

2019 —

REPRODUCTIVE, MATERNAL, NEWBORN, CHILD AND ADOLESCENT HEALTH WORKFORCE









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ABBREVIATIONS AND ACRONYMS

ΔΑΑΟ	Availability, Accessibility,	МоН	Ministry of Health
	Acceptability, Quality	NPC	Non-physician clinician
ANC	Antenatal care	PNG	Papua New Guinea
AVAR	Annual voluntary attrition rate	PSRH	Pacific Society for Reproductive Heal
BEmONC	Basic emergency obstetric	PSRO	Pacific Sub-Regional Office
	and newborn care	RMI	Republic of the Marshall Islands
CEmONC	Comprehensive emergency obstetric and newborn care	RMNCAH	Reproductive, maternal, newborn, child and adolescent health
CHIPs	Country health information profiles	SBA	Skilled birth attendant
DRE	Dedicated RMNCAH equivalent	SDGs	Sustainable Development Goals
	(headcount * % time on RMNCAH)	SoWMy	State of the World's Midwifery
EmONC	Emergency obstetric and newborn care	SPC	The Pacific Community
FSM	Federated States of Micronesia	STI	Sexually transmitted infection
GBV	Gender-based violence	UHC	Universal health coverage
HRH	Human resources for health	UNFPA	United Nations Population Fund
ICM	International Confederation of Midwives	UNICEF	United Nations Children's Fund
IPV	Intimate partner violence	VAW	Violence against women
ISCO	International Standard Classification	VWC	Vanuatu Women's Centre
	of Occupations	WHO	World Health Organization
MMR	Maternal mortality ratio		

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FOREWORD



Progress made by Pacific countries over the last 20 years for the reproductive, maternal, newborn, child and adolescent health (RMNCAH) of women, children and young people has been remarkable. However, inequity remains, and some Pacific countries still have relatively poor RMNCAH outcomes, so there is still much more to be done. Numerous global, regional

and national commitments, strategies, and initiatives recognise that a vibrant RMNCAH workforce is essential for ensuring good health outcomes and achieving health-related development goals. This positive and conducive policy environment presents an opportunity to transform RMNCAH care in the Pacific, to be of high standard, equitable, relevant and responsive so as to "leave no-one behind".

Leaving no one behind is an overarching principle of the Sustainable Development Goals (SDGs), and mandates us to appreciate and understand subnational variations and inequities. Pacific Island countries present a unique geographic context where timely access to quality health care is especially challenging.

Even when overall health worker availability is high at the national level, it is not easy to ensure that the right skills are readily accessible when required by small populations in outlying islands.

The SDGs' ambitious targets for universal health coverage including sexual and reproductive health and rights require a strong health workforce, appropriately skilled to support the achievement of all healthrelated SDGs. This workforce is the backbone of any functioning health system. Decision-makers therefore need robust evidence on which to base decisions about workforce challenges. This workforce assessment provides up-to-date evidence about the availability, accessibility, acceptability and quality of all RMNCAH workers, including nurse-midwives, nurses, auxiliary cadres, non-physician clinicians, medical officers, obstetricians/gynaecologists and paediatricians. Specialised health services provided at higher level care facilities require clients to travel long distances from remote locations in order to access them. Understanding travel time and its implications for care-seeking behaviour and workforce planning is critically important in the Pacific. It is also crucial to understand the spatial distribution of births and pregnancies, which is essential to inform overall planning decisions related to population and public health. Additionally, there is a need to provide attractive incentives and positive support to keep the health workforce engaged, motivated and willing to work, both in remote communities and busy urban contexts.

This comprehensive RMNCAH workforce assessment is a landmark achievement — the first ever conducted in the Pacific region. It has provided the best available information on the current state of the Pacific's

Pacific Island countries present a unique geographic context where timely access to quality health care is especially challenging. RMNCAH workforce. It gives clear evidence of the region's substantial progress in many areas, and it identifies the ongoing workforce bottlenecks and challenges that must be addressed if the region is to achieve the health-related SDGs. This report indicates the extent to which the RMNCAH workforce can

meet the need for RMNCAH services, and contains pointers for the future strengthening of the workforce as a key part of the health system and RMNCAH policy framework. It should be used to stimulate policy discussions and evidence-based decisionmaking at regional, national and sub-national levels, to enable countries to ensure that women, children and adolescents are able to fully realise their right to health.

Bon B. Carpbell

Bruce Campbell Director and Representative, UNFPA Pacific Sub-Regional Office

EXECUTIVE SUMMARY

This report takes its inspiration from the United Nations Secretary-General's *Every Woman Every Child* initiative, which calls for countries to do everything possible to protect the lives and futures of all women, children and adolescents. It uses a similar approach to the *State of the World's Midwifery* (SoWMy) 2014 report, but focuses on Papua New Guinea (PNG) and the 14 countries supported by the United Nations Population Fund (UNFPA) Pacific Sub-Regional Office (PSRO): Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Republic of the Marshall Islands (RMI), Nauru, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.

This report has been coordinated by UNFPA PSRO. It is primarily intended to provide an evidence base to support policy dialogue at national and regional levels, to assist countries in the region to meet the challenges of the Sustainable Development Goals (SDGs) relating to reproductive, maternal, newborn, child and adolescent health (RMNCAH). A strong workforce is essential to the success of national strategies for improving



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RMNCAH services (e.g. increased coverage of skilled attendance at birth, family planning, postnatal care

and emergency obstetric and newborn care). Understanding the current state of the RMNCAH workforce is necessary to identify the specific challenges, gaps and bottlenecks which need to be addressed in order to strengthen the workforce, and to consider suitable strategies for overcoming them.

The evidence and analysis in this report are structured according to the four domains that determine whether a health system and its workforce are providing effective coverage, i.e.

whether citizens are obtaining the RMNCAH care and services they want and need. These four domains are: availability, accessibility, acceptability and quality.

The workforce considered in this report includes all health care workers engaged in providing RMNCAH care for women, adolescents and newborns, across the full continuum of care from sexual health and family planning through pregnancy, the neonatal period, childhood and adolescence. This report is part of the *State of the World's Midwifery* series, and like the other reports in that series, it considers midwives and nurse-midwives as well as doctors, nurses, auxiliaries and other relevant health professionals. Midwives and nurse-midwives are, however, considered a key RMNCAH cadre, so sections of the report – particularly those looking at acceptability and quality– do focus mainly on them.

Understanding the current state of the RMNCAH workforce is necessary to identify the challenges which need to be addressed.

The need for RMNCAH workers

The main users of RMNCAH services (women of reproductive age, children and adolescents) represent well over half of the population in the region. To provide universal coverage of the essential RMNCAH interventions listed in the Global Strategy for Women's, Children's and Adolescents' Health, countries must ensure that there are sufficient health workers with the necessary RMNCAH competencies and deployed according to the level of need. Just over half of the region's RMNCAH need is for interventions relating to reproductive, maternal and newborn health, a further third is for child health and development and about 10% for adolescent health and development. Although most countries in the region have stable populations, some countries have growing populations - especially in adolescent age groups - and across the region as a whole the need for RMNCAH workers is projected to grow over the next 15 years.

