



THE STATE OF THE  
World's Midwifery  
2021

Webappendices

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## Webappendix 1: Occupation group definitions, headcounts and densities

### Definitions

The National Health Workforce Accounts (NHWA) platform uses the International Standard Classification of Occupations (ISCO) 2008 (1) as a framework and asks countries to allocate health workers to specific occupation groups according to ISCO code. Table A1.1 shows the occupation groups included within the *State of the World's Midwifery 2021* (SoWMy 2021) definition of the sexual, reproductive, maternal, newborn and adolescent health (SRMNAH) workforce, and the definitions used by NHWA for each.

**Table A1.1: Definitions of SRMNAH worker occupation groups**

Occupation	Definition
Midwifery professional	Midwifery professionals plan, manage and provide midwifery care services before, during and after pregnancy and childbirth. They provide delivery care to reduce health risks to women and newborn children according to the practice and standards of modern midwifery, working autonomously or in teams with other health-care providers. They may conduct research on midwifery practices and procedures, as well as implementing midwifery education activities in clinical and community settings.
Midwifery associate professional	Midwifery associate professionals provide basic health care and advice before, during and after pregnancy and childbirth. They provide advice to women, families and communities on birth and emergency plans, breastfeeding, infant care, family planning and related topics; monitor health status during pregnancy and childbirth; and implement care, treatment and referral plans usually established by medical, midwifery or other health professionals.
Nursing professional	Nursing professionals provide treatment, support and care services for people in need of nursing care due to the effects of ageing, injury, illness or other physical or mental impairment, or potential risks to health, according to the practice and standards of modern nursing. They assume responsibility for the planning and management of patient care, including the supervision of other health care workers, working autonomously or in teams with medical doctors and others in the practical application of preventive and curative measures in clinical and community settings.
Nursing associate professional	Nursing associate professionals provide basic nursing and personal care for people in need of such care due to the effects of ageing, illness, injury or other physical or mental impairment. They provide health advice to patients and families, monitor patients' conditions and implement care, treatment and referral plans usually established by medical, nursing or other health professionals.
Obstetrician and gynaecologist	Doctors in obstetric and gynaecological specialties and related branches focusing on the care of women's reproductive systems, including before, during and after pregnancy and childbirth.
Paediatrician	Doctors in paediatrics and related specialties focusing on the prevention, diagnosis and treatment of health problems in infants, children and adolescents.
General medical practitioner	Generalist medical practitioners (including family and primary care doctors) diagnose, treat and prevent illness, disease, injury and other physical and mental impairments and maintain general health in humans by applying the principles and procedures of modern medicine. They plan, supervise and evaluate the implementation of care and treatment plans by other health-care providers. They do not limit their practice to particular disease categories or methods of treatment, and may assume responsibility for providing continuing and comprehensive medical care to individuals, families and communities.
Paramedical practitioner	Paramedical practitioners (including clinical officers and related workers) provide advisory, diagnostic, curative and preventive medical services more limited in scope and complexity than those carried out by medical doctors. They work autonomously or with limited supervision by medical doctors, and perform clinical, therapeutic and surgical

Occupation	Definition
	procedures to treat and prevent diseases, injuries, and other physical or mental impairments common to specific communities.
Medical assistant	Medical assistants perform basic clinical and administrative tasks to support patient care under the direct supervision of a medical practitioner or other health professional. They perform routine tasks and procedures, such as measuring vital signs, administering medications and injections, recording information in medical record-keeping systems, preparing and handling medical instruments and supplies, and collecting and preparing specimens of bodily fluids and tissues for laboratory testing.
Community health worker	Community health workers provide health education, referral and follow-up, case management, and basic preventive health care and home visiting services to specific communities. They support and assist individuals and families in navigating the health and social services systems.

Source: International Labour Organization (2008).

Countries had the option to categorize nurses and midwives as “midwives not further defined” and/or “nurses not further defined” if it was not possible to classify them in either the professional or associate professional groups. Similarly, countries unable to disaggregate their medical doctor numbers into the different groups had the option to enter only a total number for medical doctors.

### Headcounts for all SRMNAH worker occupations

Table A1.2 shows the headcounts reported on NHWA for each SRMNAH occupation group, and the number of countries reporting a headcount for each one. A small number of reporting countries does not necessarily indicate missing data: we do not expect all countries to report for all occupation groups. Some countries may not have that occupation group as part of their health workforce.

**Table A1.2: Number (thousands) of SRMNAH workers in 192 countries, by WHO region, 2019 (or latest available year since 2014)**

Occupation group		WHO region						Total
		Africa	Americas	South-East Asia	Europe	Eastern Mediterranean	Western Pacific	
Midwifery professionals	# reporting countries	26/47	12/35	6/11	13/53	8/21	12/27	77/194
	Headcount	204.5	40.9	68.2	133.5	61.6	142.3	650.9
Midwifery associate professionals	# reporting countries	11/47	2/35	3/11	1/53	3/21	2/27	22/194
	Headcount	7.5	4.2	456.1	0.6	5.3	3.6	477.3
Midwives not further defined	# reporting countries	9/47	7/35	1/11	39/53	6/21	6/27	68/194
	Headcount	6.8	22.0	8.0	278.9	31.3	73.9	420.9
Nursing professionals	# reporting countries	34/47	30/35	10/11	34/53	10/21	26/27	144/194
	Headcount	537.5	5351.3	2126.0	5176.1	290.7	6284.8	19,766.5
Nursing associate professionals	# reporting countries	24/47	28/35	5/11	11/53	7/21	18/27	93/194
	Headcount	198.8	2921.7	1206.3	298.9	195.0	497.3	5317.9
Nurses not further defined	# reporting countries	14/47	6/35	2/11	20/53	12/21	2/27	56/194
	Headcount	146.6	23.3	106.5	1394.1	608.8	107.0	2386.2
Obstetricians and gynaecologists	# reporting countries	44/47	35/35	11/11	53/53	21/21	27/27	191/194
	Headcount	8.6	106.8	55.6	154.7	36.0	170.9	532.7
Paediatrician practitioners	# reporting countries	41/47	34/35	11/11	53/53	21/21	25/27	185/194
	Headcount	8.6	127.5	53.1	152.8	36.4	159.1	537.5
General medical practitioners	# reporting countries	44/47	34/35	11/11	53/53	21/21	27/27	190/194
	Headcount	196.9	790.0	729.9	753.8	409.9	1229.4	4109.9
Paramedical practitioners	# reporting countries	14/47	3/35	6/11	9/53	5/21	3/27	40/194
	Headcount	59.6	5.6	66.7	56.4	140.4	16.2	345.0
Medical assistants	# reporting countries	7/47	2/35	3/11	3/53	2/21	1/27	18/194
	Headcount	6.1	0.8	74.8	19.6	2.2	1.1	104.7
Community health workers	# reporting countries	15/47	10/35	6/11	4/53	3/21	5/27	43/194
	Headcount	242.4	302.0	1122.9	6.5	23.6	253.5	1950.9
<b>Total</b>	<b>Headcount</b>	<b>1623.9</b>	<b>9696.1</b>	<b>6074.1</b>	<b>8425.9</b>	<b>1841.2</b>	<b>8939.2</b>	<b>36,600.4</b>

Note: Many countries submitted a total headcount for all medical doctors, without providing headcounts for individual occupation groups. For these countries, assumptions were made about the proportion of medical doctors in each of the three medical doctor occupation groups in this table (see Webappendix 3).

Source: NHWA.

Obstetricians/gynaecologists and paediatricians were entered as a subset of the total number of specialist medical practitioners. Similarly, within the categories of nursing professionals and nursing associate professionals, countries were asked to state how many had midwifery training. Table A1.2 shows the total headcounts, making no distinction between nurses and associate nurses with midwifery training and those without midwifery training. The definitions in Table A1.3 were provided to help NHWA focal points decide how to classify nurses with midwifery training. These categories were introduced in NHWA in 2019, so countries reporting data for years before 2019 did not have the option to use them. To avoid double-counting, the number of nurses with midwifery training was subtracted from the total number of nurses.



**Table A1.3: Definitions of nurses with midwifery training**

Occupation	Definition
Nursing professional with midwifery training	Nursing professionals who have also successfully completed a midwifery education programme and acquired the requisite qualifications to be registered and/or legally licensed to practise as a midwife.
Nursing associate professional with midwifery training	Nursing associate professionals who have also successfully completed formal education to provide basic health care and advice before, during and after pregnancy and childbirth. They provide advice to women, families and communities on birth and emergency plans, breastfeeding, infant care, family planning and related topics; monitor health status during pregnancy and childbirth; and implement care, treatment and referral plans usually established by medical, midwifery or other health professionals.

For the analyses in the main SoWMy 2021 report, nurses with midwifery training are referred to as “nurse-midwives” and classed as part of the “wider midwifery workforce”. However, the assumptions about how much of their clinical time is spent on SRMNAH are different from those for midwives (see Webappendix 3).

### Availability of the nursing workforce excluding those with midwifery training

Data for 190 countries indicate a global nursing workforce (excluding those with midwifery training) of 27.1 million: 35.9 per 10,000 population (Table A1.4). Most (80%) work in the Americas, European and Western Pacific regions, and the density is 13 times higher in high-income countries than in low-income countries (112.1 and 8.4 respectively per 10,000 population).

**Table A1.4: Size (thousands) and density of nursing workforce (excluding those with midwifery training) in 190 countries, by WHO region and World Bank income group, 2019 (or latest available year since 2014)**

	Number of countries reporting headcount/all WHO Member States	Size of nursing workforce excluding those with midwifery training* in thousands (% of global total)	Density per 10,000 population**
<b>WHO region</b>			
Africa	44/47 (94%)	843 (3%)	8.2
Americas	35/35 (100%)	8203 (30%)	81.6
South-East Asia	10/11 (91%)	3383 (12%)	17.0
Europe	53/53 (100%)	6858 (25%)	74.3
Eastern Mediterranean	21/21 (100%)	1018 (4%)	14.5
Western Pacific	27/27 (100%)	6820 (25%)	35.8
<b>Income group</b>			
High	61/61 (100%)	13,383 (49%)	112.1
Upper middle	55/55 (100%)	8629 (32%)	30.0
Lower middle	46/49 (94%)	4575 (17%)	17.0
Low	28/29 (97%)	538 (2%)	8.4
<b>Total</b>	<b>190/194 (98%)</b>	<b>27,126 (100%)</b>	<b>35.9</b>

\* Includes nursing professionals, nursing associate professionals and nurses not further defined, and excludes nurses with midwifery training. \*\*Total headcount in all countries in a region/income group, expressed as a ratio of the total population of that region/income group.

Source: NHWA.

The numbers and densities in Table A1.4 are slightly different from those reported in the *State of the World's Nursing 2020* (SoWN) report (2), partly because many countries submitted updated

headcounts to NHWA after SoWN was published, and partly because 345,000 nurses with midwifery training are counted in SoWMy as part of the wider midwifery workforce, whereas in SoWN they were counted as part of the nursing workforce.

### Availability of SRMNAH doctors

Data for 191 countries indicate a global total of 5.2 million “SRMNAH doctors” (general practitioners, obstetricians/gynaecologists and paediatricians): 6.9 per 10,000 population (Table A1.5). The majority (70%) work in the Western Pacific, Americas and Europe regions, and the density is almost five times higher in high-income countries than in low-income countries (10.5 and 2.3 respectively per 10,000 population).

**Table A1.5: Number (thousands) and density of SRMNAH doctors in 191 countries, by WHO region and World Bank income group, 2019 (or latest available year since 2014)**

	Number of countries reporting headcount/all WHO Member States	Number of SRMNAH doctors* in thousands (% of global total)	Density per 10,000 population**
<b>WHO region</b>			
Africa	44/47 (94%)	214 (4%)	2.1
Americas	35/35 (100%)	1024 (20%)	10.2
South-East Asia	11/11 (100%)	839 (16%)	4.2
Europe	53/53 (100%)	1061 (20%)	11.5
Eastern Mediterranean	21/21 (100%)	482 (9%)	6.9
Western Pacific	27/27 (100%)	1559 (30%)	8.2
<b>Income group</b>			
High	61/61 (100%)	1256 (24%)	10.5
Upper middle	55/55 (100%)	2410 (47%)	8.4
Lower middle	47/49 (96%)	1368 (26%)	4.8
Low	28/29 (97%)	145 (3%)	2.3
<b>Total</b>	<b>191/194 (98%)</b>	<b>5180 (100%)</b>	<b>6.9</b>

\* Includes general medical practitioners, obstetricians/gynaecologists and paediatricians. \*\*Total number of SRMNAH doctors in all countries in a region/income group, expressed as a ratio of the total population of that region/income group.

Source: NHWA.

Few countries reported an anaesthetist headcount, so they are not included in SRMNAH doctors. However, they are an essential part of the surgical team in obstetrics and gynaecology (particularly for caesarean sections) and must be included in any SRMNAH team. In some countries, midwives and nurses are trained to provide some anaesthetic services (3).

### References for Webappendix 1

1. International standard classification of occupations (ISCO). Geneva: International Labour Organization; 2008 (<https://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm>, accessed 6 February 2021).
2. State of the world's nursing. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240003279>, accessed 8 March 2021).
3. Kempthorne P, Morriss WW, Mellin-Olsen J, Gore-Booth J. The WFSA global anesthesia workforce survey. *Anesth Analg*. 2017;125(3):981–90. doi: 10.1213/ANE.0000000000002258.

