responsible for the initial conception
299 and design of this study. DC, LS, AJH, ABM, LCV, and AA contributed to the development of the
300 eligibility and data extraction criteria. AJH developed and executed the search strategy. AJH,
301 ABM, LCV, and DC are responsible for abstract and full text screening. AJH drafted and revised
302 the manuscript. DC, LS, AJH, ABM, LCV, and AA contributed and approved the final version of
303 this protocol.

304
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311
312 **COMPETING INTERESTS STATEMENT**

313 None declared. The authors alone are responsible for the views expressed in this article and
314 they do not necessarily represent the views, decisions or policies of the funding bodies or
315 institutions with which they are affiliated.

316
317 **DATA SHARING STATEMENT**

318 The final publication will contain supporting documentation on data compiled and analyzed for
319 the scoping review. The data will be made available via supplementary materials included in the
320 published article.
321

For peer review only

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ADDITIONAL FILE 1: Skilled Attendance at Birth Scoping Review Search Strategy

Pubmed / MEDLINE Search

#	Section	Search Terms
1	Cadre Name	"Health Personnel"[MeSH] OR Midwifery[MeSH] OR Obstetric Nursing[MeSH] OR "Professional Practice"[MeSH] OR "Emergency Responders"[MeSH] OR "Health Occupations"[Mesh] OR "Allied Health Occupations"[Mesh] OR "Students, Health Occupations"[Mesh] OR "Schools, Health Occupations"[Mesh] OR "Health Manpower"[Mesh] OR "health auxiliary"[TIAB] OR "health care manpower"[TIAB] OR "hospital personnel"[TIAB] OR "medical personnel"[TIAB] OR "health care personnel"[TIAB] OR "nursing home personnel"[TIAB] OR "paramedical personnel"[TIAB] OR "Health care workers"[TIAB] OR "Health care worker"[TIAB] OR "Medical Staff"[TIAB] OR "medical personnel"[TIAB] OR "General Practitioners"[TIAB] OR "General Practitioner"[TIAB] OR Caregiver*[TIAB] OR Nurses[TIAB] OR Nurse[TIAB] OR Midwife[TIAB] OR midwives[TIAB] OR midwife[TIAB] OR "Nursing Staff"[TIAB] OR "nurse midwife"[TIAB] OR "nurse midwives"[TIAB] OR "nurse-midwife"[TIAB] OR "nurse-midwives"[TIAB] OR auxiliary[TIAB] OR "Medical students"[TIAB] OR "Nursing students"[TIAB] OR (health*[TI] AND worker*[TI]) OR "Community Health Workers"[TIAB] OR "Community Health Worker"[TIAB] OR "Dental Staff"[TIAB] OR doctor[TIAB] OR doctors[TIAB] OR obstetrician[TIAB] OR obstetricians[TIAB] OR "skilled health provider"[TIAB] OR "skilled health providers"[TIAB] OR "skilled attendant"[TIAB] OR "skilled attendants"[TIAB] OR "skilled birth attendant"[TIAB] OR "skilled birth attendants"[TIAB] OR "skilled health"[TIAB] OR "skilled assistance"[TIAB] "skilled assistant"[TIAB] OR "skilled assistants"[TIAB] OR "skilled care"[TIAB] OR "skilled manpower"[TIAB] OR "skilled delivery"[TIAB] OR "skilled staff"[TIAB] OR "skilled person"[TIAB] OR "skilled birth personnel"[TIAB] OR "skilled health workers"[TIAB] OR "skilled health care worker"[TIAB] OR "skilled health care workers"[TIAB] OR "assistance at delivery"[TIAB] OR "assistance at birth"[TIAB] OR "attendant"[TIAB] OR "SAB"[TIAB] OR "SBA"[TIAB] or cadre[TIAB]or cadres[TIAB] OR "health care worker"[TIAB] OR "health care person"[TIAB] OR "health person"[TIAB] OR "health care provider"[TIAB] OR "care provider"[TIAB] OR "care providers"[TIAB] OR "health provider"[TIAB] OR "health providers"[TIAB] OR "health aide"[TIAB] OR "health aides"[TIAB] OR "traditional birth attendant"[TIAB] OR "birth attendant"[TIAB] OR "community birth attendant"[TIAB] OR "health assistant"[TIAB] OR "feldsher"[TIAB] OR "clinical officer"[TIAB] OR "clinical officers"[TIAB] OR "medical officer"[TIAB] OR "medical officers"[TIAB] OR "assistant medical officers"[TIAB] OR "Mother and Child Health Aides"[TIAB] OR "Mother and Child Health Aide"[TIAB] OR "MCHA"[TIAB] OR "mid-level provider"[TIAB] OR "mid-level cadre"[TIAB] OR "mid-level cadres"[TIAB] OR "mid-level healthcare workers"[TIAB] OR "mid-level health care workers"[TIAB] OR "mid-level health workers"[TIAB] OR "community-based skilled birth attendants"[TIAB] OR "community-based skilled birth attendant"[TIAB] OR "community based skilled birth attendants"[TIAB] OR "community based skilled birth attendant"[TIAB] OR "health visitor"[TIAB] or (health*[TI] AND worker*[TI]) OR "fieldworker"[TIAB] OR "task shifting"[TIAB] OR "nonphysicians"[TIAB] OR "non-physician clinicians"[TIAB] OR "non-physician"[TIAB] OR "clinician"[TIAB] OR "clinicians"[TIAB]
2	Childbirth	"parturition"[MeSH] OR "Delivery, Obstetric"[MeSH] OR "Perinatal Care"[MeSH] OR "Pregnancy Outcome"[MeSH] OR "Pregnancy Complications"[MeSH] OR "Labor, Obstetric"[MeSH] OR "Obstetrics"[MeSH] OR "Postpartum Period"[MeSH] OR "Maternal