Small island countries in the region face very specific challenges to the maintenance of an effective RMNCAH workforce, due to their small populations, which in some cases are getting smaller. The need for RMNCAH services must be considered within the wider need for health services, especially non-communicable diseases which are a significant burden in some countries.

Availability

Across the participating countries, there are almost 15,000 health workers involved in the provision of RMNCAH care, of whom 58% are nurses, 10% are doctors and 10% are nurse-midwives. The remainder includes non-physician clinicians such as health assistants, and auxiliary cadres such as community health workers. Most countries in the region have sufficient nurses to meet the need for the elements of RMNCAH care that they are competent to provide, but most have insufficient specialist RMNCAH cadres: midwives/nurse-midwives, obstetricians/ gynaecologists and paediatricians. The shortage is particularly acute in PNG, and unlikely to improve without major sustained interventions.

RECOMMENDATIONS FOR THE FUTURE DEVELOPMENT OF THE REGION'S RMNCAH WORKFORCE

THEME	RECOMMENDATION	KEY STAKEHOLDERS
1 Human	Use the analyses in this report to advocate for additional resources to address the identified gaps in the availability of human resources for RMNCAH.	Professional associations, national ministries/ departments of health and employment, education institutions, development partners, Pacific Heads of Health, SPC, PSRH
resources for health (HRH) policy and planning	Use regional platforms such as the Pacific Heads of Health and Pacific Health Ministers' meetings to encourage a coordinated approach to HRH across the region. Submit policy papers to these platforms.	National ministries/departments of health, education institutions, SPC, development partners
	At a regional level, develop guidelines for health workforce planning, including RMNCAH, with technical support where needed. Draw up national health workforce plans based on these guidelines.	Pacific Heads of Health, SPC, development partners, national ministries/departments of health, education institutions, employment and finance
	Improve understanding of, and increase support to, isolated or rural practitioners, e.g. through professional development, supportive supervision.	National ministries/departments of health, professional associations, PSRH
	Review relevant national RMNCAH policies to ensure they are relevant, up-to-date, fully costed and aligned with global, regional and national HRH goals. Develop new policies if gaps are identified. Ensure the policies fit within the relevant legal and regulatory frameworks and the needs of the country.	National government ministries, development partners
	Establish or improve HRH information systems, so that key HRH data related to RMNCAH are accessible to relevant stakeholders and of high quality. Investigate tools to help with the analysis of HRH data.	National ministries/departments of health, national statistics offices, development partners.

Across the participating countries, there are almost

15,000 health workers involved in the provision of RMNCAH care



Several countries in the region experience very high staff turnover rates among key RMNCAH workers, making it challenging to maintain or increase the numbers. The statutory retirement age in some countries is comparatively low (e.g. 55 years), and nurse-midwives are an ageing cadre in many countries, which presents a challenge for future availability.

Midwives and nurse-midwives are a vital RMNCAH cadre because they are competent to provide a wide range of RMNCAH interventions across the entire continuum of care. It is therefore of concern that there are significant shortages of midwives in a number of countries. Another concern is that midwifery is not generally recognised as a separate discipline from nursing in regulation, education or practice, but rather as a branch of nursing that does not always have a specific nomenclature in regulation or attract a higher salary despite requiring additional years of study to qualify and often, additional responsibilities. This may go some way towards explaining why more of the region's nurses do not pursue a midwifery career to help address the shortages.

THEME	RECOMMENDATION	KEY STAKEHOLDERS
2 Scopes of	Review scopes of practice for all RMNCAH cadres. Their revision is necessary to ensure they accurately describe the tasks that each cadre is expected to perform in each country context.	Regulatory bodies, education institutions, national ministries/departments of health, development partners, professional associations
practice	Develop a regional midwifery strategy to increase the visibility and influence of this key RMNCAH cadre.	Professional associations, development partners, ICM, PSRH
3	Use regional platforms to share resources and knowledge, with a RMNCAH coordinating organisation.	SPC, NGOs, development partners, education institutions, national government ministries
Collaboration		
4 Stewards	Mobilise resources for additional scholarships for all RMNCAH cadres, especially midwives.	Development partners, donors, education institutions, national ministries/departments of health and education
Strengthen health worker education	Develop a regional framework for health worker education especially those providing RMNCAH, e.g. duration of courses, curriculum content, student: teacher ratios. Ensure that curricula align with updated scopes of practice.	Pacific Heads of Health, SPC, development partners, regional associations
	Capacity building of midwifery schools (including faculty development,	National ministries/departments of health, education and finance: education institutions:

Accessibility

Countries in the region face very specific challenges relating to accessibility, due to their geography and climate. Most countries have at least one national policy document that specifically addresses how the country will remove financial, geographical and other barriers to accessing RMNCAH care. Many have implemented innovative solutions to improve accessibility.

All countries have a policy of offering at least some essential RMNCAH interventions free at the point of access, but none includes all the essential interventions defined in the Global Strategy for Women's, Children's and Adolescents' Health in their "minimum guaranteed benefits package". Common gaps include health response to intimate partner violence (common in the region), and detection and management of genetic conditions.

Most countries in the region have a policy to deploy RMNCAH workers according to population distribution. However, remote areas tend to have fewer RMNCAH workers per head of population, and are often heavily reliant on auxiliary cadres and non-physician clinicians rather than fully-qualified doctors, nurses and midwives. Remote areas have fewer services including education and opportunities for advancement, leading to a reluctance to be deployed to these areas.

A needs-based analysis of RMNCAH workforce availability and accessibility shows that no country in the region has sufficient qualified and equitablydistributed health workers to meet all of the need for RMNCAH care. Five countries come close: Nauru, Niue, Tokelau, Tonga and Cook Islands, but a lack of specialist doctors in these countries prevents their workforce from being able to meet all of the need. These are also all relatively small counties which makes workforce planning more challenging and the movement or retirement of a few workers will make a big difference. PNG's workforce, on the other hand, has the potential to meet less than 25% of the need for essential RMNCAH care.

As well as being a challenge to the public's ability to access health workers, the region's geography of many small islands and inaccessible topography

RECOMMENDATIONS FOR THE FUTURE DEVELOPMENT OF THE REGION'S RMNCAH WORKFORCE

THEME	RECOMMENDATION	KEY STAKEHOLDERS
5 Regulation	Establish or strengthen regional and national regulatory bodies to advise on issues such as scopes of practice and regulatory frameworks.	Pacific Heads of Health, SPC, professional associations, ICM, development partners, national ministries/departments of health, national regulatory bodies
	Strengthen licensing systems for nurses, midwives and auxiliary cadres.	National ministries/departments of health, regulatory bodies, ICM, professional associations
	Include the acceptability of care within regulatory frameworks: understand what service users (women and families) want, monitor the extent to which their needs are met, take action to address gaps.	National ministries/departments of health, regulatory bodies, ICM, professional associations, CSOs
6 Caroor	Develop clear, standardised career pathways for each cadre, with midwives identified separately from nurses in regulation. Ensure remuneration reflects qualifications and responsibilities.	National ministries/departments of health, employment and finance, professional associations, ICM, development partners
development	Ensure continuous professional development is a condition of re- licensing in all countries, to encourage in-service training for all, even isolated practitioners.	National ministries/departments of health, professional associations, regulatory bodies
	Improve accessibility to educational institutions in other countries to obtain additional qualifications that cannot be obtained in country.	Pacific Heads of Health, SPC, educational institutions, professional associations, development partners
	Design mentoring programmes so that established or recently retired health workers can share their knowledge and experience with less experienced colleagues.	National ministries/departments of health and education, professional associations, educational institutions

leads to a large number of isolated practitioners in some countries, which in turn presents challenges in terms of motivating, supporting and developing these practitioners to provide high quality care.