## Webappendix 2: Data collection process and response rate

Most of the data for the *State of the World's Midwifery 2021* (SoWMy 2021) report were obtained from two sources: the World Health Organization (WHO) National Health Workforce Accounts (NHWA) platform and the International Confederation of Midwives (ICM) Global Midwives Associations Map survey. Other data sources used are referenced where they are mentioned in the main text.

### National health workforce accounts

Each country was invited to submit its most recent data about the sexual, reproductive, maternal, newborn and adolescent health (SRMNAH) workforce via the online NHWA platform. The SoWMy Core Group identified 28 key NHWA indicators (Table A2.1).

**Table A2.1: National Health Workforce Accounts key indicators for SoWMy 2021**

Indicator	Abbreviated name
1-01	Health worker density
1-02	Health worker density at sub-national level
1-03	Health worker distribution by age group
1-04	Female health workforce
1-07	Share of foreign-born health workers
1-08	Share of foreign-trained health workers
2-01	Master list of accredited health workforce education and training institutions
2-02	Duration of education and training
2-03	Applications for education and training
2-04	Ratio of admissions to available places
2-05	Ratio of students to qualified educators for education and training
2-06	Exit drop-out rate from education and training programmes
2-07	Graduation rate from education and training programmes
3-01	Standards for the duration and content of education and training
3-02	Accreditation mechanisms for education and training institutions and their programmes
4-05	Expenditure per graduate on health workforce education
5-01	Graduates starting practice within one year
5-02	Replenishment rate from domestic efforts
5-03	Entry rate for foreign health workers
5-04	Voluntary exit rate from health labour market
5-05	Involuntary exit rate from health labour market
5-06	Unemployment rate
5-07	Vacancy rate
6-01	Standard working hours
6-02	Health workers with a part time contract
6-09	Measures to prevent attacks on health workers
7-05	Entry level wages and salaries
7-07	Gender wage gap

NHWA is an ongoing data collection process. Each country is encouraged to appoint one or more NHWA focal points with responsibility for collating, validating and entering the data. In addition to the NHWA Handbook (1), detailed SoWMy-specific guidance notes were provided in English, French and Spanish. Focal points were encouraged to convene multistakeholder working groups to identify suitable data sources and conduct internal validation before submitting data to NHWA. WHO Health



Workforce Team and Regional Office staff worked with United Nations Population Fund (UNFPA) Regional Office teams and Novametrics to facilitate virtual regional workshops and support the NHWA data collection process. Focal points could choose either to enter their data directly onto the NHWA platform, or to submit it to WHO using a spreadsheet template, from which WHO entered the data onto the platform. Most of the data elements in Modules 2-6 can only be entered onto the NHWA platform for midwifery professionals, nursing professionals and general medical practitioners, so for all other occupation groups these data elements were collected via spreadsheet and collated by Novametrics. The NHWA data presented in this report are based on a download from the NHWA platform on 14 December 2020, so not include any data submitted after that date. WHO reviewed all the data submitted for internal logic and validity.

Of the 194 WHO Member States, 192 reported data on headcount for at least one of the 12 SRMNAH occupation groups. To be included in SoWMy 2021, the data had to be more recent than 2014 (the year of the last SoWMy report). Numbers are presented in the individual country profiles, showing the year to which the headcount applies. Overall, 73% of headcount entries for all occupation groups date from 2018 or 2019. For the wider midwifery workforce, 70% of headcount entries are from 2018 or 2019.

For occupation groups other than nurses and midwives, the 2019 baseline figures in the report are for the most recent year since 2014. However, for nurses and midwives, it is recognized that a number of countries have made changes in their roles, education and competencies and therefore made different reporting decisions in different years. As a result, if the most recent year had been selected for nurses and midwives, some would have been double-counted. To avoid this, the following principles were applied.

1. As the default, the analysis uses all entries from the most recent year of entry for all the nursing and midwifery occupation groups.
2. Alternatively, where it is clear that this default would miss either nurses or midwives, the analysis includes totals from the most recent year of entry for nurses and for midwives, separately. This affected fewer than 40 countries. For example, in 2019, Country A reported midwifery professionals, but no nurses. In 2018, the same country reported nursing professionals and nursing associate professionals, but no midwives. In this case, the analysis includes midwife headcounts from 2019 and nurse headcounts from 2018.

The proposed option for each country was shared with WHO and United Nations Population Fund (UNFPA) Regional Offices in October 2020 and they were asked to discuss the decisions taken with national stakeholders, then to feed back to the SoWMy team if they wanted to make different decisions.

SoWMy 2021 analyses NHWA data only for those indicators and occupation groups with sufficient data. Additional data will be made available progressively through a public portal (2).

### **ICM Global Midwives Associations Map Survey**

ICM included questions on SoWMy indicators in their regular survey of member associations. The survey and accompanying guidance were available in English, French, Russian and Spanish and consisted of four sections: (1) association, (2) education, (3) leadership and (4) regulation. All ICM member associations were invited to consult with national stakeholders to collate the data, then to submit their response via an online platform. Countries with more than one ICM member association were instructed to submit a response to the association section for each association,

then to respond jointly to the education, leadership and regulation sections. Via UNFPA and WHO regional offices, countries with no ICM member associations were also invited to participate. The invitation was issued in December 2019, and the closing date for submission of completed surveys was 31 May 2020.

When a country had submitted all four sections, its data were reviewed by a multilingual team at Novametrics, and any queries were referred back to the association. Following their responses, the data were edited to ensure completeness, internal logic and validity. The revised data were then sent to the association which was asked to obtain letters of validation from the competent authority for each survey section. The competent authority varied by country, but was usually a government department (e.g. Ministry of Health, Ministry of Education) and/or the regulator for the midwifery profession (e.g. the Nursing and Midwifery Council). In a few cases, the association signed the validation letters to indicate that the data provided were publicly available from reputable sources, and that the association had used these sources when collating the data.

In total, 123 countries/territories engaged with the survey, of which 115 achieved fully edited data. Their data were included in the analysis in this report if (1) the country is a WHO Member State and (2) the relevant validation letters were received. The closing date for receipt of validation letters was 5 February 2021, by which time 90 countries had provided validation for the association section, 83 for the education section, 82 for the leadership and regulation sections, and 80 for all four sections. All survey data submitted by ICM member associations, including those not used in this report, can be accessed at the ICM [Global Midwives' Hub](#). The countries submitting validated data via the ICM survey included the two WHO Member States which did not submit data via NHWA. This means that all 194 Member States submitted at least one data item which features in SoWMy 2021.

Previous SoWMy reports have collected data via a detailed country questionnaire, completed by national stakeholders under the leadership of UNFPA and WHO country offices. SoWMy 2021 used a significantly different data collection method, which affects comparability between this and earlier SoWMy reports. In particular, the use of NHWA brings greater harmonization in the classification of SRMNAH workers into occupation groups, making international comparisons more valid. However, there is still some way to go before this harmonization process is complete, so caution is advised when making comparisons between countries. Some data sources for SoWMy 2021 use different indicator wording and definitions from those used in previous SoWMy reports, which makes it inadvisable to draw direct comparisons between these results and those from earlier years.

## References for Webappendix 2

1. National health workforce accounts: a handbook. Geneva: World Health Organization; 2017 ([https://www.who.int/hrh/documents/brief\\_nhwa\\_handbook/en/](https://www.who.int/hrh/documents/brief_nhwa_handbook/en/), accessed 17 March 2021).
2. National health workforce accounts data portal. Geneva: World Health Organization; 2021 (<https://apps.who.int/nhwportal/>, accessed 8 February 2021).

## Webappendix 3: Data analysis and modelling

Much of the information in the *State of the World's Midwifery* (SoWMy) 2021 results from descriptive analysis of the data provided by National Health Workforce Accounts (NHWA) and the International Confederation of Midwives (ICM) survey (see Webappendix 2).

This Webappendix describes the additional adjustments and analyses conducted as part of the need- and demand-based modelling reported in Chapter 4 and in the country profiles. Both types of modelling required the supply of sexual, reproductive, maternal, newborn and adolescent health (SRMNAH) workers to be projected forward to 2030, to enable comparison between the projected supply and the projected need and demand.

### Analysis by World Bank income group

Two participating countries (Cook Islands and Niue) did not have a World Bank income group classification. For the analysis by income group, Cook Islands was assumed to be a high-income country and Niue an upper middle-income country, based on their gross domestic product (GDP) and classification of neighbouring countries.

### Estimating and projecting the need for SRMNAH workers

“Need” was defined as the amount of SRMNAH worker time required to deliver all essential SRMNAH interventions to every person who needs them. It was estimated as follows:

1. estimate the number of women, newborns and adolescents requiring each intervention using demographic and epidemiological data from secondary sources (see Webappendix 5);
2. estimate the average contact time required to deliver each intervention to one individual, using time estimates from the OneHealth tool (1) where available, otherwise expert estimates (see Webappendix 5);
3. based on the two previous quantities, estimate the total annual contact time required to deliver each intervention to all individuals who need it; and
4. repeat the above calculation for each year to 2030, using projections for demography and epidemiology (see Webappendix 5 for data sources).

A number of interventions considered essential in the *Global Strategy for Women's, Children's and Adolescents' Health* were not included in the estimation of need. There are three possible reasons for this: (i) they are not SRMNAH interventions and are therefore provided by health and social care occupation groups that are not covered by this report, (ii) global guidance on their use has changed since the *Global Strategy* was published, or (iii) no treatment currently exists. These excluded interventions are: detection and treatment of noncommunicable disease and reproductive tract infections; management of gender-based and interpersonal violence; pre-pregnancy detection and management of risk factors such as obesity, alcohol abuse, mental ill health, genetic conditions; treatment of hepatitis B; management of genetic conditions; presumptive antibiotic therapy for newborns at risk of bacterial infection; all child health and development interventions; parent skill training to manage behavioural disorders in adolescents; assessment and management of unintentional injury in adolescents; routine vaccinations for adolescents; prevention, detection and management of anaemia in adolescents; detection and management of hazardous and harmful substance use in adolescents; prevention of suicide and management of self-harm/suicide risks in adolescents; psychosocial support and related services for adolescent mental health and well-being; promotion of healthy behaviours in adolescents (e.g. nutrition, physical activity, avoiding tobacco, alcohol and drugs). However, it should be noted that every SRMNAH worker has a responsibility to understand and take appropriate action in relation to noncommunicable disease risk factors.

## Estimating and projecting the supply of SRMNAH workers

To estimate **current** supply, baseline headcounts reported in NHWA were converted into available SRMNAH worker hours, as follows.

1. Convert headcounts into “dedicated SRMNAH equivalents” (DSEs) by multiplying the headcount number by an estimation of the average amount of clinical contact time that each occupation group spends on SRMNAH. For low- and lower middle-income countries, most of these estimations were based on data provided by countries for previous SoWMy reports: the median estimates were used. For upper middle- and high-income countries, and for the medical doctor occupation groups, the assumptions were based on expert estimates provided by members of the International Council of Nurses (ICN), the International Confederation of Gynaecology and Obstetrics (FIGO), the International Pediatric Association (IPA) and the World Organization of Family Doctors (WONCA).

**Table A3.1: Estimated % of clinical time spent on SRMNAH, by occupation group**

Occupation group	% of clinical time spent on SRMNAH interventions		
Midwifery professionals	100%		
Midwifery associate professionals	100%		
Community health workers	10%		
Paramedical practitioners	30%		
Medical assistants	30%		
Generalist medical practitioners	20%		
Obstetricians and gynaecologists	50%		
Paediatrician practitioners	15%		
	High- and upper middle-income countries	Lower middle- and low-income countries	
		With midwives	Without midwives
Nursing professionals	30%	44%	60%
Nursing associate professionals	40%	50%	88%
Nurses with midwifery training	85%	60%	100%
Associate nurses with midwifery training	85%	60%	100%

2. Convert the DSEs into annual hours available, assuming that all SRMNAH workers work 40 hours per week, take an average of 5 days of sick leave and 30 days of annual leave per year, and spend 70% of their available working hours providing clinical interventions.

The following two methods were used to estimate headcount numbers for five key SRMNAH occupation groups if any of these were not reported in NHWA (midwives, nurses, general medical practitioners, obstetricians / gynaecologists and paediatricians).

### 1. Previous regional SoWMy reports

Two recent regional reports, published as part of the SoWMy series, included primary data collection: East and Southern Africa Region, 2017: 22 countries and territories (2), and Pacific Island Countries, 2019: 15 countries and territories (3). If there was no later nurse or midwife headcount in NHWA, the headcount in these reports was included in the modelling (but not shown in the country profile).

## 2. Estimating doctor numbers

If headcount data were not provided for general medical practitioners, obstetricians / gynaecologists or paediatricians, these were estimated using a proportion of the medical doctor stock total, based on a country income group average. Again, these estimates were included in the global and regional estimates in the main SoWMy report and in the modelling of supply, but not shown in the country profiles.

Analysis indicated that the number of generalist medical practitioners as a proportion of all medical doctors is highest in low-income countries, whereas for obstetricians / gynaecologists and paediatricians there was little variation between income groups. Consequently, for countries that did not report headcounts for one or more of the three types of SRMNAH doctor since 2014 but did report the total number of medical doctors, the potential met need analysis used an estimate for the number of SRMNAH doctors based on the figures set out on Table A3.2.