1		Health Services"[MeSH] OR "Women's Health Services"[Mesh] OR "Reproductive Health
2		Services"[Mesh] OR "Pregnant Women"[Mesh] OR "Pregnancy"[Mesh] OR "Maternal
3		Death"[Mesh] OR "Maternal-Fetal Relations"[Mesh] OR "Maternal Exposure"[Mesh] OR
4		"Maternal Mortality"[Mesh] OR "Maternal Behavior"[Mesh] OR "pregnant"[TIAB] OR
5		"pregnancy"[TIAB] OR "Maternity"[TIAB] OR "perinatal"[TIAB] OR "peri-natal"[TIAB] OR
6		"peri natal"[TIAB] OR "Postnatal"[TIAB] OR "post natal"[TIAB] OR "post-natal"[TIAB] OR
7		"ante natal"[TIAB] OR "antenatal"[TIAB] OR "ante-natal"[TIAB] OR "Postpartum"[TIAB]
8		OR "Post partum"[TIAB] "Post-partum"[TIAB] OR "puerperium"[TIAB] OR "childbirth
9		care"[TIAB] OR "childbirth"[TIAB] OR "birth"[TIAB] OR "intrapartum"[TIAB] OR (labour[TI
10		AND delivery[TI]) OR (labor[TI] AND delivery[TI]) OR "maternal health"[TIAB] OR
11		"maternal and child health"[TIAB] OR "maternity care"[TIAB] OR "c-section"[TIAB] OR
12		"caesarean"[TIAB] OR "cesarean"[TIAB] OR "caesarean section"[TIAB] OR "cesarean
13		section"[TIAB] OR "obstetric surgery"[TIAB] OR "signal functions"[TIAB] OR "obstetric
14		interventions"[TIAB] OR "emergency obstetric care"[TIAB] OR "emergency
15		obstetric"[TIAB] OR "emergency obstetrics"[TIAB] OR "EmOC"[TIAB] OR "emergency
16		newborn care"[TIAB] OR "essential obstetric care"[TIAB] OR "vaginal delivery"[TIAB] OR
17		"home birth"[TIAB] or "home births"[TIAB] OR "delivery"[TIAB] OR "deliveries"[TIAB] or
18		"normal delivery"[TIAB]
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24	Cochrane	Northern[Mesh:noexp] OR Africa South of the Sahara[Mesh:noexp] OR Africa,
25	Filter	Central[Mesh:noexp] OR Africa, Eastern[Mesh:noexp] OR Africa, Southern[Mesh:noexp]
26		OR Africa, Western[Mesh:noexp] OR Asia[Mesh:noexp] OR Asia, Central[Mesh:noexp] OR
27		Asia, Southeastern[Mesh:noexp] OR Asia, Western[Mesh:noexp] OR Caribbean
28		Region[Mesh:noexp] OR West Indies[Mesh:noexp] OR South America[Mesh:noexp] OR
29		Latin America[Mesh:noexp] OR Central America[Mesh:noexp] OR
30		Afghanistan[Mesh:noexp] OR Albania[Mesh:noexp] OR Algeria[Mesh:noexp] OR
31		American Samoa[Mesh:noexp] OR Angola[Mesh:noexp] OR "Antigua and
32		Barbuda"[Mesh:noexp] OR Argentina[Mesh:noexp] OR Armenia[Mesh:noexp] OR
33		Azerbaijan[Mesh:noexp] OR Bahrain[Mesh:noexp] OR Bangladesh[Mesh:noexp] OR
34		Barbados[Mesh:noexp] OR Benin[Mesh:noexp] OR Byelarus[Mesh:noexp] OR
35		Belize[Mesh:noexp] OR Bhutan[Mesh:noexp] OR Bolivia[Mesh:noexp] OR Bosnia-
36		Herzegovina[Mesh:noexp] OR Botswana[Mesh:noexp] OR Brazil[Mesh:noexp] OR
37		Bulgaria[Mesh:noexp] OR Burkina Faso[Mesh:noexp] OR Burundi[Mesh:noexp] OR
38		Cambodia[Mesh:noexp] OR Cameroon[Mesh:noexp] OR Cape Verde[Mesh:noexp] OR
39		Central African Republic[Mesh:noexp] OR Chad[Mesh:noexp] OR Chile[Mesh:noexp] OR
40		China[Mesh:noexp] OR Colombia[Mesh:noexp] OR Comoros[Mesh:noexp] OR
41		Congo[Mesh:noexp] OR Costa Rica[Mesh:noexp] OR Cote d'Ivoire[Mesh:noexp] OR
42		Croatia[Mesh:noexp] OR Cuba[Mesh:noexp] OR Cyprus[Mesh:noexp] OR
43		Czechoslovakia[Mesh:noexp] OR Czech Republic[Mesh:noexp] OR Slovakia[Mesh:noexp]
44		OR Djibouti[Mesh:noexp] OR "Democratic Republic of the Congo"[Mesh:noexp] OR
45		Dominica[Mesh:noexp] OR Dominican Republic[Mesh:noexp] OR East Timor[Mesh:noexp]
46		OR Ecuador[Mesh:noexp] OR Egypt[Mesh:noexp] OR El Salvador[Mesh:noexp] OR