Acceptability

About half of the countries in the region have developed national policy documents which state how they will deliver RMNCAH care which is sensitive to social, cultural and traditional needs. However, most acknowledge that there are still reasons why a woman might be uncomfortable seeking care from a nursemidwife or doctor. These range from embarrassment about discussing sexual and reproductive health with a male health worker or one who is known to the family, to fear of being treated disrespectfully.

There is also a common misconception that a doctor automatically knows better than a nurse or midwife. This may be related to a lack of visibility in the region of midwifery professionals in leadership positions (e.g. there are very few midwife-led units in the region's hospitals) and/or to midwifery not necessarily being viewed as a separate profession from nursing. Vulnerable and marginalised groups often have additional needs which must be met if they are to find the care on offer to be acceptable. For example, adolescents are an important group with very specific RMNCAH needs, but there is very little provision of integrated youth-friendly sexual and reproductive health services in the region.

Quality

The International Confederation of Midwives (ICM) has identified education, regulation and association as the three pillars of a strong, high-quality midwifery profession, and this report focuses mainly on these three aspects of quality from the perspective of the midwifery workforce.

Pre-service education curricula for midwives in the region generally align with global standards in terms of course duration, but there are numerous challenges to the delivery of these curricula, including a shortage of qualified teaching staff and a lack of opportunities for teaching staff and students to develop or maintain their practical skills as well as update their theoretical knowledge on an ongoing basis. After qualification,

THEME	RECOMMENDATION	KEY STAKEHOLDERS	
7	Invest in the development of career pathways for specialist child health cadres, e.g. paediatric or community child health nurses.	National ministries/departments of health, education and employment, professional associations, educational institutions	
Child health and development (especially nutrition and immunisation)	Invest in the education of families and communities, e.g. nutrition, parenting skills.	National ministries/departments of health, communities and education	
8 Adolescent health and development (especially sexual	Develop regional and national initiatives to assess the capacity of health workers to provide adolescent-friendly services, especially in relation to sexual and reproductive health. Address the identified gaps by designing services and educating health workers to encourage adolescents to access care. Consider the appointment of specialist adolescent health workers.	Pacific Heads of Health, SPC, development partners, national ministries/departments of health, NGOs, national ministries of youth, national youth bodies/councils	
and reproductive health)	Invest in the education of young people and their communities about adolescent health.	National ministries/departments of health and education, development partners, NGOs, national ministries of youth, national youth bodies/ councils	
9 Gender-based violence	Ensure that health workers have the guiding protocols, resources and competencies to prevent and respond safely to all forms of gender based violence, including sexual violence.	National ministries/departments of health, justice finance and women, educational institutions, professional associations, NGOs, development partners	

just six of the participating countries (Cook Islands, FSM, Fiji, RMI, Samoa and Tonga) have a licensing system that requires nurse-midwives to do continuing professional development activities as a condition of re-licensing.

Most countries ensure that the job descriptions and scopes of practice of nurse-midwives and obstetricians/gynaecologists include all the competencies associated with a skilled birth attendant, but a few do not. Likewise, a few countries do not authorise these cadres to perform all the emergency obstetric and newborn care (EmONC) signal functions, which raises questions about the skills and competencies of some of the available RMNCAH workers.

All countries in the region have a regulatory body that is responsible for nurse-midwives or are in the process of establishing one. Only in Samoa and Tonga does the name of the regulatory body include the word 'midwives' or 'midwifery'; in all other countries it is a nursing board or a health professionals board. Most of these regulatory bodies perform a wide range of functions, but in a few countries their role is more restricted, and it is rare for them to be called upon to advise the government on RMNCAH policy.



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Most of the countries in the region have a professional association that is open to nurse-midwives, but very few are specifically for nurse-midwives: most are nursing associations. One of the participating countries (PNG) currently has a professional association that is a member of ICM, and five (Cook Islands, Fiji, Samoa, Solomon Islands and Tonga) have an association that is a member of the International Council of Nurses.

Most countries in the region have a set of core RMNCAH policy and planning documents, but often these are out of date and they are rarely fully costed, which raises questions about countries' ability to implement their policies and plans.

Conclusion and recommendations

Workforce availability is essential to the provision of RMNCAH services, but the effective coverage of those services depends as much on accessibility, acceptability and quality as on availability. It should be noted that the estimates in this report of the workforce's potential to meet the need take into account the availability and (geographic) accessibility dimensions of effective coverage, but not the acceptability or quality dimensions. Countries with low levels of potential met need for RMNCAH care need to focus on availability and geographical accessibility as the foundations for improving effective coverage. All countries, whether their potential met need estimate is high or low, should address the identified challenges to the provision of a RMNCAH workforce that is affordable, acceptable and of high quality.

A regional workshop to validate the findings of the assessment took place in September 2018, attended by representatives from 14 of the 15 participating countries. One of the outputs of this workshop was a set of recommendations for future development of the RMNCAH workforce in the region. The recommendations were organised around nine broad themes, as set out in the preceding pages. Other outputs included country action plans for RMNCAH workforce development. These are described in the State of the Pacific's RMNCAH Workforce Advocacy Toolkit, which was developed to support advocacy efforts to strengthen the RMNCAH workforce in the Pacific.

INTRODUCTION

CHAPTER

Despite significant progress since 2000, most lowand middle-income countries failed to meet the 2015 targets set under the Millennium Development Goals relating to maternal and child health [1]. It is estimated that there were 303,000 maternal deaths in the world in 2015, and nearly all of the preventable deaths occurred in low- and middle-income countries [2]. Similarly, 2.7 million neonatal deaths and 2.6 million stillbirths occurred across the world in 2015 [3,4], mostly in low- and middle-income countries.

Between 2000 and 2015, there was a reduction of 37% in the global maternal mortality ratio (MMR) [2]. Over the same period, in the UN Oceania region¹ (excluding Australia and New Zealand), there was a similar reduction of 36% (the MMR declined from 292 maternal deaths per 100,000 live births in 2000 to 187 in 2015) [5], and all countries except Tonga recorded significant MMR reductions [2]. Despite this progress, many countries in the region still have relatively poor maternal and neonatal outcomes. In 2015, the estimated MMR for the larger countries in the region ranged from 30 maternal deaths per 100,000 live births in Fiji to 215² in PNG, against a 2015 global average of 216 and an ambitious global 2030 target from the SDGs of less than 70 as illustrated by the red line in Figure 1. The small populations of many Pacific islands make it difficult to produce accurate estimates of maternal mortality: a single maternal death would have a large impact on the MMR, which is why the smaller countries are not shown in Figure 1. The table below Figure 1, however, shows that several small countries recorded zero maternal deaths in the most recent reporting year.