**Table A3.2: % of medical doctor headcount assumed to be SRMNAH doctors, by income group**

	Income group				
	High	Upper-middle	Lower-middle	Low	None
Generalist medical practitioners	23%	27%	53%	66%	30%
Obstetricians and gynaecologists	3%	5%	5%	3%	5%
Paediatrician practitioners	4%	4%	4%	3%	4%

To estimate **future** supply, the method used was similar to that adopted in the *State of the World's Nursing 2020* (SoWN) report. The SoWN report developed the following three scenarios to estimate the stock of nurses by 2030.

### Scenario 1: Ageing

$$\text{StockYrX} = \text{Stock2019} * [1 + \{((\text{YrX}-2019)/10) * \% \text{stockaged}<35\} - \{((\text{YrX}-2019)/10) * \% \text{stockaged}>55\}]$$

This scenario assumes a “stable” supply of new health workers each year, equivalent to 10% of the current stock of health workers aged under 35. At the same time, 10% of health workers aged over 55 are assumed to retire and leave the health workforce.

### Scenario 2: Replenishment

$$\text{StockYrX} = \text{Stock2019} * [1 - \{((\text{YrX}-2019)/10) * \% \text{stockaged}>55\}] + [60\% * 2018\text{graduates} * (\text{YrX}-2019)]$$

This scenario uses the same retirement estimate as the ageing scenario but, instead of assuming an inflow of 10% of under 35s, the actual reported graduate numbers are used for each occupation group. A 60% conversion factor is applied to the graduate numbers to estimate the number of new workers actually joining the health workforce each year. This is the conversion factor used in the SoWN report “to mimic the difference between graduation and entry into the active workforce as observed in OECD countries”.

### Scenario 3: Accelerated replenishment

$$\text{StockYrX} = \text{Stock2019} * [1 - \{((\text{YrX}-2019)/10) * \% \text{stockaged}>55\}] + [60\% * 2018\text{grads} * 1.0377^{(\text{YrX}-2019)}]$$

This scenario assumes that the number of graduates can be increased each year, so that by 2030 there will be 50% more graduates every year than in 2019. This equates to an annual increase of 3.77%. Other assumptions on retirement and graduation employment are unchanged.

Having applied all three of the above methods to the data, Scenario 2 was selected as the best balance between robustness, plausibility and consistency with SoWN. This is a different approach to that taken for SoWMy 2014, so the future projections are not directly comparable. It was not possible to recreate the SoWMy 2014 method because very few countries were able to provide data on the priority NHWA indicators concerned with inflows and outflows, such as graduate numbers (Indicator 2.07), graduate employment rate (5.01), the number of new foreign workers (5.03) and the voluntary exit rate (5.04). Although 38% of countries reported graduate numbers for nursing professionals, for most other SRMNAH occupation groups fewer than 5% of countries reported data.

All projections should be used with caution: they are, of necessity, estimates based on uncertain assumptions. The following limitations apply to the projections.

- The number of countries able to provide age-disaggregated data and graduate numbers was very low, so it was often necessary to impute missing values based on regional averages.
- Occasionally the sum of disaggregated headcount numbers reported by countries did not equal the reported headcount. In these cases, the disaggregated total was proportionally adjusted so that the sum matched the headcount total. (Very occasionally, disaggregated numbers were reported when there was no reported headcount total. In these cases, the disaggregated values were not used.)
- Graduate numbers vary over time. This is especially noticeable in smaller countries, which may not recruit students every year, and in countries looking to increase production or change the nature of education programmes. However, there is currently insufficient historical data in NHWA to identify trends reliably. Various options were examined, but the most recently reported graduate numbers were assumed to be representative.
- Graduate employment rates are likely to vary by country.

### Estimating potential met need

The next step was to allocate the available DSE time to the need for each intervention. To do this, we determined which of the essential interventions each occupation group should be competent to perform or contribute to if educated and regulated according to global standards (see Webappendix 6 for details) even if they do not currently do so. It was therefore necessary to reclassify “midwives not further defined” and “nurses not further defined” as either professionals or associate professionals. The following reclassification protocol was applied for all countries, in the order presented below.

- a) **Country instruction:** When WHO or UNFPA regional offices, in consultation with national stakeholders, issued specific instructions about reclassification, these instructions took precedence.
- b) **Education:** If the education programme duration reported in NHWA (indicator 2.02) was 3 years or more for nurses or midwives, then they were reclassified as professionals. Similarly, midwives were assigned as professionals if the validated ICM survey reported a single midwifery education pathway lasting 3 years or more for direct entry or combined nursing and midwifery pathways, or 18 months or more for a post-nursing pathway.
- c) **Similar occupation groups:** If midwives were reported as “not further defined” but nurses had been classified as professional (or vice versa) it was assumed that both groups were educated to similar standards and both were professionals.



- d) **Previous SoWMy reports:** Previous SoWMy regional reports were used to indicate which occupation groups exist.
- e) **Proportionality:** If a country reported “midwives not further defined” as well as professional midwives and associate professional midwives, then the “not further defined” midwives were added to the professionals and associate professionals based on their existing proportions. The same process was applied to “nurses not defined”, where possible. Finally, if a country reported “midwives not further defined” but reported both professional and associate professional nurses, then the nurse proportions were applied to the midwives. Similarly, “nurses not further defined” were apportioned based on the distribution of midwives, where this was provided.
- f) **Default:** In the absence of any other information, “midwives not further defined” were reclassified as midwifery associate professionals, and “nurses not further defined” as nursing associate professionals. In the final analysis, this default assumption was applied to 16 countries, accounting for 7% of the wider midwifery workforce.

Having thus reclassified all “not further defined” headcounts, the following procedure was followed:

1. Using a logical algorithm, the number of hours required to provide universal coverage for each intervention was allocated sequentially to each occupation group competent to deliver the intervention, in the following order of priority: community health workers, midwifery associate professionals, associate nurses with midwifery training, nursing associate professionals, midwifery professionals, professional nurses with midwifery training, nursing professionals, paramedical practitioners, medical assistants, general medical practitioners, obstetricians/gynaecologists, paediatricians.
2. Hours needed were allocated to available competent occupation groups. If insufficient hours were available from the first competent occupation group on the list to meet all of the need for an intervention, the unallocated time was allocated to the next competent occupation group until either all of the need had been (theoretically) met or all of the available DSE time had been allocated. In practice, this means that, although a doctor could deliver family planning advice (for example), a doctor’s time would only be allocated to this intervention if the available working time from the other occupation groups was insufficient to meet all of the need for that intervention.
3. Calculate potential met need by comparing the amount of time needed which was allocated to the available DSEs to the total need, and express this as a percentage.

### Estimating and projecting the required number of DSEs, and total shortages

The DSE workforce required was estimated as follows:

1. start with the hours of SRMNAH worker time needed for universal coverage of the essential interventions, as above;
2. select a “preferred occupation group” for each intervention, based on expert opinion (see Webappendix 6);
3. calculate the need for each occupation group as the sum of the hours needed for each intervention for which that occupation group is the preferred one, even if a country does not currently report any headcount for that occupation group;
4. convert the number of hours needed into the number of DSEs needed, using the above assumptions about working hours (each SRMNAH worker works 40 hours per week, takes an

average of 5 days of sick leave and 30 days of annual leave per year, and spends 70% of their available working hours providing clinical interventions);

5. project the need forward from the 2019 baseline to 2030, based on forecast changes in population and epidemiological conditions; and
6. for each year, compare the number of DSEs needed with the projected supply.

The total, regional and income group needs-based SRMNAH worker shortages presented in SoWMy 2021 were calculated by: (1) for each country, subtracting the supply from the number of DSEs needed to obtain an estimate of that country's shortage, then (2) summing each country's shortage to give regional, income group and global estimates. Countries with "excess" supply (i.e. whose supply was larger than the number of DSEs needed) were excluded from this calculation, on the premise that their needs-based oversupply cannot easily be used to compensate for needs-based shortages in other countries.

### Projecting demand for SRMNAH workers

"Demand" is defined as the number of health workers that the health system (both public and private) can support in terms of funded positions or economic demand for services. Demand correlates with the economic capacity of a country, with higher levels of resource availability resulting in greater demand for health services and thus for health workers to provide them.

Future demand for each country was estimated by means of the SoWMy demand model. This is a cross-country linear regression model which predicts density of DSE health workers (DSEs per 10,000 population) based on historical NHTWA data from 2014-2019 and a range of economic and demographic predictor variables. After estimating the coefficients using historical data, the model was used to predict DSE densities for 2030.

A summary measure of "percentage met demand" (PMD) was calculated for each country to indicate how demand will compare with supply in 2030. PMD 2030 is defined as the % of demand which is likely to be met if the country continues on its current trajectory in terms of supply of DSEs. It compares the future size of the workforce that each country is likely to be able to afford with its future estimated supply.

The SoWMy demand model is adapted from an approach taken in Liu et al. which was developed for the full health workforce (4). The adaptations reflect the SoWMy focus on the SRMNAH workforce only. The model specifies DSE density (dependent variable) as a function of three independent variables:

- National income: measured by GDP per capita, lagged by up to 5 years to allow cyclicity effects in the time for GDP to affect the labour market (5).
- Demography: measured by (a) % of population who are women of reproductive age, and (b) total fertility rate.
- Health financing: measured by (a) out-of-pocket spending on health (OOPS) as a % of current health expenditure, and lagged by up to 5 years. This is a proxy measure of the generosity of health insurance coverage: higher OOPS usually indicates lower demand for health workers, and (b) government health expenditure (GHE) as a % of general government expenditure (GGE): this is a measure of government investment in the health workforce.

Estimating the future demand for health workers involved the following steps:

1. Calculate historical DSE densities from NHTWA (2014-2019), and obtain consistent and up-to-date estimates of the independent variables from 2014-2019 and also projections of the independent variables to 2030 from reputable sources.
2. Using these data, estimate the relationship between DSE density and the independent variables for 104 countries with sufficient workforce supply data. Express the dependent variable as a function of the independent variables to create the "SoWMy demand model".
3. Use this to predict the DSE density that will be demanded given predicted future change in the independent variables for 144 countries with sufficient economic and demographic data).
4. Compare the number of DSEs demanded in 2030 with the number projected to be available in 2030, and express as a percentage: this is the PMD (percentage met demand).

1. *Obtain and prepare data for dependent and independent variables and future projections.*

The dependent variable (DSE density) was calculated for 104 countries and projected to 2030 as described above.

The independent variables were calculated as follows:

- |            |  |
|------------|--|
| Demography | UN World Population Prospects' medium variant estimates were used for historical and future demography projections to 2030, including total populations, <b>Total Fertility Rates (TFRs)</b> and <b>% women of reproductive age</b> .  |
| Economics  | Estimates of historical and future <b>GDP, GHE as a percentage of GGE and OOPS</b> were obtained from World Bank (6). GDP, GGE, GHE and OOPS per capita were used to adjust for population size, and were expressed in constant 2018 US dollars.<br><br>GHE is based on the National Health Accounts (NHA) database maintained by WHO. GHE consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds. Future estimates of GHE are based on World Bank's scenario 2 (governments choose to maintain the pre-pandemic share of health in government spending). This is considered the most likely scenario, in which health spending would increase in 2020 with overall government spending, but then fall with the projected falls in government spending in 2021 and 2022. Future estimates of OOPS are based on WB scenario 4. |

2. *Predict the demanded SRMNAH worker density*

Using a generalized linear model, the relationship between DSE density and the independent variables was estimated. Missing data points in the independent variables were replaced by linear interpolation between actual data points. Missing data points in the dependent variable were not imputed, but set as missing. Although this resulted in fewer data, it also meant that individual years were independent of each other and robust standard errors were not necessary.

Natural log transformations were applied to skewed variables and the best lagged variable was used, squared terms were entered and retained if coefficients were significant. The best model was assumed to be that with the greatest adjusted  $R^2$  value.

Data manipulation, interpolation and model-fitting was carried out in *R*. The resulting model was as follows:

$$\ln(\text{SRMNAH DSE per 10000 population}_{it}) = \beta_0 + \beta_1 \ln(\text{GDP per capita}_{it-5}) + \beta_2 \ln(\text{OOPS per capita}_{it-5}) + \beta_3 \ln(\text{TFR}_{it}) + \beta_4 \ln(\text{TFR}_{it})^2 + \beta_5 (\text{GHE/GGE}_{it-5}) + \xi_{it}$$

where  $\xi_{it}$  is the disturbance term, and  $\beta$  coefficients are estimated as follows:

Coefficients:		Estimate
(Intercept)	$\beta_0$	-0.155921
Xgdp_per_capita_logL5	$\beta_1$	0.261201
Xoops_per_capita_logL5	$\beta_2$	0.110446
XTFRfertility_rate_log	$\beta_3$	1.036523
XTFRfertility_rate_logsquared	$\beta_4$	-0.875603
Xgge_as_percent_gov_exp_5year_lag	$\beta_5$	0.003642

3. Use the SoWMy demand model to predict demand density in 2030

Using 2030 predicted economic and demographic values for 144 countries, the SoWMy demand model was used to predict DSE demand density in 2030.

4. Calculate PMD and demand-based shortages

For 144 countries with sufficient economic and demographic data, the predicted values for DSE density were compared with the projected DSE supply in 2030 to yield a PMD estimate. Countries were allocated to one of four categories of supply compared with demand, according to their PMD estimate (Table A3.3).