47		Eritrea[Mesh:noexp] OR Estonia[Mesh:noexp] OR Ethiopia[Mesh:noexp] OR
48		Fiji[Mesh:noexp] OR Gabon[Mesh:noexp] OR Gambia[Mesh:noexp] OR "Georgia
49		(Republic)"[Mesh:noexp] OR Ghana[Mesh:noexp] OR Greece[Mesh:noexp] OR
50		Grenada[Mesh:noexp] OR Guatemala[Mesh:noexp] OR Guinea[Mesh:noexp] OR Guinea-
51		Bissau[Mesh:noexp] OR Guam[Mesh:noexp] OR Guyana[Mesh:noexp] OR
52		Haiti[Mesh:noexp] OR Honduras[Mesh:noexp] OR Hungary[Mesh:noexp] OR
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2		Kazakhstan[Mesh:noexp] OR Kenya[Mesh:noexp] OR Korea[Mesh:noexp] OR
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9		Micronesia[Mesh:noexp] OR Middle East[Mesh:noexp] OR Moldova[Mesh:noexp] OR
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11		Mozambique[Mesh:noexp] OR Myanmar[Mesh:noexp] OR Namibia[Mesh:noexp] OR
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13		Caledonia[Mesh:noexp] OR Nicaragua[Mesh:noexp] OR Niger[Mesh:noexp] OR
14		Nigeria[Mesh:noexp] OR Oman[Mesh:noexp] OR Pakistan[Mesh:noexp] OR
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16		Paraguay[Mesh:noexp] OR Peru[Mesh:noexp] OR Philippines[Mesh:noexp] OR
17		Poland[Mesh:noexp] OR Portugal[Mesh:noexp] OR Puerto Rico[Mesh:noexp] OR
18		Romania[Mesh:noexp] OR Russia[Mesh:noexp] OR "Russia (Pre-1917)"[Mesh:noexp] OR
19		Rwanda[Mesh:noexp] OR "Saint Kitts and Nevis"[Mesh:noexp] OR Saint
20		Lucia[Mesh:noexp] OR "Saint Vincent and the Grenadines"[Mesh:noexp] OR
21		Samoa[Mesh:noexp] OR Saudi Arabia[Mesh:noexp] OR Senegal[Mesh:noexp] OR
22		Serbia[Mesh:noexp] OR Montenegro[Mesh:noexp] OR Seychelles[Mesh:noexp] OR Sierra
23		Leone[Mesh:noexp] OR Slovenia[Mesh:noexp] OR Sri Lanka[Mesh:noexp] OR
24		Somalia[Mesh:noexp] OR South Africa[Mesh:noexp] OR Sudan[Mesh:noexp] OR
25		Suriname[Mesh:noexp] OR Swaziland[Mesh:noexp] OR Syria[Mesh:noexp] OR
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31		Venezuela[Mesh:noexp] OR Vietnam[Mesh:noexp] OR Yemen[Mesh:noexp] OR
32		Yugoslavia[Mesh:noexp] OR Zambia[Mesh:noexp] OR Zimbabwe[Mesh:noexp])) OR
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42		Paraguay[ot] OR Peru[ot] OR Philippines[ot] OR Philipines[ot] OR Phillipines[ot] OR
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45		Ruanda[ot] OR Saint Kitts[ot] OR St Kitts[ot] OR Nevis[ot] OR Saint Lucia[ot] OR St
46		Lucia[ot] OR Saint Vincent[ot] OR St Vincent[ot] OR Grenadines[ot] OR Samoa[ot] OR
47		Samoa Islands[ot] OR Navigator Island[ot] OR Navigator Islands[ot] OR Sao Tome[ot] OR
48		Saudi Arabia[ot] OR Senegal[ot] OR Serbia[ot] OR Montenegro[ot] OR Seychelles[ot] OR
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1	Nevis[tiab] OR Saint Lucia[tiab] OR St Lucia[tiab] OR Saint Vincent[tiab] OR St
2	Vincent[tiab] OR Grenadines[tiab] OR Samoa[tiab] OR Samoan Islands[tiab] OR Navigator
3	Island[tiab] OR Navigator Islands[tiab] OR Sao Tome[tiab] OR Saudi Arabia[tiab] OR
4	Senegal[tiab] OR Serbia[tiab] OR Montenegro[tiab] OR Seychelles[tiab] OR Sierra
5	Leone[tiab] OR Slovenia[tiab] OR Sri Lanka[tiab] OR Ceylon[tiab] OR Solomon Islands[tiab]
6	OR Somalia[tiab] OR Sudan[tiab] OR Suriname[tiab] OR Surinam[tiab] OR Swaziland[tiab]
7	OR Syria[tiab] OR Tajikistan[tiab] OR Tadjhikistan[tiab] OR Tadjikistan[tiab] OR
8	Tadzhik[tiab] OR Tanzania[tiab] OR Thailand[tiab] OR Togo[tiab] OR Togolese