1 The Oceania region includes the 14 countries included in this report, plus: American Samoa, French Polynesia, Guam, New Caledonia, Northern Mariana Islands, Pitcairn, Samoa, Wallis and Futuna Island.

2 National estimates from PNG indicate that the MMR is actually much higher than 215 [85]



FIGURE 1 Maternal mortality ratio estimates for 8* Pacific island countries, 2015

Source: SDG database [5]

*Recent data are not available for the smaller Pacific island countries in the SDG database. However, the 2011 Country Health Information Profiles (CHIPs) report [6] quotes:

	Cook Islands	Marshall Islands	Nauru	Niue	Palau	Tokelau	Tuvalu
MMR	0	143	300	0	0	0	0
Year	2009	2010	2002	2006	2010	2005-10	2003

There was also a wide range in estimates of the 2017 neonatal mortality rate, from 3.9 neonatal deaths per 1,000 live births in the Cook Islands to 23.7 in PNG (Figure 2). In 2017, eight countries had a neonatal mortality rate below the SDG 2030 target of no more than 12.

The stillbirth rate varied slightly less, standing at between 8.6 and 17.8 stillbirths per 1,000 live births in 2015, and all 9 countries with data have a rate below the global average of 18.4 (Figure 3). A high stillbirth rate is one indicator of poor quality of care provided during pregnancy and childbirth. Some countries with low and decreasing MMR have a high stillbirth rate, highlighting the need to strengthen the quality of care provided to pregnant and birthing women.

Estimates of the under-5 mortality rate for countries in the region are generally better than the global average of 39.1 deaths per 1,000 live births, with the exceptions of Kiribati and PNG. They range from 7.6 in the Cook Islands to 53.4 in PNG and 54.6 in Kiribati (Figure 4), against a global target of no more than 25 by 2030.

Similarly, estimates of the adolescent mortality rate for Pacific island countries, where available,

vary considerably, from 31.7 deaths of 10-19 year-olds per 100,000 10-19 year-olds in Samoa to 116.4 in PNG (Figure 5).

Globally and regionally, several initiatives aim to improve reproductive, maternal, newborn, child and adolescent health (RMNCAH) outcomes. Launched in 2015 as successors to the Millennium Development Goals, the SDGs set ambitious targets for universal coverage of essential health services, including sexual and reproductive health and rights [8]. These targets include:

- By 2030, reduce the global maternal mortality ratio (MMR) to fewer than 70 maternal deaths per 100,000 live births. To achieve this target, the global MMR will need to reduce by at least 7.5% each year between 2016 and 2030. Additionally, there are national targets under the Ending Preventable Maternal Mortality initiative: by 2030, every country should reduce its MMR by two-thirds from the 2010 baseline, and by 2030 no country should have an MMR higher than 140 [9].
- By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality



FIGURE 2 Neonatal mortality rate estimates for 14* Pacific island countries, 2017

*Recent data are not available for Tokelau in the SDG database. However, the 2011 CHIPs report [6] quotes the Tokelau neonatal mortality rate as 0 in 2009.

Source: SDG database [5]

to at least as low as 12 neonatal deaths per 1,000 live births and under-5 mortality to at least as low as 25 deaths per 1,000 live births.

- By 2030, ensure universal access to sexual and reproductive health care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes. There is a proposed benchmark under FP2020 to satisfy 75% of the demand for family planning [10].
- Achieve universal health coverage (UHC), including access to quality essential health care services for all.
- Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries.

The year 2015 also saw the launch of the Global Strategy for Women's, Children's and Adolescents' Health [11], which calls for partnership working to generate, synthesise, coordinate and implement a prioritised research agenda for improving RM-NCAH. In 2016 the World Health Assembly adopted *Workforce 2030: the Global Strategy on human resources for health* (HRH) [12]. This strategy has the overall goal "to improve health, social and economic development outcomes by ensuring universal availability, accessibility, acceptability and quality of the health workforce", and sets out four main objectives:

- To optimise performance, quality and impact of the health workforce through evidence-informed policies on HRH, contributing to healthy lives and well-being, effective UHC, resilience and strengthened health systems at all levels.
- 2. To align investment in HRH with the current and future needs of the population and of health systems, taking into account labour market dynamics and education policies; to address shortages and improve distribution of health workers, so as to enable maximum improvements in health outcomes, social welfare, employment creation and economic growth.
- 3. To build the capacity of institutions at sub-national, national, regional and global levels for effective public policy stewardship, leadership and governance of actions on HRH.



FIGURE 3 Stillbirth rate estimates for 9* Pacific island countries, 2015

Source: Healthy Newborn Network [4]

*Published data are not available for the other Pacific island countries.

4. To strengthen data on HRH, for monitoring and ensuring accountability for the implementation of national and regional strategies, and the Global Strategy.

The Global Strategy on HRH [12] suggests a global benchmark of 4.45 doctors, nurses and midwives per 1,000 population, to enable countries to provide the essential health services necessary to achieve the health-related SDGs by 2030. Figure 6 shows that several of the smaller Pacific islands have achieved or surpassed this benchmark, but that most of the larger countries in the region are well below it. It should be noted that global benchmarks should not be assumed to apply uniformly in every country; countries with very small populations and/or very remote areas may need more than 4.45 per thousand to provide essential services to all who need them. This benchmark also does not account for the skillmix of cadres with a RMNCAH workforce and therefore is a limited measure.

A number of regional initiatives, strategies and declarations are in place to guide countries in the region towards achieving goals related to RMNCAH and the RMNCAH workforce, including:

- The Small Island Developing States Accelerated Modalities of Action (SAMOA) pathway [15], which notes that sustainable development is only possible if the population has good physical and mental health, and commits to supporting small island developing countries to develop specific national programmes and policies geared towards the strengthening of health systems for the achievement of UHC, and to reduce maternal, newborn and child mortality.
- The Moana declaration [16], which calls for: sexual and reproductive health to become an integral part of national health strategies and plans, prioritisation of family planning as a key strategy to improve sexual and reproductive health, elimination of violence against women, integration of gender-based violence services within sexual and reproductive health services, prioritisation of adolescent sexual and reproductive health, and strengthening of the prevention and control of non-communicable diseases.
- The Kaila declaration [17], which commits the island countries to the SDGs, acknowledges the need to prioritise RMNCAH in humanitar-



FIGURE 4 Under-5 mortality rate estimates for 14* Pacific island countries, 2015

*Recent data are not available for Tokelau in the SDG database. However, the 2011 CHIPs report [6] quotes the Tokelau under-5 mortality rate as 0 in 2010.

ian and fragile settings, including those most affected by climate change (women and girls tend to be worst affected through exclusion, marginalisation and exploitation). Prioritising their health needs will improve resilience to the effects of climate change.