**Table A3.3: Four “percentage met demand” categories**

Category	PMD	Description
Supply severely below capacity to employ	Below 50%	At current rates of production, by 2030 the country’s supply of SRMNAH workers will be <50% of the number it could afford to employ: a <b>severe demand-based shortage</b> is predicted.
Supply moderately below capacity to employ	50%-95%	At current rates of production, by 2030 the country’s supply of SRMNAH workers will be between 50% and 95% of the number it could afford to employ: a <b>moderate demand-based shortage</b> is predicted.
Supply matches capacity to employ	95%-105%	At current rates of production, by 2030 the country’s supply of SRMNAH workers will be between 95% and 105% of the number it could afford to employ: it is predicted that <b>supply will meet demand</b> .
Supply exceeds capacity to employ	Above 105%	At current rates of production, by 2030 the country will produce more SRMNAH workers than it can afford to employ: a <b>demand-based oversupply</b> is predicted.

The total, regional and income group demand-based SRMNAH worker shortages presented in SoWMy 2021 were calculated by: (1) for each country, subtracting the supply from the number of DSEs demanded to obtain an estimate of that country’s shortage, then (2) summing each country’s shortage to give regional, income group and global estimates. Countries with an “excess” supply (i.e. where supply was larger than the number of DSEs demanded) were excluded from this calculation, on the premise that their demand-based oversupply cannot easily be used to compensate for the demand-based shortages in other countries.

### References for Webappendix 3

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## Webappendix 4: WHO Member States providing data for key analyses

### Chapters 3 and 6:

	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Afghanistan	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Albania											✓
Algeria					✓						✓
Andorra											✓
Angola											✓
Antigua and Barbuda											✓
Argentina					✓						✓
Armenia											✓
Australia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Austria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Azerbaijan											✓
Bahamas					✓						✓
Bahrain											
Bangladesh	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barbados											✓
Belarus											✓
Belgium					✓						✓
Belize											✓
Benin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Bhutan	✓	✓		✓		✓	✓	✓	✓	✓	✓
Bolivia (Plurinational State of)	✓	✓		✓	✓	✓		✓	✓	✓	✓
Bosnia and Herzegovina											✓
Botswana											✓
Brazil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brunei Darussalam											✓
Bulgaria					✓						✓
Burkina Faso	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Burundi	✓	✓	✓		✓						
Cabo Verde											
Cambodia	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓



	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Cameroon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Canada	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Central African Republic				✓	✓	✓	✓	✓	✓	✓	✓
Chad	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Chile					✓						
China											✓
Colombia											✓
Comoros	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Congo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cook Islands											✓
Costa Rica											✓
Côte d'Ivoire	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Croatia											✓
Cuba											✓
Cyprus			✓	✓	✓	✓	✓	✓	✓	✓	✓
Czech Republic					✓						✓
Democratic People's Republic of Korea											
Democratic Republic of the Congo											
Denmark					✓						✓
Djibouti											
Dominica											✓
Dominican Republic											✓
Ecuador					✓						✓
Egypt											
El Salvador											✓
Equatorial Guinea											
Eritrea											✓
Estonia	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Eswatini		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ethiopia					✓						
Fiji					✓						✓
Finland		✓	✓		✓						✓
France	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gabon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Gambia					✓						✓
Georgia					✓						✓
Germany											✓
Ghana	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Greece											✓
Grenada											✓
Guatemala											✓
Guinea	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Guinea-Bissau	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Guyana	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Haiti	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Honduras											✓
Hungary											✓
Iceland					✓						✓
India	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Indonesia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iran (Islamic Republic of)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iraq	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Ireland					✓						✓
Israel											✓
Italy					✓						✓
Jamaica	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Japan	✓		✓	✓	✓	✓		✓	✓	✓	✓
Jordan											✓
Kazakhstan											✓
Kenya		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kiribati		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kuwait											
Kyrgyzstan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lao People's Democratic Republic	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Latvia											✓
Lebanon					✓						✓
Lesotho											✓
Liberia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Libya		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lithuania											✓
Luxembourg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Madagascar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Malawi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Malaysia											✓
Maldives											✓
Mali	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Malta											✓
Marshall Islands											✓
Mauritania	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mauritius											
Mexico	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Micronesia (Federated States of)											✓
Monaco											✓
Mongolia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Montenegro											✓
Morocco					✓						✓
Mozambique				✓	✓	✓	✓	✓	✓	✓	✓
Myanmar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Namibia	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Nauru											
Nepal		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Netherlands	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
New Zealand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nicaragua											✓
Niger	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Nigeria					✓						✓
Niue											
North Macedonia											✓
Norway					✓						✓
Oman											✓
Pakistan	✓	✓	✓		✓					✓	✓
Palau											✓

	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Panama											✓
Papua New Guinea		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Paraguay	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peru	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Philippines					✓						✓
Poland					✓						✓
Portugal		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Qatar											✓
Republic of Korea					✓						✓
Republic of Moldova											✓
Romania					✓						✓
Russian Federation											✓
Rwanda	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Saint Kitts and Nevis											✓
Saint Lucia											✓
Saint Vincent and the Grenadines											✓
Samoa											✓
San Marino											✓
Sao Tome and Principe											
Saudi Arabia			✓	✓	✓	✓	✓	✓	✓	✓	
Senegal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serbia					✓						✓
Seychelles											✓
Sierra Leone					✓						✓
Singapore											✓
Slovakia											✓
Slovenia					✓						✓
Solomon Islands		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Somalia					✓						
South Africa											✓
South Sudan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Spain			✓	✓	✓	✓	✓	✓	✓	✓	✓
Sri Lanka					✓						✓
Sudan	✓		✓	✓	✓	✓	✓	✓	✓	✓	

	Fig 3.1: education duration	Fig 3.2: midwife educators	Fig 3.3: highest qualification	Tab 3.1: legislation	Tab 3.1: association	Fig 3.4: regulation	Fig 3.5: licensing	Tab 3.2: BEmONC	Tab 3.3: contra- ception	Tab 6.1: midwife leaders	Fig 6.1: attack policy
Suriname					✓						✓
Sweden		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Switzerland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Syrian Arab Republic		✓		✓	✓	✓	✓	✓	✓	✓	
Tajikistan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thailand					✓						✓
Timor-Leste	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Togo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tonga											✓
Trinidad and Tobago	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tunisia					✓						✓
Turkey					✓						✓
Turkmenistan											✓
Tuvalu											✓
Uganda	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ukraine											✓
United Arab Emirates											
United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
United Republic of Tanzania											✓
United States of America		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Uruguay	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Uzbekistan											✓
Vanuatu		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Venezuela (Bolivarian Republic of)											✓
Viet Nam	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Yemen					✓						✓
Zambia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zimbabwe		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Chapters 4-5 and Webappendix 1:

	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Afghanistan	✓	✓	✓	✓	✓	✓		✓			
Albania	✓	✓	✓	✓	✓	✓		✓	✓		
Algeria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Andorra		✓	✓	✓	✓						
Angola	✓		✓	✓	✓						
Antigua and Barbuda	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Argentina	✓		✓	✓	✓					✓	
Armenia	✓	✓	✓	✓	✓	✓		✓		✓	
Australia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Austria	✓	✓	✓	✓	✓	✓		✓		✓	
Azerbaijan	✓	✓	✓	✓	✓	✓	✓	✓			
Bahamas	✓	✓	✓	✓	✓	✓		✓			
Bahrain	✓		✓	✓	✓						
Bangladesh	✓	✓		✓	✓	✓	✓	✓	✓		✓
Barbados	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Belarus	✓	✓	✓	✓	✓	✓		✓			
Belgium	✓	✓	✓	✓	✓	✓		✓		✓	
Belize	✓	✓	✓	✓	✓	✓		✓		✓	
Benin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bhutan	✓		✓	✓	✓					✓	✓
Bolivia (Plurinational State of)	✓		✓	✓	✓					✓	
Bosnia and Herzegovina	✓	✓	✓	✓	✓	✓		✓		✓	
Botswana	✓	✓	✓	✓	✓	✓		✓		✓	
Brazil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brunei Darussalam	✓		✓	✓	✓					✓	
Bulgaria	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Burkina Faso	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Burundi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cabo Verde	✓		✓	✓	✓					✓	
Cambodia	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Cameroon	✓										
Canada	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	



	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Central African Republic	✓	✓	✓	✓	✓	✓		✓			
Chad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Chile	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
China	✓		✓	✓	✓					✓	
Colombia	✓		✓	✓	✓					✓	
Comoros	✓	✓		✓	✓		✓		✓		
Congo	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Cook Islands	✓	✓	✓	✓	✓	✓				✓	✓
Costa Rica	✓	✓	✓	✓	✓	✓		✓		✓	✓
Côte d'Ivoire	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Croatia	✓	✓	✓	✓	✓	✓		✓		✓	
Cuba	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Cyprus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Czech Republic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Democratic People's Republic of Korea	✓	✓	✓	✓	✓	✓					
Democratic Republic of the Congo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Denmark	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Djibouti	✓	✓	✓	✓	✓	✓		✓			
Dominica			✓	✓	✓						
Dominican Republic	✓		✓	✓	✓					✓	✓
Ecuador	✓	✓	✓	✓	✓	✓		✓		✓	✓
Egypt	✓		✓	✓	✓					✓	✓
El Salvador	✓		✓	✓	✓					✓	✓
Equatorial Guinea	✓		✓	✓	✓						
Eritrea	✓	✓	✓	✓	✓	✓		✓		✓	
Estonia	✓	✓	✓	✓	✓	✓		✓		✓	
Eswatini	✓	✓	✓	✓	✓	✓		✓		✓	✓
Ethiopia	✓	✓	✓	✓	✓	✓		✓			
Fiji	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Finland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
France	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gabon	✓	✓	✓	✓	✓	✓		✓			
Gambia	✓	✓	✓	✓	✓	✓	✓	✓			

	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Georgia	✓	✓	✓	✓	✓	✓		✓			
Germany	✓	✓	✓	✓	✓	✓		✓		✓	
Ghana	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Greece	✓	✓	✓	✓	✓	✓		✓		✓	
Grenada	✓		✓	✓	✓					✓	
Guatemala	✓		✓	✓	✓					✓	✓
Guinea	✓	✓	✓	✓	✓	✓	✓	✓			
Guinea-Bissau	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Guyana	✓	✓	✓	✓	✓	✓				✓	
Haiti	✓	✓	✓	✓	✓	✓		✓			
Honduras	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hungary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iceland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
India	✓	✓*	✓	✓	✓	✓		✓		✓	
Indonesia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iran (Islamic Republic of)	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Iraq	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Ireland	✓	✓	✓	✓	✓	✓		✓		✓	
Israel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Italy	✓	✓	✓	✓	✓	✓		✓			
Jamaica	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Japan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Jordan	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Kazakhstan	✓	✓	✓	✓	✓	✓		✓			
Kenya	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Kiribati	✓	✓	✓	✓	✓	✓		✓		✓	✓
Kuwait	✓		✓	✓	✓						
Kyrgyzstan	✓	✓	✓	✓	✓	✓	✓	✓			
Lao People's Democratic Republic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Latvia	✓	✓	✓	✓	✓	✓		✓		✓	
Lebanon	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Lesotho	✓		✓		✓						
Liberia	✓		✓	✓	✓					✓	
Libya	✓	✓	✓	✓	✓	✓					

	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Lithuania	✓	✓	✓	✓	✓	✓		✓		✓	
Luxembourg	✓	✓	✓	✓	✓	✓		✓		✓	
Madagascar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Malawi	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Malaysia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Maldives	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mali	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Malta	✓	✓	✓	✓	✓	✓		✓			
Marshall Islands	✓	✓	✓	✓	✓	✓				✓	✓
Mauritania	✓	✓	✓	✓	✓	✓	✓	✓			
Mauritius	✓		✓	✓	✓						
Mexico	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Micronesia (Federated States of)	✓	✓	✓	✓	✓	✓		✓		✓	✓
Monaco		✓	✓	✓	✓						
Mongolia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Montenegro	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Morocco	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Mozambique	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Myanmar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Namibia	✓		✓	✓	✓						
Nauru	✓	✓	✓	✓	✓	✓				✓	
Nepal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Netherlands	✓	✓	✓	✓	✓	✓		✓		✓	
New Zealand	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Nicaragua	✓		✓	✓	✓					✓	
Niger	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Nigeria	✓	✓	✓	✓	✓	✓		✓		✓	✓
Niue	✓	✓	✓	✓	✓	✓				✓	
North Macedonia	✓		✓	✓	✓						
Norway	✓	✓	✓	✓	✓	✓		✓		✓	
Oman	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Pakistan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Palau	✓	✓	✓	✓	✓	✓				✓	✓
Panama	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Papua New Guinea	✓	✓	✓	✓	✓	✓		✓		✓	✓
Paraguay	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peru	✓	✓	✓	✓	✓	✓		✓		✓	
Philippines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Poland	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Portugal	✓	✓	✓	✓	✓	✓		✓		✓	
Qatar	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Republic of Korea	✓	✓	✓	✓	✓	✓		✓			
Republic of Moldova	✓	✓	✓	✓	✓	✓		✓			
Romania	✓	✓	✓	✓	✓	✓		✓		✓	
Russian Federation	✓	✓	✓	✓	✓	✓		✓			
Rwanda	✓	✓	✓	✓	✓	✓	✓	✓			✓
Saint Kitts and Nevis			✓	✓	✓						
Saint Lucia	✓	✓	✓	✓	✓	✓		✓			
Saint Vincent and the Grenadines	✓		✓	✓	✓					✓	
Samoa	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
San Marino		✓	✓	✓	✓						
Sao Tome and Principe	✓		✓	✓	✓					✓	
Saudi Arabia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Senegal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serbia	✓	✓	✓	✓	✓	✓		✓			✓
Seychelles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sierra Leone	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Singapore	✓	✓	✓	✓	✓	✓		✓		✓	
Slovakia	✓	✓	✓	✓	✓	✓		✓		✓	
Slovenia	✓	✓	✓	✓	✓	✓		✓		✓	
Solomon Islands	✓	✓	✓	✓	✓	✓		✓		✓	✓
Somalia	✓	✓	✓	✓	✓	✓			✓		✓
South Africa	✓	✓	✓	✓	✓	✓		✓		✓	
South Sudan	✓										
Spain	✓	✓	✓	✓	✓	✓		✓		✓	
Sri Lanka	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sudan	✓	✓	✓	✓	✓	✓		✓	✓		
Suriname	✓	✓	✓	✓	✓	✓		✓		✓	✓