9	Republic[tiab] OR Tonga[tiab] OR Trinidad[tiab] OR Tobago[tiab] OR Tunisia[tiab] OR
10	Turkey[tiab] OR Turkmenistan[tiab] OR Turkmen[tiab] OR Uganda[tiab] OR Ukraine[tiab]
11	OR Uruguay[tiab] OR USSR[tiab] OR Soviet Union[tiab] OR Union of Soviet Socialist
12	Republics[tiab] OR Uzbekistan[tiab] OR Uzbek OR Vanuatu[tiab] OR New Hebrides[tiab]
13	OR Venezuela[tiab] OR Vietnam[tiab] OR Viet Nam[tiab] OR West Bank[tiab] OR
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21	Belize[tiab] OR Bhutan[tiab] OR Bolivia[tiab] OR Bosnia[tiab] OR Herzegovina[tiab] OR
22	Hercegovina[tiab] OR Botswana[tiab] OR Brasil[tiab] OR Brazil[tiab] OR Bulgaria[tiab] OR
23	Burkina Faso[tiab] OR Burkina Fasso[tiab] OR Upper Volta[tiab] OR Burundi[tiab] OR
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43	Lesotho[tiab] OR Basutoland[tiab] OR Liberia[tiab] OR Libya[tiab] OR Lithuania[tiab])) OR
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Namibia[pl] OR Nepal[pl] OR Netherlands Antilles[pl] OR New Caledonia[pl] OR
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32		"lower income economy"[tiab] OR "lower income economies"[tiab] OR "low gdp"[tiab]
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35		national"[tiab] OR lmic[tiab] OR lmic[tiab] OR "third world"[tiab] OR "lami country"[tiab]
36		OR "lami countries"[tiab] OR "transitional country"[tiab] OR "transitional countries"[tiab])
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46	4	1 AND 2 AND 3 AND Filter: Publication date from 2000/01/01 to 2015/12/31

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page Number(s)
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	Page 1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not applicable
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Page 1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Page 9
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Not applicable
Support:			
Sources	5a	Indicate sources of financial or other support for the review	Page 9
Sponsor	5b	Provide name for the review funder and/or sponsor	Page 9
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Page 9
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	Page 4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Page 5-6
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Page 5-7
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	Page 7
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits such that it could be repeated	Additional File 1.doc

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Page 8
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Page 8
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently in duplicate), any processes for obtaining and confirming data from investigators	Page 8
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Page 8
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Page 8
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Not applicable for Scoping Review
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Not applicable
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	Not applicable
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Page 8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable for Scoping Review

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (if available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.