- The Yanuca Island Declaration [18], which recommends improvements to the quality of data and evidence for policy- and decision-making, resource allocation and progress tracking, including the production of evidence-based technical policy briefs, fact sheets and dashboards including for HRH.
- The 12th Pacific Health Ministers meeting [19], which called for: actions to reduce education attrition rates among student doctors, nurses and midwives and a regional qualifications register to harmonise education and training to make mobile labour easier. A specific communiqué on the health workforce [20] acknowledged the uneven quality and coverage of health services and the need to strengthen the health workforce, and called for regional efforts on education curricula, setting standards for practice and information sharing, as well as national

efforts on health workforce management and planning, with a particular focus on the primary health care workforce.

- The Pacific Sexual Health and Well-Being Shared Agenda [21] acknowledges that health worker shortages are a barrier to the effective coverage of sexual and reproductive health services, and sets out strategic directions for the provision of integrated services for better utilisation of scarce HRH.
- The Pacific HRH Alliance was formed in 2008 to take an integrated approach to a range of health workforce challenges, including creating effective partnerships between countries and institutions. The Alliance supported evidence-based health workforce policy, planning, strategy development and leadership, but has become less active in recent years. A more recent regional initiative is the Pacific Regional Clinical Services and Workforce Improvement Programme, with a remit to improve education and training of health workers, improve quality of hospital care, maintain a database of specialists and support national internship programmes [20].



FIGURE 5 Adolescent mortality rate estimates for 8* Pacific island countries, 2015

Source: WHO [7]

*Recent published data are not available for the other Pacific island countries.



FIGURE 6 Density of physicians, nurses and midwives for 15 Pacific island countries, most recent available year

Source: Global Health Observatory [13] for all countries except Tokelau, which was sourced from National Minimum Development Indicators [14].

There is a high level of aid dependency in the region, which makes long-term workforce planning particularly challenging [22]. The small size of several island nations also presents a challenge, since there are few opportunities to be creative and innovative in RMNCAH workforce planning when the country needs only a few health workers. However, the SDGs and their overarching principle of "Leave No One Behind" present an opportunity to transform RMNCAH care in the Pacific. It is important to maximise the benefits of the commitments made by Pacific leaders to address existing unmet need for RMNCAH services and facilitate the achievement of UHC and primary health care services, and access to quality RMNCAH care. This is also in line with the commitment of the Global Strategy for Women's, Children's and Adolescents' Health [11] to work with partners to generate, synthesise, coordinate and implement a prioritised research agenda for improving RMNCAH, and the United Nations High-Level Commission on Health Employment and Economic Growth which underlines the importance of investing in new jobs in the health and social workforce to generate economic growth and contribute to the implementation of the 2030 Agenda for Sustainable Development [23].

A wealth of recent, high-quality evidence has demonstrated the importance and effectiveness of midwifery. The 2014 State of the World's Midwifery (SoWMy) report concluded that midwives, when educated and regulated to international standards, can meet 87% of the global need for essential sexual, reproductive, maternal and newborn health services [24]. There is evidence to indicate that investment in midwives and midwifery is a cost-effective approach to the reduction of maternal and neonatal mortality and stillbirths [25], and that midwifery-led models of care result in excellent maternal and neonatal outcomes [26]. Midwives are therefore considered key to the achievement of the ambitious global targets described above, and their specific role within RMNCAH care means that a strong midwifery workforce is critical to meeting the health needs of women and adolescents.

On the basis of this body of evidence, integrated midwifery services are seen as fundamental to the provision of quality RMNCAH care, as they achieve excellent outcomes with fewer interventions and are cost-effective [27]. In 2017, the Director-General of WHO made clear his recognition of the pivotal role of midwives and nurses by establishing a Chief Nursing Officer role as part of WHO's executive team, and stated that "midwives are critical members of the health workforce" [28]. Similarly, UNFPA is prioritising investment in the midwifery workforce to help achieve its goals for sexual and reproductive health and rights: its current strategic plan includes several targets for strengthening the health workforce with a particular focus on midwives [29].

The workforce forms the backbone of accelerating universal access to RMNCAH services. A strong RMNCAH workforce is therefore considered vital to the achievement of the ambitious global targets of the health-related SDGs. The 12th Pacific Health Ministers Meeting called upon development partners to provide support for health workforce development in the region [20], and this study forms part of the response of UNFPA and other partners. It presents an up-to-date and comprehensive picture of the RMNCAH workforce in PNG and the 14 countries in the UNFPA Pacific sub-region, and:

- Provides country-specific information on the status of the RMNCAH workforce and need for RMNCAH services, which are converted into estimates of need for the RMNCAH workforce.
- Assesses accessibility of the minimum universal RMNCAH benefit package.
- Assesses acceptability of RMNCAH workers in the region.
- Analyses the status of midwifery education, regulation and association: the three pillars of a strong profession as defined by the International Confederation of Midwives (ICM) [30].
- Assesses the extent to which other key health services are integrated with RMNCAH services.

A recent survey in 12 Pacific island countries produced a descriptive analysis of the current midwifery workforce, and highlighted considerable shortages of midwives in many countries [31]. This report considers the extent to which the entire RMNCAH workforce is able to meet the need for RMNCAH services. It will help stakeholders in each of the participating countries to develop their RMNCAH advocacy work via the provision of up-to-date evidence. It provides pointers for the future strengthening of the RMNCAH workforce as a key part of the health system and RMNCAH policy framework, and should therefore be used to stimulate policy discussions and evidence-based decision-making at regional, national and subnational levels.

The country profiles in Chapter 3 of this report can be used as a basis for policy briefings. This report will thus assist countries in the region to invest appropriately in the RMNCAH workforce with a view to enabling women, children and adolescents to obtain the RMNCAH care that they need and enabling countries in the region to meet the targets set via global architecture such as the SDGs. Regular updating of this RMNCAH workforce analysis is recommended for progress monitoring. It is also hoped that this report will enable government and health systems to advocate for midwives and nurse-midwives to be accorded the respect and investment that they deserve.

Figures 1-5 indicate considerable variation in health system performance across the countries in the region, and thus suggest that recommendations for improving performance should be contextspecific rather than being based on a 'one size fits

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all' approach. This report aims to be a valuable addition to the toolkit of those charged with strengthening health systems and improving RMNCAH outcomes, by providing both a regional overview and country-specific assessments of the RMNCAH workforce which take into account each country's demographic and epidemiological conditions and thus enable tailored solutions to be considered.

What is the RMNCAH workforce? The workforce considered in this report includes all health workers engaged in providing RMNCAH care for women, children and adolescents, across the full continuum of care from reproductive health and family planning through pregnancy, the neonatal period, childhood and adolescence. Although this report is part of the *State of the World's Midwifery* series, it considers doctors, non-physician clinicians, nurses and other relevant health professionals in addition to midwives and nurse-midwives. Midwives and nurse-midwives are, however, a key RMNCAH cadre, so sections of the report – particularly those looking at acceptability and quality - do focus mainly on them.