	Figs 4.1 & 4.2: need	Tab 4.2 & Fig 4.3: midwife density	Tab A1.4: nurse density	Tab A1.5: doctor density	Figs 4.4 & 4.5: workforce composition	Tab 4.3 & Fig 4.7: met need	Fig 4.6: midwife age	Figs 4.8 & 4.9: met demand	Fig 5.1: midwife gender	Fig 5.1: nurse gender	Fig 5.1: doctor gender
Sweden	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Switzerland	✓	✓	✓	✓	✓	✓		✓		✓	
Syrian Arab Republic	✓		✓	✓	✓						
Tajikistan	✓	✓	✓	✓	✓	✓		✓		✓	
Thailand	✓		✓	✓	✓					✓	✓
Timor-Leste	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Togo	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Tonga	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Trinidad and Tobago	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Tunisia	✓		✓	✓	✓			✓**			✓
Turkey	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Turkmenistan	✓	✓	✓	✓	✓	✓		✓			
Tuvalu	✓	✓	✓	✓	✓	✓				✓	✓
Uganda	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Ukraine	✓	✓	✓	✓	✓	✓		✓			
United Arab Emirates	✓		✓	✓	✓					✓	
United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
United Republic of Tanzania	✓	✓	✓	✓	✓	✓		✓		✓	
United States of America	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Uruguay	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Uzbekistan	✓	✓	✓	✓	✓	✓	✓	✓			
Vanuatu	✓	✓	✓	✓	✓	✓		✓		✓	✓
Venezuela (Bolivarian Republic of)	✓		✓	✓	✓					✓	
Viet Nam	✓	✓	✓	✓	✓	✓		✓			
Yemen	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Zambia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Zimbabwe	✓	✓	✓	✓	✓	✓		✓	✓		✓

\* India is included in Figure 4.3 but not in Table 4.2. \*\* Tunisia is included in Figure 4.8 but not Figure 4.9.

## Webappendix 5: Estimating health worker time needed for universal coverage of essential interventions

For each of the essential sexual, reproductive, maternal, newborn and adolescent health (SRMNAH) interventions, the following table explains how the amount of health worker time needed to deliver the intervention was estimated. Duration of contacts with an SRMNAH worker were taken from [OneHealth](#) where available, and otherwise expert opinion was sought.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
<b>WOMEN (INCLUDING PRE-PREGNANCY INTERVENTIONS)</b>		
Information and counselling for sexual and reproductive health, including contraception	One 20-minute contact per woman of reproductive age (WRA) per year	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> United Nations (UN) Population Division World Population Prospects database, medium variant, 2019 revision ( <a href="https://population.un.org/wpp/">https://population.un.org/wpp/</a> ), accessed 5 October 2020, except for: Cook Islands, Marshall islands, Nauru, Niue, Palau, Tokelau and Tuvalu which were obtained from the sources used for the 2019 Pacific States SoWMy report ( <a href="https://pacific.unfpa.org/en/publications/state-pacifics-rmncah-workforce-2019-report">https://pacific.unfpa.org/en/publications/state-pacifics-rmncah-workforce-2019-report</a> ).
Delivery of condoms, vaginal barriers, vaginal tablets	Three contacts per year totalling 35 minutes per WRA using condoms, estimated as follows: WRA x (contraceptive prevalence rate (CPR) + unmet need) x % of female contraceptive users who use male or female condoms	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above.
Delivery of contraceptive pills and injectables	Three contacts per year totalling 40 minutes per WRA using pills or injectables, estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use pills or injectables	<b>Indicator:</b> CPR (any method), 2019-2030. <b>Source:</b> UN Department of Economic and Social Affairs family planning indicators ( <a href="https://www.un.org/en/development/desa/population/theme/family-planning/cp_model.asp">https://www.un.org/en/development/desa/population/theme/family-planning/cp_model.asp</a> ), accessed 12 August 2020. A regional mean was applied for countries not included within this source.
Insertion and extraction of contraceptive implants	One 60-minute contact every 5 years per WRA using implants (assuming Jadelle), estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use implants	<b>Indicator:</b> Unmet need for contraception (%). <b>Source:</b> UN Department of Economic and Social Affairs family planning indicators as above.
Intrauterine device (IUD) insertion	One 55-minute contact every 10 years per WRA using IUD (assuming Copper T 380-A-IUD), estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use IUDs	<b>Indicator:</b> % of female contraceptive users (aged 15-49) who use each type. <b>Source:</b> UN Department of Economic and Social Affairs World Contraceptive Use dataset 2019 ( <a href="https://www.un.org/en/development/desa/population/publications/dataset/contraception/wcu2019.asp">https://www.un.org/en/development/desa/population/publications/dataset/contraception/wcu2019.asp</a> ), accessed 12 August 2020. A regional mean was applied for countries not included within this source.
Female sterilization	One 100-minute contact per unsterilized WRA requesting sterilization, estimated as follows: (New members of the WRA cohort, i.e. 20% of women aged 15-19) x (CPR + unmet need) x (% of female contraceptive users who use female sterilization)	
Prevention of sexually transmitted infections (STIs), including human	One 10-minute contact per woman aged 15+ per year	<b>Indicator:</b> Number of women aged 15+ (2019-2030). <b>Source:</b> UN Population Division World Population Prospects database as above.



Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
immunodeficiency virus (HIV) and syphilis		
Detection of HIV	<p>One 10-minute contact per WRA reporting risky behaviours, estimated as follows:</p> <p>WRA x (prevalence of intravenous drug use among women + % of WRA reporting higher-risk sex in last year)</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of intravenous drug use among women.</p> <p><b>Source:</b> Degenhardt et al. (2017) Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: A multistage systematic review (<a href="https://www.thelancet.com/action/showPdf?pii=S2214-109X%2817%2930375-3">https://www.thelancet.com/action/showPdf?pii=S2214-109X%2817%2930375-3</a> ). Regional estimates applied to all countries.</p> <p><b>Indicator:</b> % of WRA reporting higher-risk sex in last year.</p> <p><b>Source:</b> Most recent Demographic &amp; Health Survey (DHS) for LMICs (<a href="https://www.statcompiler.com/en/">https://www.statcompiler.com/en/</a>), accessed 4 September 2020. Regional means applied for low- and middle-income countries (LMICs) without a DHS. Estimate of 9% applied to all high-income countries (HICs), based on data from population surveys from the UK and New Zealand (2010-12 NATSAL and 2014-15 national health survey respectively).</p>
Detection of other STIs	<p>One 10-minute contact per WRA reporting risky behaviours, estimated as follows:</p> <p>WRA x % of WRA reporting higher-risk sex in last year</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> % of WRA reporting higher-risk sex in last year.</p> <p><b>Source:</b> As above.</p>
Treatment of HIV	<p>Four contacts per year totalling 240 minutes* per WRA with HIV per year, estimated as follows:</p> <p>WRA x HIV prevalence in WRA</p> <p>* To cover first-link anti-retroviral therapy only</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> HIV prevalence in WRA (%).</p> <p><b>Source:</b> Global Burden of Disease (GBD) study 2019 (<a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.</p>
Treatment of syphilis	<p>One 15-minute contact per WRA with syphilis, estimated as follows:</p> <p>WRA x prevalence of syphilis in WRA</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of syphilis in WRA (%).</p> <p><b>Source:</b> GBD study 2019 (<a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.</p>
Treatment of gonorrhoea	<p>One 15-minute contact per WRA with gonorrhoea, estimated as follows:</p> <p>WRA x prevalence of gonorrhoea in WRA</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of gonorrhoea in WRA (%).</p>

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
		<b>Source:</b> GBD study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.
Treatment of chlamydia	One 15-minute contact per WRA with chlamydia, estimated as follows: WRA x prevalence of chlamydia in WRA	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of chlamydia in WRA (%). <b>Source:</b> GBD study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.
Treatment of trichomoniasis	One 15-minute contact per WRA with trichomoniasis, estimated as follows: WRA x prevalence of trichomoniasis in WRA	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of trichomoniasis in WRA (%). <b>Source:</b> GBD study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.
Treatment of pelvic inflammatory disease (PID) <sup>§</sup>	One 15-minute contact per WRA with PID, estimated as follows: WRA x (0.1 <sup>1</sup> x (prevalence of syphilis in WRA + prevalence of gonorrhoea in WRA + prevalence of chlamydia in WRA + prevalence of trichomoniasis in WRA))	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of syphilis, gonorrhoea, chlamydia, trichomoniasis in WRA (%). <b>Source:</b> As above.
Pre-conception iron and folic acid supplementation	One 10-minute contact per woman trying to conceive, estimated as follows: pregnancies x 0.6 <sup>2</sup>	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> Live births from UN World Population Prospects 2019 revision ( <a href="https://population.un.org/wpp/">https://population.un.org/wpp/</a> ) accessed 5 October 2020, with a multiplier to account for stillbirths, spontaneous abortions and induced abortions based on estimates made by the Guttmacher Institute <sup>3</sup> and used in Tatem et al. 2014 ( <a href="https://ij-healthgeographics.biomedcentral.com/articles/10.1186/1476-072X-13-2">https://ij-healthgeographics.biomedcentral.com/articles/10.1186/1476-072X-13-2</a> )
Safe abortion (wherever legal)	One 27-minute contact* per legal abortion (assuming surgical rather than medical procedure used), estimated as follows: WRA/1,000 x abortions per 1,000 WRA  * 15 minutes for a professional midwife or nurse + 12 minutes for a doctor (on average)	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Abortions per 1,000 WRA. <b>Source:</b> Bearak et al. (2020) Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990-2019 ( <a href="https://www.thelancet.com/action/showPdf?pii=S2214-109X%2820%2930315-6">https://www.thelancet.com/action/showPdf?pii=S2214-109X%2820%2930315-6</a> ). Regional estimates applied to all countries.

<sup>1</sup> According to CDC, 10% of women with a previous STI diagnosis are likely to develop PID (<https://www.cdc.gov/std/stats18/womenandinf.htm#pid>)

<sup>2</sup> Assuming that 60% of pregnancies are intended: see Sedgh et al. 2014 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4727534/>)

<sup>3</sup> Guttmacher Institute, 16 February 2014, tabulations of data for Singh S, Darroch JE and Ashford LS. Adding it up: The costs and benefits of investing in sexual and reproductive health. New York: Guttmacher Institute; 2014.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
Post-abortion care	Contact totalling 165-minutes* per spontaneous or induced abortion (legal or illegal), estimated as follows: (live births x 0.2 <sup>4</sup> ) + (WRA/1,000 x abortions per 1,000 WRA) * 66 minutes for an associate midwife or nurse + 66 minutes for a professional midwife or nurse + 33 minutes for an ob/gyn (on average)	<b>Indicator:</b> Live births (2019-2030). <b>Source:</b> United Nations Population Division World Population Prospects database, medium variant, 2019 revision ( <a href="https://population.un.org/wpp/">https://population.un.org/wpp/</a> ), accessed 5 October 2020. <b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Abortions per 1,000 WRA. <b>Source:</b> As above.
Screening for cervical cancer	One 10-minute contact every three years per WRA	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above.
Screening for breast cancer	One 15-minute* contact every year per woman aged 40-69 * assuming clinical breast exam rather than mammogram	<b>Indicator:</b> Number of women aged 40-69 (2019-2030). <b>Source:</b> United Nations Population Division World Population Prospects database, medium variant, 2019 revision ( <a href="https://population.un.org/wpp/">https://population.un.org/wpp/</a> ), accessed 5 October 2020.
Ectopic pregnancy case management <sup>5</sup>	Contacts totalling 420 minutes* per ectopic pregnancy, estimated as follows: WRA x incidence of ectopic pregnancy * 170 minutes for a midwife or nurse + 250 minutes for a doctor	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Incidence of ectopic pregnancy. <b>Source:</b> GBD study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 30 August 2020.
<b>PREGNANCY (ANTENATAL CARE)</b>		
Early and appropriate antenatal care (eight visits) <sup>5</sup>	Eight 10-minute contacts per pregnancy of >12 weeks gestation, estimated as follows: live births + stillbirths	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Stillbirths (2019-2030). <b>Source:</b> Blencowe et al. (2016) National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis ( <a href="https://www.thelancet.com/action/showPdf?pii=S2214-109X%2815%2900275-2">https://www.thelancet.com/action/showPdf?pii=S2214-109X%2815%2900275-2</a> ). 2015 stillbirth rate applied to live births for future years.
Screening for maternal illness, e.g. heart disease	One 5-minute contact per pregnancy	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above.
Iron and folic acid supplementation	One 8-minute contact per pregnancy	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above.
Tetanus immunization	Contacts totalling 5 minutes per pregnancy	<b>Indicator:</b> Number of pregnancies (2019-2030).

<sup>4</sup> To represent spontaneous abortions.

<sup>5</sup> Including the following essential interventions: identification of GBV/IPV; accurate determination of gestational age; prevention of and screening for hypertensive disorders; counselling on family planning, birth and emergency preparedness, screening for and prevention of STIs (syphilis and hepatitis B), detection of risk factors for genetic conditions.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
		<b>Source:</b> As above.
Prevention of mother-to-child transmission of HIV (PMTCT), including with antiretrovirals	Contacts totalling 360 minutes per pregnant woman with HIV, estimated as follows: pregnancies x HIV prevalence in WRA	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> HIV prevalence in WRA. <b>Source:</b> As above.
Prevention of malaria, including insecticide-treated nets and intermittent preventive treatment	Contacts totalling 6-minutes per pregnant woman living in areas of high malaria transmission, estimated as follows: pregnancies x % of population living in areas of high malaria transmission	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> % of population living in areas of high malaria transmission. <b>Source:</b> WHO (2019) World Malaria Report country profiles ( <a href="https://www.who.int/malaria/publications/country-profiles/en/">https://www.who.int/malaria/publications/country-profiles/en/</a> ), accessed 2 September 2020. Assumed 0% for countries not included in the report.
Treatment of malaria in pregnancy	One 4-minute contact per pregnant woman with malaria, estimated as follows: pregnancies x incidence of presumed and confirmed malaria cases	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Incidence of presumed and confirmed malaria cases (%). <b>Source:</b> WHO (2019) World Malaria Report as above, 2018 values.
Identification and response to intimate partner violence <sup>5</sup>	One 16-minute contact per pregnant woman (to cover identification and referral to specialist services)	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above.
Smoking cessation	One 16-minute contact per pregnant woman who smokes, estimated as follows: pregnancies x prevalence of current tobacco use among adult women	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of current tobacco use (% of female adults). <b>Source:</b> World Bank world development indicators ( <a href="https://databank.worldbank.org/source/world-development-indicators#">https://databank.worldbank.org/source/world-development-indicators#</a> ), accessed 2 September 2020. A regional mean was applied for countries not included in this source.
Management of syphilis	Contacts totalling 17 minutes per pregnant woman with syphilis, estimated as follows: pregnancies x incidence of syphilis in WRA	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Incidence of syphilis in WRA. <b>Source:</b> GBD study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.
Dietary counselling for healthy weight gain and adequate nutrition	Contacts totalling 10 minutes per pregnant woman	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above.
Prevention of and screening for gestational diabetes	Contacts totalling 10 minutes per pregnant woman	<b>Indicator:</b> Number of pregnancies (2019-2030). <b>Source:</b> As above.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
Calcium supplementation for prevention of pre-eclampsia and eclampsia (PEE) <sup>5</sup>	<p>Contacts totalling 10 minutes per pregnant woman at risk of PEE, estimated as follows:</p> <p>pregnancies x ((% of pregnant women who are primiparous) + (100 - % of pregnant women who are primiparous) x % of pregnant women who experience PEE)</p>	<p><b>Indicator:</b> Number of pregnancies (2019-2030).  <b>Source:</b> As above.</p> <p><b>Indicator:</b> % of pregnant women who are primiparous.  <b>Source:</b> Most recent DHS (<a href="https://www.statcompiler.com/en/">https://www.statcompiler.com/en/</a>), accessed 21 November 2020. For countries without a DHS, an estimate was made based on the 2015-2020 total fertility rate (TFR), obtained from World Population Prospects 2019 revision (as above). The lower the TFR, the higher the % of pregnant women who are primiparous.</p> <p><b>Indicator:</b> % of pregnant women who experience PEE.  <b>Source:</b> Abalos et al. (2013) Global and regional estimates of preeclampsia and eclampsia: a systematic review (<a href="https://www.ejog.org/article/S0301-2115(13)00196-6/fulltext">https://www.ejog.org/article/S0301-2115(13)00196-6/fulltext</a>). Regional estimates applied to all countries.</p>
Treatment of gestational diabetes	<p>Contacts totalling 70 minutes per pregnant woman with gestational diabetes, estimated as follows:</p> <p>pregnancies x prevalence of gestational diabetes</p>	<p><b>Indicator:</b> Number of pregnancies (2019-2030).  <b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of gestational diabetes.  <b>Source:</b> Guariguata et al. (2013) Global estimates of the prevalence of hyperglycaemia in pregnancy (<a href="https://www.diabetesresearchclinicalpractice.com/article/S0168-8227(13)00386-0/pdf">https://www.diabetesresearchclinicalpractice.com/article/S0168-8227(13)00386-0/pdf</a>). Regional estimates applied to all countries.</p>
Treatment of eclampsia	<p>Contacts totalling 360 minutes* per pregnant woman with eclampsia, estimated as follows:</p> <p>pregnancies x incidence of eclampsia x % of eclampsia cases occurring antenatally</p> <p>* 240 minutes for professional midwife + 120 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of pregnancies (2019-2030).  <b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of eclampsia (% of births).  <b>Source:</b> Abalos et al. (2013) as above.</p> <p><b>Indicator:</b> % of eclampsia cases occurring antenatally.  <b>Source:</b> Thornton et al. (2013) The incidence of preeclampsia and eclampsia and associated maternal mortality in Australia from population-linked datasets (<a href="https://www.ajog.org/article/S0002-9378(13)00237-8/abstract">https://www.ajog.org/article/S0002-9378(13)00237-8/abstract</a>). Estimate of 26% applied to all countries.</p>
Treatment of pre-eclampsia	<p>Contacts totalling 1,500 minutes* per pregnant woman with pre-eclampsia, estimated as follows:</p> <p>pregnancies x incidence of maternal hypertensive disorders</p> <p>* 1,440 minutes for professional midwife + 60 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of pregnancies (2019-2030).  <b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of maternal hypertensive disorders.  <b>Source:</b> Abalos et al. (2013) as above.</p>
Management of obstetric complications (preterm premature rupture of	<p>One 30-minute* contact per pregnant woman with obstetric complications, estimated as follows:</p> <p>(live births + stillbirths) x incidence of pPROM</p> <p>* 20 minutes for professional midwife + 10 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).  <b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p>

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
membranes (pPROM), macrosomia, etc.)		<p><b>Source:</b> Blencowe et al. (2016) as above.</p> <p><b>Indicator:</b> Incidence of pPROM (%).</p> <p><b>Source:</b> WHO global survey on maternal and perinatal health 2005, Table 4.1 (<a href="https://www.who.int/reproductivehealth/topics/best_practices/GS_Tabulation.pdf?ua=1">https://www.who.int/reproductivehealth/topics/best_practices/GS_Tabulation.pdf?ua=1</a>). The regional mean was applied for countries whose region was represented in the survey, and the global mean of 10.3% was applied for all other countries.</p>
Antenatal corticosteroids for women at risk of birth from 24-34 weeks of gestation when appropriate conditions are met	<p>One 70-minute* contact per preterm birth, estimated as follows: (live births + still births) x preterm birth rate (&lt;35 weeks)</p> <p>* 40 minutes for professional midwife or nurse + 30 minutes for doctor (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Preterm birth rate (&lt;35 weeks).</p> <p><b>Source:</b> Healthy Newborn Network numbers, January 2020 update (<a href="https://www.healthynewbornnetwork.org/numbers/">https://www.healthynewbornnetwork.org/numbers/</a>), accessed 21 November 2020. This source gives estimates for % of births at &lt;37 weeks and &lt;28 weeks. The % born at &lt;35 weeks was estimated assuming an exponential trend between these two estimates.</p>
Management of malpresentation at term	<p>One 107-minute* contact per case of malpresentation at term, estimated as follows: (live births + still births) x 0.04<sup>6</sup></p> <p>* 90 minutes for professional midwife + 17 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
<b>CHILDBIRTH</b>		
Facility-based childbirth with a skilled attendant <sup>7</sup>	<p>Contacts totalling 390 minutes* per birth, estimated as follows: live births + stillbirths</p> <p>* 360 minutes for professional midwife + 30 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
Active management of third stage of labour	<p>One 10-minute contact per birth, estimated as follows: live births + stillbirths</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
Management of prolonged or obstructed labour	<p>Contacts totalling 480 minutes* per case of prolonged or obstructed labour, estimated as follows:</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p>

<sup>6</sup> WHO multicountry study on MNH 2010-2012, reported in Vogel 2015 ([https://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X\(15\)70094-X.pdf](https://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(15)70094-X.pdf)) gives a global estimate of 4% for malpresentation at term.

<sup>7</sup> Including the following essential interventions: routine monitoring with partograph, detection of infections, and hygienic management of the cord at birth.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
	(live births + stillbirths) x incidence of prolonged or obstructed labour * 360 minutes for professional midwife + 120 minutes for ob/gyn (on average)	<b>Indicator:</b> Number of stillbirths (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Incidence of prolonged or obstructed labour (% of live births) <b>Source:</b> Dolea & Abouzahr 2003: Global burden of obstructed labour in the year 2000 ( <a href="https://www.who.int/healthinfo/statistics/bod_obstructedlabour.pdf">https://www.who.int/healthinfo/statistics/bod_obstructedlabour.pdf</a> ). Regional estimates applied to all countries.
Instrumental delivery for maternal/fetal indications	One 90-minute* contact per birth requiring instrumental delivery, estimated as follows: (live births + stillbirths) x 0.1 <sup>8</sup> * 60 minutes for midwife + 30 minutes for ob/gyn (on average)	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Number of stillbirths (2019-2030). <b>Source:</b> As above.
Caesarean section for maternal/fetal indications	One 390-minute* contact per birth requiring caesarean section, estimated as follows: (live births + stillbirths) x 0.1 <sup>9</sup> * 210 minutes for associate midwife or nurse + 90 minutes for professional midwife or nurse + 90 minutes for ob/gyn (on average)	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Number of stillbirths (2019-2030). <b>Source:</b> As above.
Induction of labour for gestation >41 completed weeks <sup>10</sup>	One 60-minute* contact per birth occurring after 41 completed weeks of gestation, estimated as follows: (live births + stillbirths) x 0.05 <sup>11</sup> * 40 minutes for professional midwife + 20 minutes for ob/gyn (on average)	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Number of stillbirths (2019-2030). <b>Source:</b> As above.
Management of intrapartum haemorrhage	One 195-minute* contact per case of intrapartum haemorrhage, estimated as follows: WRA x (0.1 <sup>12</sup> x incidence of maternal haemorrhage among WRA) * 80 minutes for professional midwife or nurse + 115 minutes for doctor (on average)	<b>Indicator:</b> Number of WRA (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Incidence of maternal haemorrhage among WRA (%). <b>Source:</b> Global Burden of Disease study 2019 ( <a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a> ), accessed 22 November 2020.
Prevention and management of eclampsia (including with magnesium sulphate)	Contacts totalling 1,500 minutes* per case of intrapartum eclampsia, estimated as follows: (live births + stillbirths) x incidence of eclampsia x % of eclampsia cases occurring during childbirth	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Number of stillbirths (2019-2030).

<sup>8</sup> Assumption based on average intrapartum caesarean section rate from WHO multicountry study on MNH 2010-2012.

<sup>9</sup> Assume "recommended" rate is 10% as per WHO guidance ([https://apps.who.int/iris/bitstream/handle/10665/161442/WHO\\_RHR\\_15.02\\_eng.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/161442/WHO_RHR_15.02_eng.pdf?sequence=1)).

<sup>10</sup> Other common indications for induction include pre-eclampsia, gestational diabetes and pPROM, but the time estimates for these conditions are included elsewhere.

<sup>11</sup> OneHealth indicates 5% of pregnancies go beyond 41 completed weeks of gestation.

<sup>12</sup> Based on the assumption that 10% of cases of maternal haemorrhage occur during labour and birth. This assumption makes no difference to the need estimates because the time needed for intrapartum haemorrhage is the same as for postpartum haemorrhage (see below), so all cases of maternal haemorrhage are counted in the same way.



Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
	* 1,000 minutes for professional midwife or nurse + 500 minutes for ob/gyn (on average)	<p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of eclampsia (% of births).</p> <p><b>Source:</b> Abalos et al. (2013) as above.</p> <p><b>Indicator:</b> % of eclampsia cases occurring during childbirth.</p> <p><b>Source:</b> Thornton et al. (2013) as above. Estimate of 46% applied to all countries.</p>
Management of women with or at risk of infections (including prophylactic use of antibiotics for caesarean section)	One 30-minute contact per woman with or at risk of infections, estimated as follows: (live births + stillbirths) x 0.1 <sup>13</sup>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
<b>POSTNATAL (MOTHER)</b>		
Care in the facility for mother and baby for at least 24 hours after an uncomplicated vaginal birth <sup>14</sup>	Contacts totalling 240 minutes* per birth, estimated as follows: live births + stillbirths * 120 minutes for associate professional midwife or nurse + 120 minutes for professional midwife or nurse (on average)	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
Promotion, protection and support of exclusive breastfeeding for 6 months	Contacts totalling 70 minutes* per live birth * 20 minutes for associate professional midwife or nurse and 50 minutes for professional midwife (on average)	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p>
Treatment of mastitis <sup>5</sup>	Contacts totalling 60 minutes per woman with mastitis, estimated as follows: live births x (0.25 <sup>15</sup> x early initiation of breastfeeding)	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Early initiation of breastfeeding (%).</p> <p><b>Source:</b> Healthy Newborn Network (2020) as above. A regional mean was applied for countries not included within this source.</p>
Management of postpartum haemorrhage (PPH)	Contacts totalling 345-minutes* per birth resulting in PPH, estimated as follows: WRA x (0.9 <sup>16</sup> x incidence of maternal haemorrhage) * 80 minutes for associate professional midwife or nurse + 150 minutes for professional midwife or nurse + 115 minutes for doctor (on average)	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of maternal haemorrhage among WRA (%).</p> <p><b>Source:</b> As above.</p>

<sup>13</sup> Recommended caesarean section rate ([https://apps.who.int/iris/bitstream/handle/10665/161442/WHO\\_RHR\\_15.02\\_eng.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/161442/WHO_RHR_15.02_eng.pdf?sequence=1)).