How was this report compiled? The Pacific Heads of Health gave approval for this study in 2017. UNFPA engaged three data collection consultants to work with the 15 countries and complete a questionnaire. In most cases, they travelled to the country to facilitate the questionnaire completion (the exceptions being Samoa and Tokelau, where support was offered via telephone and email). A verbal briefing was given to the consultants at the start of the process. They involved relevant national stakeholders and experts during the process of questionnaire completion (e.g. government ministries/departments, professional associations, heads of professional schools, private sector providers), and the final data were validated by national ministries/departments of health and other key stakeholders in each country. Data collection took place between October 2017 and September 2018. Countries were requested to provide data on workforce numbers from the

most recent complete calendar year before data collection. In September 2018, representatives of 14 of the 15 participating countries (the exception being Niue) attended a three-day data validation workshop in Fiji, where they had the opportunity to review and amend key data items based on the first run of the analyses presented in this report, and to plan how they will use the report to contribute to the development of their country's health workforce. The regional workshop participants developed the recommendations in the Executive Summary of this report.

Chapter 2 provides an analysis of the availability, accessibility, acceptability and quality of the workforce across the 15 participating countries (including a 'key messages' box for each of these dimensions of effective coverage), Chapter 3 includes a two-page "country profile" for each of these countries, and Chapter 4 includes a set of maps to illustrate each country's "pregnancy hotspots" and travel time to the nearest health facility. More detail on the methods used for data collection and analysis can be found in Annex 1, along with a discussion of the limitations of the assessment.

How to use the country profiles. The country profiles contain a mix of recent data and needsbased projections for the period from 2016 to 2030. All estimates are sensitive to the quality of data informing them, and involve a number of assumptions, including the assumption that tasks are allocated to health workers according to the principle of economic efficiency, which may or may not reflect the reality in any given country. The briefs should therefore be used, not as fact-sheets, but as a focus for discussion to review and improve the quality of data, and to stimulate debate about different policy options within countries. The guidance at the beginning of Chapter 3 explains more about how to read, understand and use the country profiles. An advocacy toolkit also accompanies this report, to help countries understand and use this assessment.

THE CURRENT RMNCAH WORKFORCE IN THE PACIFIC ISLANDS

CHAPTER

This chapter contains a broad assessment of the state of the region's RMNCAH workforce, including an account of progress in the last five years. The chapter is based on responses from all 14 countries in the UNFPA Pacific sub-region, plus Papua New Guinea (PNG). It gives an in-depth description of what women, children and adolescents need in the participating countries, the characteristics of the workforce that should serve them, and a detailed breakdown of what is actually available to them. The concept of "effective coverage" is used to examine the RMNCAH workforce (see Box 1). Effective coverage is defined as the proportion of the population who need an intervention, receive that intervention and benefit from it [32]. It can be measured by considering the availability, accessibility, acceptability and quality of health services and of the personnel providing those

services. This chapter uses these four dimensions to examine the readiness of the workforce to deliver universal access to RMNCAH care.

Evidence of progress in the last five years

Countries were asked to report on recent initiatives or plans that have affected or will affect the RM-NCAH workforce, and a summary of their responses is shown in Table 1. It is clear that many countries in the region have recognised the need for improvements to the effective coverage of RMNCAH workers, and in particular to the domains of accessibility and quality. For example, nine countries reported targeted deployment of key RMNCAH workers to outer islands or other underserved locations, and eleven countries have introduced new initiatives to ensure the qualified RMNCAH workers maintain and expand their skills and competencies.



Photos © UNICEF Pacific; WHO/Y. Shimizu; UNFPA Pacific



BOX 1

Examining the RMNCAH workforce using the concept of effective coverage

The concept of "effective coverage" was developed by the World Health Organization (WHO) in the 1970s to explore the delivery of health services. In 1978 Tanahashi published a conceptual framework in the Bulletin of the WHO [32], which captured the simple logic of how each domain of availability, accessibility and acceptability influences whether the population obtains health services that meet their requirements. Tanahashi argued that the simplicity of the logic could be applied to consider the effective coverage of all health services, or particular services and components of service delivery: for example RMNCAH services and the workforce providing them.

General Comment No. 14 [33] on the right to health, published in 2000, mirrored

the Tanahashi domains of availability, accessibility and acceptability, adding quality as the fourth domain. Article 12 states that "the right to health in all its forms and at all levels contains the following interrelated and essential elements, the precise application of which will depend on the conditions prevailing in a particular State Party", before listing each of the AAAQ domains and the obligations for all States. The use of the AAAQ domains is therefore of immediate value in exploring effective coverage, but also reinforces the right to health.

The use of the Tanahashi framework to explore human resources for health, and the AAAQ of the health workers who are at the core of service delivery, is enabling new policy insights across countries [12,34–36]. Similar insights have been achieved when analysing RMNCAH services [37,38] and the RMNCAH workforce [24,39,40]. New opportunities have thus been created to review barriers, challenges and opportunities in the delivery of effective coverage and are complementary to similar domains to measure quality of care in health systems.

The figure below illustrates the need to focus on measuring whether women obtain health services in relation to need and how the AAAQ of the RMNCAH workforce influences this. This logic underpins the discussion in Chapter 2, and echoes the latest guidance on monitoring progress towards universal health coverage [41].

Effective coverage as applied to RMNCAH services and the workforce



Source: Adapted from Campbell et al, 2013 [34] and Colston, 2011 [37]

Recent or planned initiatives affecting effective coverage of the RMNCAH workforce

Action	Number of			
AVAILABILITY	(out of 15)	Examples		
Increased recruitment	6	 Cook Islands and Nauru plan to recruit specialist obstetricians/gynaecologists Tokelau and Tuvalu have recruited additional midwives from overseas 		
New or revised plans/ strategies/policies/ legislation	6	 Cook Islands and Kiribati published health workforce plans Solomon Islands has developed a role delineation policy, which provides a road map for increasing RMNCAH worker availability Vanuatu is developing a 3-year succession plan 		
Increased number of education places	3	 Cook Islands School of Nursing has enrolment targets for the next three years to increase the number of nurses and nurse practitioners PNG has increased production of nurses, midwives and community health workers The School of Nursing in Tonga will soon commence midwifery education for nurses, to increase the number with midwifery skills 		
Retention initiatives	3	 Cook Islands has developed new pathways for nursing career progression to encourage qualified nurses to remain in the country Fiji is making it easier for retired midwives to re-join the workforce Tuvalu developed a retention strategy for health professionals in 2017 		
ACCESSIBILITY				
Targeted deployment to underserved areas	9	 Tonga's current Corporate Plan includes job rotation to ensure that outer islands receive more Medical Officer time Recent nurse and midwife recruits in Tuvalu are to be deployed specifically to the outer islands 		
New or revised plans/ strategies/policies/ legislation	5	 Chuuk State in FSM is creating policies and protocols to ensure that RMNCAH services are delivered to remote areas, including outer islands The Solomon Islands UHC policy aims to reduce financial costs for accessing RMNCAH services The current Vanuatu health sector strategy has 7 guiding principles that include making RMNCAH services accessible 		
Subsided travel for service users	3	 Tokelau recently endorsed an increase in the allowances provided to those needing to access health care outside of the country Tonga is considering the provision of subsidies to allow relatives to accompany those who need to travel to access health care 		
Outreach/community work	3	 In Fiji, village health workers are encouraged to help pregnant women to make preparations for their labour and childbirth Nauru has recently opened 3 wellness centres in the community In Niue, maternal and child health nurses have recently commenced a home visiting programme for new mothers and babies 		
Extended opening hours of clinics	3	 In Niue, opening hours have been extended to include lunchtimes Urban health clinics in Solomon Islands have extended their opening hours until 10pm 		
Use of technology for remote consultations	2	 In the Cook Islands, remote consultations are now available via a visual network Pohnpei State in FSM uses radios for remote consultations 		
New or extended health facility buildings	2	 There are plans to open a new urban health clinic in Honiara, Solomon Islands St Joseph's Hospital on Nukunonu, Tokelau, was upgraded to a referral hospital, including the building of 2 additional wards 		