<sup>14</sup> Including the following essential interventions: (for the mother): eclampsia prevention, anaemia prevention, detection of postpartum sepsis, family planning advice and contraceptives, screening for cervical cancer in appropriate age group, identification of GBV/IPV, early detection of maternal morbidities, nutrition and lifestyle counselling; and (for the newborn): immediate drying and thermal care; early initiation of breastfeeding; hygienic cord and skin care; detection of bacterial infections and genetic conditions.

<sup>15</sup> Wilson et al. 2020 (<https://journals.sagepub.com/doi/full/10.1177/0890334420907898>) estimated that, on average, 1 in 4 breastfeeding women experience mastitis.

<sup>16</sup> Based on the assumption that 90% of cases of maternal haemorrhage occur postpartum.



Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
Management of eclampsia	<p>Contacts totalling 1,500 minutes* per case of postpartum eclampsia, estimated as follows:</p> <p>pregnancies x incidence of eclampsia x % of eclampsia cases occurring postpartum</p> <p>* 1,000 minutes for professional midwife + 500 minutes for ob/gyn (on average)</p>	<p><b>Indicator:</b> Number of pregnancies (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of eclampsia (% of births).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> % of eclampsia cases occurring postpartum.</p> <p><b>Source:</b> Thornton et al. (2013) as above. Estimate of 28% applied to all countries.</p>
Treatment of maternal anaemia	<p>One 30-minute* contact per case of maternal anaemia, estimated as follows:</p> <p>(live births + stillbirths) x prevalence of postpartum anaemia</p> <p>* 20 minutes for professional midwife or nurse + 10 minutes for doctor (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of postpartum anaemia (%).</p> <p><b>Source:</b> Milman (2011) Postpartum anemia I: definition, prevalence, causes and consequences (<a href="https://link.springer.com/article/10.1007/s00277-011-1279-z">https://link.springer.com/article/10.1007/s00277-011-1279-z</a>). Estimate of 50% applied to all HICs, and 65% to all LMICs.</p>
Management of postpartum sepsis	<p>Contacts totalling 240-minutes* per birth resulting in postpartum sepsis, estimated as follows:</p> <p>WRA x (incidence of maternal sepsis and other maternal infections among WRA)</p> <p>* 70 minutes for associate professional midwife or nurse + 140 minutes for professional midwife or nurse + 30 minutes for doctor (on average)</p>	<p><b>Indicator:</b> Number of WRA (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of maternal sepsis and other maternal infections among WRA.</p> <p><b>Source:</b> GBD study 2019 (<a href="http://ghdx.healthdata.org/gbd-results-tool">http://ghdx.healthdata.org/gbd-results-tool</a>), accessed 22 November 2020.</p>
Routine postpartum examination	<p>One 10-minute contact per birth, estimated as follows:</p> <p>live births + stillbirths</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
Initiation or continuation of antiretroviral therapy	<p>Contacts totalling 240 minutes per postpartum woman with HIV, estimated as follows:</p> <p>(live births + stillbirths) x HIV prevalence in WRA</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> HIV prevalence in WRA (%)</p> <p><b>Source:</b> As above.</p>
Response to intimate partner violence (IPV)	<p>Contacts totalling 35 minutes per new mother experiencing IPV, estimated as follows:</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p>

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
	(live births + stillbirths) x lifetime prevalence of IPV among ever-partnered women.	<p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Lifetime prevalence of IPV among ever-partnered women.</p> <p><b>Source:</b> WHO (2013) Global and regional estimates of violence against women (<a href="https://www.who.int/publications/i/item/9789241564625">https://www.who.int/publications/i/item/9789241564625</a>). Regional estimates applied to all countries.</p>
Screening for postpartum depression	One 10-minute contact per birth, estimated as follows: live births + stillbirths	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
Management of postpartum depression	<p>Contacts totalling 30-minutes* per birth, estimated as follows: (live births + stillbirths) x prevalence of postpartum depression * 20 minutes for professional midwife or nurse + 10 minutes for doctor (on average)</p> <p>NB this is the time required to make a referral to specialist care, not the time taken to treat the condition</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Prevalence of postpartum depression (%).</p> <p><b>Source:</b> Shorey et al. (2018) Prevalence and incidence of postpartum depression among healthy mothers: a systematic review and meta-analysis (<a href="https://www.sciencedirect.com/science/article/abs/pii/S0022395618304928">https://www.sciencedirect.com/science/article/abs/pii/S0022395618304928</a>). Regional estimates applied to all countries in regions included in the study (except Australia, which had a country estimate of 21%). Global mean of 17% applied to all other countries.</p>
Postnatal contact with an appropriately skilled health-care provider, at home or in a health facility, around day 3, day 7 and at 6 weeks after birth	Three contacts totalling 180 minutes per birth, estimated as follows: live births + stillbirths	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Number of stillbirths (2019-2030).</p> <p><b>Source:</b> As above.</p>
<b>POSTNATAL (NEWBORN)</b>		
Neonatal resuscitation with bag and mask	One 23-minute contact per newborn requiring resuscitation, estimated as follows: 5% <sup>17</sup> of live births	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p>
Hygienic cord and skin care	One 10-minute contact per live birth	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p>
Initiation of prophylactic antiretroviral therapy for babies exposed to HIV	Contacts totalling 135 minutes per newborn exposed to HIV, estimated as follows: live births x prevalence of HIV in WRA	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p>

<sup>17</sup> Based on global estimate from Wall et al. (2009) <https://obgyn.onlinelibrary.wiley.com/doi/full/10.1016/j.ijgo.2009.07.013>

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
		<p><b>Indicator:</b> Prevalence of HIV in WRA.</p> <p><b>Source:</b> As above.</p>
Kangaroo mother care for small babies	<p>Contacts totalling 135 minutes per newborn with low birth weight, estimated as follows:</p> <p>live births x % of newborns with birth weight &lt;2500g</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> % of newborns with birth weight &lt;2500g.</p> <p><b>Source:</b> Healthy Newborn Network (2020) as above. A regional mean was applied for countries not included within this source.</p>
Extra support for feeding small and preterm babies with breast milk	<p>Contacts totalling 210 minutes per small or preterm newborn, estimated as follows:</p> <p>live births x % of births at &lt;36 weeks' gestation</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> % of births at &lt;36 weeks' gestation.</p> <p><b>Source:</b> Healthy Newborn Network, as above. This source gives estimates for % of births at &lt;37 weeks and &lt;28 weeks. The % born at &lt;36 weeks was estimated assuming an exponential trend between these two estimates.</p>
Continuous positive airway pressure to manage babies with respiratory distress syndrome (RDS)	<p>One 120-minute contact per newborn with RDS, estimated as follows:</p> <p>live births x % of births at &lt;32 weeks' gestation<sup>18</sup></p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> % of births at &lt;32 weeks' gestation.</p> <p><b>Source:</b> Healthy Newborn Network, as above. This source gives estimates for % of births at &lt;37 weeks and &lt;28 weeks. The % born at &lt;32 weeks was estimated assuming an exponential trend between these two estimates.</p>
Case management of possible severe bacterial infection (pSBI)	<p>Contacts totalling 570 minutes* per newborn with pSBI, estimated as follows:</p> <p>live births x incidence of pSBI in newborns (%)</p> <p>* 480 minutes for professional midwife or nurse + 90 minutes for paediatrician (on average)</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of pSBI in newborns (%).</p> <p><b>Source:</b> Seale et al. (2014) Estimates of pSBI in neonates in sub-Saharan Africa, south Asia and Latin America for 2012 (<a href="https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(14)70804-7/fulltext">https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(14)70804-7/fulltext</a>). Regional averages applied to all countries in South Asia (7.6%), Sub-Saharan Africa (6.2%) and Latin America (11.7%). Global average of 7.6% applied to all other countries.</p>
Management of newborns with jaundice	<p>One 150-minute contact per newborn with severe jaundice, estimated as follows:</p> <p>live births x incidence of severe jaundice in newborns</p>	<p><b>Indicator:</b> Number of live births (2019-2030).</p> <p><b>Source:</b> As above.</p> <p><b>Indicator:</b> Incidence of severe jaundice in newborns (%).</p>

<sup>18</sup> WHO (2012) estimated that most babies born at <32 weeks develop RDS: see [http://www.who.int/pmnch/media/news/2012/201204\\_born\\_too\\_soon\\_report.pdf](http://www.who.int/pmnch/media/news/2012/201204_born_too_soon_report.pdf)

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
		<b>Source:</b> Slusher et al. (2018) Burden of severe neonatal jaundice: a systematic review and meta-analysis ( <a href="https://bmjpaedsopen.bmj.com/content/1/1/e000105">https://bmjpaedsopen.bmj.com/content/1/1/e000105</a> ). Regional estimates applied to all countries.
Management of genetic conditions	Contacts totalling 120 minutes per newborn with genetic conditions, estimated as follows: live births x prevalence of rare single gene disorders at birth	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of rare single gene disorders at birth. <b>Source:</b> Blencowe et al. (2018) Rare single gene disorders: estimating baseline prevalence and outcomes worldwide ( <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6167259/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6167259/</a> ). Regional estimates applied to all countries.
Postnatal contact with a skilled health-care provider, at home or in a health facility, around day 3, day 7 and at 6 weeks after birth	Contacts totalling 30 minutes per live birth (Note: this is for neonatal assessments in addition to checks on the newborn that would normally take place at the same time as the mother's postnatal checks)	<b>Indicator:</b> Number of live births (2019-2030). <b>Source:</b> As above.
<b>ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH</b>		
Comprehensive sexuality education, information and counselling for sexual and reproductive health, including contraception	Contacts totalling 5 minutes per adolescent per year (on the assumption that this intervention will be delivered in groups of 30, each lasting 2.5 hours)	<b>Indicator:</b> Number of adolescents aged 10-19 (2019-2030). <b>Source:</b> United Nations Population Division World Population Prospects database, medium variant, 2019 revision ( <a href="https://population.un.org/wpp/">https://population.un.org/wpp/</a> ), accessed 5 October 2020, except for: Cook Islands, Marshall islands, Nauru, Niue, Palau, Tokelau and Tuvalu which were obtained from the sources used for the 2019 Pacific States SoWMy report ( <a href="https://pacific.unfpa.org/en/publications/state-pacifics-rmncah-workforce-2019-report">https://pacific.unfpa.org/en/publications/state-pacifics-rmncah-workforce-2019-report</a> )
Services for comprehensive sexual and reproductive health, including contraception	Contacts totalling 10 minutes per adolescent per year, estimated as follows: (10-14 year-old girls <sup>19</sup> + 10-19 year-old boys)	<b>Indicator:</b> Number of 10-14 year-old girls and 10-19 year-old boys (2019-2030). <b>Source:</b> As above.
Prevention of sexual and other forms of gender-based violence (SGBV)	Contacts totalling 5 minutes per 10-14 year-old per year (on the assumption that this intervention will be delivered in groups of 30, each lasting 2.5 hours)	<b>Indicator:</b> Number of adolescents aged 10-14 (2019-2030). <b>Source:</b> As above.
Response to SGBV	Contacts totalling 35 minutes* per adolescent experiencing SGBV, estimated as follows: (10-14 year-old girls x prevalence of sexual violence in girls aged 10-14) + (10-19 year-old boys x prevalence of sexual violence in boys aged 10-24) * 20 minutes for associate professional midwife or nurse + 15 minutes for professional midwife or nurse (on average)	<b>Indicator:</b> Number of 10-14 year-old girls and 10-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of sexual violence in 10-14 year-old girls. <b>Source:</b> GBD study 2019 as above. <b>Indicator:</b> Prevalence of sexual violence in 10-24 year-old boys. <b>Source:</b> GBD study 2019 as above.