(continued)

TABLE 1

Actio

Action	Number of	
ACCEPTABILITY	countries (out of 15)	Examples
Expanded domestic capacity for RMNCAH worker education	5	 Cook Islands is increasing domestic capacity, partly to enable culturally appropriate health care The new midwifery education curriculum for Tongan nurses will include the cultural norms and practices of Tonga
Complaint/ feedback mechanisms	4	 Patient feedback forms have been introduced at the hospitals in Niue and Tuvalu, and are regularly reviewed by senior management Fiji's Ministry of Health introduced a toll-free complaint line in 2017
Improvements to health facility infrastructure	3	 One of PNG's provincial hospitals recently introduced shower facilities and resting areas for new mothers The reception desk at a hospital in Tuvalu was relocated to make it easier for service users to find and use it
Development of youth- friendly services	2	 In Niue, specific services for adolescents and youth have been initiated, including a separate centre for STI screening and counselling The Vanuatu MoH has partnered with UNICEF to develop youth-friendly spaces within sports facilities to include sexual and reproductive health services
Reduced waiting times	2	The Cook Islands MoH business plan includes waiting time targets for health care providers
Professional separation of nursing and midwifery	2	In Tonga and Vanuatu, discussions have commenced about forming separate professional associations for midwives

QUALITY		
Continuing professic development initiati	nal ves 11	 The continuing professional development requirements for medical officers in the Cook Islands have been revised to increase the number of hours In at least three countries (e.g. Fiji, Palau and RMI), continuing professional development is required for health workers to be re-licensed. Similar requirements are in the pipeline in Niue, PNG, Tokelau, Tonga and Vanuatu The Kiribati HRH plan includes provision for health workers to attend international conferences, workshops and refresher courses
Upskilling of existin RMNCAH workers	g 8	 Cook Islands and RMI are working towards having more nurses qualify as nurse practitioners. Cook Islands is also encouraging all Enrolled Nurses to upgrade to Registered Nurses, and is considering the introduction of a Primary Health Care postgraduate qualification for nurses RMI is sending doctors to Taiwan for further training Midwives in Palau have been given training with the specific aim of reducing rates of stillbirth, maternal mortality and neonatal mortality In Tuvalu, health workers based on the outer islands are brought once a year to the main island for in-service training, and medical officers are offered mentoring via visits from expatriate specialists
Quality assurance or quality improveme initiatives	ent 7	 Cook Islands has a quality assurance manager with a mandate to encourage staff to recognise the importance of reporting incidents and near misses and to foster a 'no-blame' culture PNG has established a national qualifications framework to monitor the quality of pre-service education Tonga has introduced a system to assess the competencies of medical graduates educated in other countries before they can be registered as medical officers The Vanuatu Nursing Council has developed a handbook for registered nurses, which specifies the core competencies that must be demonstrated before registration The Fiji Mother Safe Hospital Initiative is a 12-step quality of care accreditation system which aims to ensure safe obstetric services
New or revised plan strategies/policies/ legislation	s/ 6	 The Cook Islands MoH has a revised business plan to monitor quality of health care, including documentation of complaints and feedback from service users Tuvalu is revising its Health Professionals Act, which has significant implications for regulation
Improved health wor registration and/or regulation systems	rker 6	 The proposed Niue Health Practitioners' Council will be responsible for registration and regulation of all the country's health workers Tonga is seeking funding to secure a Registrar to manage the new Nursing, Midwifery and Nurse Practitioner Board
Higher-level nursing midwifery qualificat	or 6 ions	Higher-level qualifications (e.g. Bachelors degree, diploma, nursing practitioner qualification) have been or will shortly be introduced for nurses in: Cook Islands, Fiji, Nauru, RMI, Solomon Islands and Vanuatu
New or revised RMNCAH worker education curricula	2	 PNG's midwifery curriculum was reviewed and the revised version of an 18 month program endorsed Vanuatu's midwifery education programme was aligned with ICM global standards



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What women, children and adolescents need

Table 2 shows some indicators of the level of need for RMNCAH services in the Pacific islands: collectively, the PSRO countries and PNG are home to 2.6 million women of reproductive age (WRA), who in 2015 had almost 340,000 live births. PNG accounts for about three-quarters of these WRA and births, whereas some of the small island nations each have fewer than 500 WRA and fewer than 50 births per year. Fertility rates tend to be fairly high in the region, with Samoa and the Solomon Islands having a total fertility rate (total number of children born per woman) of 4 or more and only Cook Islands, Palau and Tokelau having a total fertility rate below the global average of 2.5. Although fertility rates have declined over recent decades, the decline is slowing [42], and in some countries there have been recent increases, indicating that, in most countries, the need for RMNCAH services will not decrease significantly in the foreseeable future. Correspondingly, many countries in the region have a large adolescent population representing 10% or more of the total population (compared with a global average of 8%).

Demographic data relevant to RMNCAH services for 15 Pacific island countries

	Women aged 15-49	% of population aged 15-19	Total fertility rate	Live births
Year of estimate (unless otherwise stated):	2016	2016	2015	2018
Cook Islands	4,520**	8.4**	2.4** (2016)	252
Federated States of Micronesia	25,143**	11.6**	3.33	2,485
Fiji	224,931	8.5	2.61	19,180**
Kiribati	29,655	10.2	3.9**	3,380
Marshall Islands	13,260**	8.9**	4.1** (2011)	1,392
Nauru	2,600*	9.3*	3.9 § (2011-13)	314
Niue	357*	8.3*	2.8 § (2007-11)	18
Palau	4,186**	6.8**	2.1 § (2011-13)	244
Papua New Guinea	2,015,463	10.4	3.84	277,020
Samoa	43,436	10.6	5.1** (2014)	5,295
Solomon Islands	148,247	10.8	4.4**	20,455
Tokelau	356*(2018)	10.6*(2018)	2.1** (11)	29
Tonga	23,384**	11.1**	4.1** (2012)	2,569**
Tuvalu	2,320*	9.3*	3.6 § (2012)	253
Vanuatu	68,006	9.8	4.2** (2013)	8,715
Total	2,605,864	10.3		341,601

Sources: Population and total fertility rates from UN Population projections [43], except for those marked with:

- * which are from SPC unpublished data from 2016 round of population projections
- ** which were provided by the countries during data collection for this assessment, e.g. from the most recent census, administrative data or population survey

\$ which are from NMDI [14] Live births from SPC unpublished data from the 2016 round of population projections, except for those marked with **, which are 2016/17 estimates provided by the countries during data collection for this assessment. Figure 7 shows that rates of skilled birth attendance are generally high in the Pacific island countries, indicating that this aspect of RMNCAH care is seen as a priority in most countries in the region. There are however measurement challenges in that skilled birth attendants are not defined across all countries in the region according to global standards [44], making it difficult to know the exact extent to which appropriately skilled attendants are attending births. The most notable exception is PNG, with an SBA rate of 40%.