<sup>19</sup> For this and most of the following interventions, 15-19 year-old girls are not included, because their need for these interventions is covered under “women of reproductive age”, above.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
Prevention of harmful practices such as female genital mutilation (FGM) and early and forced marriage	Contacts totalling 5 minutes for all 10-19 year-old girls living in countries with prevalence of FGM >0 (on the assumption that this intervention will be delivered in groups of 30, each lasting 2.5 hours)	<b>Indicator:</b> Number of 10-19 year-old girls (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> FGM prevalence (%). <b>Source:</b> World Bank World Development Indicators as above, accessed 20 November 2020.
Response to harmful practices such as FGM and early and forced marriage	Contacts totalling 35 minutes* per adolescent girl experiencing FGM, estimated as follows: 10-19 year-old girls x FGM prevalence * 30 minutes for professional midwife or nurse + 5 minutes for doctor (on average)	<b>Indicator:</b> Number of 10-19 year-old girls (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> FGM prevalence (%). <b>Source:</b> As above.
Prevention and detection of communicable and noncommunicable diseases and STIs, including HIV and syphilis	One 5-minute contact per adolescent per year	<b>Indicator:</b> Number of adolescents aged 10-19 (2019-2030). <b>Source:</b> As above.
Treatment of HIV	Four 60-minute contacts per year per adolescent with HIV, estimated as follows: (10-14 year-old girls x HIV prevalence in girls aged 10-14) + (10-19 year-old boys x HIV prevalence in boys aged 10-19)	<b>Indicator:</b> Number of 10-14 year-old girls and 10-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> HIV prevalence in girls aged 10-14. <b>Source:</b> GBD study 2019 as above. <b>Indicator:</b> HIV prevalence in boys aged 10-19. <b>Source:</b> GBD study 2019 as above.
Treatment of syphilis	One 15-minute contact per adolescent boy with syphilis, estimated as follows: boys aged 15-19 x prevalence of syphilis in boys aged 15-19	<b>Indicator:</b> Number of 15-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of syphilis in boys aged 15-19. <b>Source:</b> GBD study 2019 as above.
Treatment of gonorrhoea	One 15-minute contact per adolescent boy with gonorrhoea, estimated as follows: boys aged 15-19 x prevalence of gonorrhoea in boys aged 15-19	<b>Indicator:</b> Number of 15-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of gonorrhoea in boys aged 15-19. <b>Source:</b> GBD study 2019 as above.
Treatment of chlamydia	One 15-minute contact per adolescent boy with chlamydia, estimated as follows: boys aged 15-19 x prevalence of chlamydia in boys aged 15-19	<b>Indicator:</b> Number of 15-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Prevalence of chlamydia in boys aged 15-19. <b>Source:</b> GBD study 2019 as above.
Treatment of trichomoniasis	One 15-minute contact per adolescent boy with trichomoniasis, estimated as follows:	<b>Indicator:</b> Number of 15-19 year-old boys (2019-2030). <b>Source:</b> As above.

Intervention	Number and average duration of contacts needed with an SRMNAH worker	Data requirements and sources
	boys aged 15-19 x prevalence of trichomoniasis in boys aged 15-19	<b>Indicator:</b> Prevalence of trichomoniasis in boys aged 15-19. <b>Source:</b> GBD study 2019 as above.
Voluntary medical male circumcision in countries with generalized HIV epidemics	One 279-minute contact per uncircumcised new member of the cohort of boys aged 10-19 living in a country with a generalized HIV epidemic, estimated as follows: (10% of boys aged 10-19 living in countries with HIV prevalence >1% among WRA) x (100 - % of adult men who are circumcised)	<b>Indicator:</b> Number of 10-19 year-old boys (2019-2030). <b>Source:</b> As above. <b>Indicator:</b> Countries with HIV prevalence >1% in WRA. <b>Source:</b> GBD study 2019 as above. <b>Indicator:</b> % of adult men who are circumcised. <b>Source:</b> Morris et al. (2016) Estimation of country-specific and global prevalence of male circumcision <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772313/pdf/12963_2016_Article_73.pdf">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772313/pdf/12963_2016_Article_73.pdf</a>

<sup>5</sup> This is not included in the Global Strategy list of essential interventions, but it is an SRMNAH intervention included in OneHealth and it was therefore judged appropriate for inclusion in the list of essential interventions.

CPR = contraceptive prevalence rate; DHS = demographic and health survey; FGM = female genital mutilation; GBD = global burden of disease; HICs = high-income countries; HIV = human immunodeficiency virus; IPV = intimate partner violence; IUD = intrauterine device; LMICs = low- and middle-income countries; ob/gyn = obstetrician and gynaecologist; PEE = pre-eclampsia and eclampsia; PID = pelvic inflammatory disease; PMTCT = prevention of mother-to-child transmission of HIV; PPH = postpartum haemorrhage; pPROM = preterm premature rupture of membranes; pSBI = possible severe bacterial infection; RDS = respiratory distress syndrome; SGBV = sexual and gender-based violence; SRMNAH = sexual, reproductive, maternal, newborn and adolescent health; STI = sexually transmitted infection; TFR = total fertility rate; UN = United Nations; WHO = World Health Organization; WRA = women of reproductive age (15-49 years).

## Webappendix 6: SRMNAH worker competencies

The following table sets out the assumptions made about the competency and authority of occupation groups to deliver each of the essential sexual, reproductive, maternal, newborn and adolescent health (SRMNAH) interventions used to define “need” for SRMNAH worker time. This does not necessarily reflect what SRMNAH workers actually do in any given country: their scope of practice may be limited due to their education and/or regulatory rules, or they may perform tasks beyond their scope of practice due to low availability of other health workers. A check (✓) indicates that the occupation group should be competent to deliver all aspects of the intervention without supervision. A check in square brackets ([✓]) indicates that the occupation group should be competent to perform some aspects of the intervention as part of multidisciplinary team, or that the group should be able to manage uncomplicated cases without supervision. Yellow shading indicates the preferred occupation group for that intervention. These preferred groups were used when estimating the amount of health worker time needed (see Webappendix 3). More than one group is shaded if the intervention requires a team consisting of more than one type of health worker, with the time requirement split between occupation groups as detailed in Webappendix 4. If midwives are shaded, this indicates that midwives and nurses with midwifery training are equally preferred. If associate professional nurses are shaded, this indicates that associate nurses and associate midwives are equally preferred.

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
<b>WOMEN (INCLUDING PRE-PREGNANCY INTERVENTIONS)</b>												
Information and counselling for sexual and reproductive health, including contraception	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Delivery of condoms, vaginal barriers, vaginal tablets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Delivery of contraceptive pills and injectables	✓		✓		✓			✓	✓	✓	✓	
Insertion and extraction of contraceptive implants	✓		✓		✓			✓		✓	✓	
Intrauterine device insertion	✓				✓			✓		✓	✓	
Female sterilization											✓	
Prevention of sexually transmitted infections (STIs)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	



	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
Detection of HIV	✓		✓		✓			✓	✓	✓	✓	
Detection of other STIs	✓	✓	✓	✓	✓	✓		✓		✓	✓	
Treatment of HIV										✓	✓	
Treatment of syphilis	✓		✓		✓			✓		✓	✓	
Treatment of gonorrhoea	✓		✓		✓			✓		✓	✓	
Treatment of chlamydia	✓		✓		✓			✓		✓	✓	
Treatment of trichomoniasis	✓		✓		✓			✓		✓	✓	
Treatment of pelvic inflammatory disease								✓		✓	✓	
Pre-conception iron and folic acid supplementation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Safe abortion (wherever legal)	[✓]		[✓]		[✓]			[✓]		✓	✓	
Post-abortion care	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]		[✓]	[✓]	✓	✓	
Screening for cervical cancer	✓		✓		✓					✓	✓	
Screening for breast cancer	✓		✓		✓			✓		✓	✓	
Ectopic pregnancy case management	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]		[✓]		✓	✓	
<b>PREGNANCY (ANTENATAL CARE)</b>												
Early and appropriate antenatal care (eight visits) <sup>20</sup>	✓	✓			✓	✓		✓		✓	✓	
Screening for maternal illness	✓		✓		✓			✓		✓	✓	
Iron and folic acid supplementation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

<sup>20</sup> Including the following essential interventions: identification of GBV/IPV; accurate determination of gestational age; prevention of and screening for hypertensive disorders; counselling on family planning, birth and emergency preparedness; screening for and prevention of STIs (syphilis and hepatitis B); detection of risk factors for genetic conditions.

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
Tetanus immunization	✓		✓		✓			✓	✓	✓	✓	
Prevention of mother-to-child transmission of HIV	✓		✓		✓			✓		✓	✓	
Prevention of malaria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Treatment of malaria in pregnancy	✓		✓		✓			✓	✓	✓	✓	
Identification and response to intimate partner violence (in ANC)	✓	✓			✓	✓				✓	✓	
Smoking cessation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Management of syphilis	✓		✓		✓			✓		✓	✓	
Dietary counselling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Prevention of and screening for gestational diabetes	✓	✓	✓		✓	✓		✓		✓	✓	
Calcium supplementation	✓	✓			✓	✓		✓		✓	✓	
Treatment of gestational diabetes	✓				✓			✓		✓	✓	
Treatment of eclampsia	[✓]				[✓]			[✓]		[✓]	✓	
Treatment of pre-eclampsia	[✓]				[✓]			[✓]		[✓]	✓	
Management of obstetric complications	[✓]				[✓]			[✓]		[✓]	✓	
Antenatal corticosteroids	[✓]		[✓]		[✓]			✓		✓	✓	
Management of malpresentation at term	[✓]				[✓]			[✓]		[✓]	✓	
<b>CHILDBIRTH</b>												

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
Facility-based childbirth <sup>21</sup>	[✓]				[✓]			[✓]		[✓]	✓	
Active management of third stage of labour	✓				✓			✓		✓	✓	
Management of prolonged or obstructed labour	[✓]				[✓]			[✓]		[✓]	✓	
Instrumental delivery	[✓]				[✓]			[✓]		[✓]	✓	
Caesarean section	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]		[✓]	[✓]	[✓]	✓	
Induction of labour	[✓]				[✓]			[✓]		✓	✓	
Management of intrapartum haemorrhage	[✓]		[✓]		[✓]			[✓]		✓	✓	
Prevention and management of eclampsia	[✓]		[✓]		[✓]			[✓]		[✓]	✓	
Management of women with or at risk of infections	✓		✓		✓			✓	✓	✓	✓	
<b>POSTNATAL (MOTHER)</b>												
Care in the facility for mother and baby <sup>22</sup>	✓	[✓]	✓	[✓]	✓	[✓]		✓	[✓]	✓	✓	
Promotion, protection and support of exclusive breastfeeding	✓	[✓]	[✓]	[✓]	✓	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]
Treatment of mastitis	✓		✓		✓			✓		✓	✓	
Management of postpartum haemorrhage	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]		[✓]	[✓]	✓	✓	

<sup>21</sup> Including the following essential interventions: routine monitoring with partograph, detection of infections, and hygienic management of the cord at birth.

<sup>22</sup> Including the following essential interventions: (for the mother): eclampsia prevention, anaemia prevention, detection of postpartum sepsis, family planning advice and contraceptives, screening for cervical cancer in appropriate age group, identification of GBV/IPV, early detection of maternal morbidities, nutrition and lifestyle counselling; and (for the newborn): immediate drying and thermal care; early initiation of breastfeeding; hygienic cord and skin care; detection of bacterial infections and genetic conditions.

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
Management of eclampsia	[✓]				[✓]			[✓]		[✓]	✓	
Treatment of maternal anaemia	[✓]		[✓]		[✓]			[✓]		✓	✓	
Management of postpartum sepsis	[✓]	[✓]	[✓]	[✓]	[✓]	[✓]		[✓]	[✓]	✓	✓	
Routine postpartum examination	✓		✓		✓			✓		✓	✓	
Initiation or continuation of antiretroviral therapy	✓		✓		✓			✓	✓	✓	✓	
Response to intimate partner violence	✓		✓		✓			✓		✓	✓	
Screening for postpartum depression	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Management of postpartum depression	[✓]		[✓]		[✓]			[✓]		✓	✓	
Postnatal contact	✓				✓			✓		✓	✓	
<b>POSTNATAL (NEWBORN)</b>												
Neonatal resuscitation with bag and mask	✓		✓		✓			✓		✓	✓	✓
Hygienic cord and skin care	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initiation of prophylactic antiretroviral therapy	✓		✓		✓			✓		✓		✓
Kangaroo mother care for small babies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra support for feeding small and preterm babies with breast milk	✓	✓	✓		✓	✓		✓		✓		✓
Continuous positive airway pressure	[✓]		[✓]		[✓]			[✓]		✓		✓

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
Case management of possible severe bacterial infection	[✓]		[✓]		[✓]			[✓]		[✓]		✓
Management of newborns with jaundice	✓		✓		✓			✓		✓		✓
Management of genetic conditions										✓		✓
Postnatal contact	✓		✓		✓			✓		✓		✓
<b>ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH</b>												
Comprehensive sexuality education, information and counselling for sexual and reproductive health	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Services for comprehensive sexual and reproductive health (girls)	✓		✓		✓			✓		✓		✓
Services for comprehensive sexual and reproductive health (boys)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Prevention of sexual and other forms of gender-based violence (SGBV)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Response to SGBV (girls)	✓	[✓]	✓	[✓]	✓	[✓]	[✓]	✓	[✓]	✓		✓
Response to SGBV (boys)			✓	[✓]	✓	[✓]	[✓]	✓	[✓]	✓		✓
Prevention of harmful practices such as female genital mutilation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Professional midwife	Associate professional midwife	Professional nurse	Associate professional nurse	Professional nurse with midwifery training	Associate professional nurse with midwifery training	Community health worker	Paramedical practitioner	Medical assistant	General medical practitioner	Obstetrician and gynaecologist	Paediatrician
(FGM) and early and forced marriage												
Response to harmful practices	[✓]		[✓]		[✓]			[✓]		✓	✓	✓
Prevention and detection of communicable and noncommunicable diseases and STIs	✓		✓		✓			✓	✓	✓	✓	✓
Treatment of HIV (girls)								✓		✓	✓	✓
Treatment of HIV (boys)								✓		✓		✓
Treatment of syphilis	✓		✓		✓			✓		✓	✓	✓
Treatment of gonorrhoea	✓		✓		✓			✓		✓	✓	✓
Treatment of chlamydia	✓		✓		✓			✓		✓	✓	✓
Treatment of trichomoniasis	✓		✓		✓			✓		✓	✓	✓
Voluntary medical male circumcision								✓		✓		✓

FGM = female genital mutilation; SGBV = sexual and gender-based violence; SRMNAH = sexual, reproductive, maternal, newborn and adolescent health; STI = sexually transmitted infection.

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