However, there are indications that the need for other aspects of RMNCAH care is not routinely being met in the region. For example, Figure 8 shows Fiji is the only country in the region where more than 90% of pregnant women access four or more antenatal care (ANC) visits. In the other countries, substantial proportions do not access this level of ANC, and recent global guidance now indicates that a minimum of eight visits is recommended [45].

Similarly, unmet need for family planning (the percentage of women of reproductive age, either married or in a union, who have an unmet need for family planning) is a major issue in some countries, especially among young and disadvantaged populations [42]. Figure 9 shows the most recent available data on unmet need for family planning, and illustrates that most countries in the region have a higher level of unmet need than the 2015 global average of 12% [47].

There is evidence that gender-based violence (GBV) is common in many Pacific island countries, which impacts negatively on the mental and physical health of women and girls (Figure 10). High rates of GBV mean that health workers must to be sensitive to this issue and enabled to provide practical and emotional support to women and girls who have experienced violence. The social and cultural barriers to reporting GBV and the fact that many women and girls cannot access the available GBV services due to their being primarily located in urban areas, have led to a recommendation that GBV services should be integrated with health services [51], and progress has been made in this regard in some countries in the region (see Box 2).

For the analysis shown in the country profiles in Chapter 3, estimates were made of the amount of health worker time that would be needed to meet the need for RMNCAH services in each country, taking into account the country's demography



FIGURE 7 Percent of live births attended by a midwife, nurse or doctor in 15 Pacific island countries, most recent available year

Source: National Minimum Development Indicators [14]

FIGURE 8 Percent of birthing women in 11* Pacific island countries who had at least 4 antenatal care visits, most recent available year



Source: UNICEF [46]

* No published data for Cook Islands, FSM, Niue or Tokelau.



FIGURE 9 Unmet need for family planning in 11* Pacific countries, most recent available year

Source: National Minimum Development Indicators [14], except for PNG [48], Marshall Islands [49] and Samoa [50]

* No published data for Cook Islands, Niue, Palau or Tokelau.

FIGURE 10 Patterns of gender-based violence in the Pacific Island countries, based on national studies (percentages)



Source: UNFPA analysis of published national statistics.

BOX 2

Integration of gender-based violence services and health services

The Vanuatu Women's Centre (VWC) was established in 1992, with the aim of eliminating violence against women and children through advocacy and awareness-raising, both at a national level and in the community. VWC has worked alongside the government on legislation that made domestic violence a criminal offence. VWC noticed that women who had experienced violence were often followed to hospital by their abusers, which exposed them to additional risk that is difficult to prevent in a public area such as a hospital waiting area. VWC worked with the main referral hospital in Port Vila to provide a secure room where women can be safe while they access care from health professionals, and be referred to VWC for support and counselling.



Solomon Islands Seif Ples centre. Image: Jenny Narasia

In Honiara in the Solomon Islands, the Ministry of Health, police force and local community worked together to establish the *Seif Ples* centre for women and children who have experienced violence. Operational since 2014, the centre is located next to the police station for ease of referral, and it is staffed by nurses who provide medical care and counselling (including specialist counselling for children), and can refer women for legal advice. The centre also provides temporary accommodation for women and children, but cannot always meet the demand for this.

Sources: Merilyn Tahi (Vanuatu Women's Centre), Litea Meo-Sewabu (UNFPA consultant)

(e.g. number of women of reproductive age, fertility rate) and epidemiology (e.g. prevalence of sexually transmitted infections): see Annexes 1 and 4 for full details. Variation in demography and epidemiology results in varying amount of need for RMNCAH services.

Figure 11 sums these estimates across all participating countries, and shows the need for health workers in 2016 across the different stages of the continuum of care. This highlights that almost half of the need for RMNCAH care is for child and adolescent health and development, and just over half is for sexual, reproductive, maternal and newborn health care.

Many countries in the region have stable populations, and the amount of need for RMNCAH care is unlikely to change much in the foreseeable future. However, other countries are experiencing population growth, such that across the region as a whole, the need for RMNCAH worker time is projected to increase by 13% by 2030 (Figure 12). The largest increase will relate to the need for sexual and reproductive health care, which is due to rise by 31%. Full details of how these projections were made can be found in Annex 1. The need for RMNCAH services varies by location, and it can be helpful for workforce and infrastructure planning to use modelling and mapping techniques to estimate where the need is greatest. As part of this assessment, a mapping exercise was carried out, using population and age-specific fertility data to estimate the number of pregnancies occurring in different parts of each



FIGURE 12 Projected need for RMNCAH worker time across 15 Pacific island countries, by element of RMNCAH care, 2016 – 2030



of the participating countries. These maps can be seen in Chapter 4, where dark shades of red indicate relatively large numbers of pregnancies, and dark shades of blue relatively small numbers. The pattern of pregnancies largely mirrors the main population centres. In combination with information about the time it takes to travel to the nearest health facility (see later), countries can use this information to feed into decisions about where to deploy the available health workers.

What is the RMNCAH workforce?

The participating countries were asked to provide detailed information on the RMNCAH workforce, including cadre names, headcounts, duration of education, roles and responsibilities, and proportion of working time spent on providing RMNCAH services. As an initial stage of the analysis, RMNCAH workers in the region were grouped into one of 7 categories based on their cadre name: midwives/nurse-midwives, nurses, auxiliary cadres (e.g. enrolled nurses), nonphysician clinicians (e.g. health assistants, nurse practitioners), medical officers, obstetricians/ gynaecologists and paediatricians. Anaesthetists were not included in this assessment because of the small number of RMNCAH interventions in which they have a role (mainly caesarean sections) and therefore the relatively small amount of health worker time that is needed from them for RMNCAH care. However, their role is essential and there should be sufficient anaesthetist cover as part of every country's referral RMNCAH service.

For most countries, community health workers were not counted as RMNCAH professionals because there is no standard definition of a community health worker, nor a standard expectation of which RMNCAH tasks they are competent and authorised to deliver. However, for PNG, community health workers were counted as an auxiliary nursing profession because they account for such a large proportion of the country's health workforce, have the roles and responsibilities of an auxiliary nurse, receive two years of formal education to qualify, have a licensing framework and work autonomously in some remote parts of the country [52]. Since this assessment was conducted, WHO has published a set of standards for community health workers [53], so in the future it should be possible to include them routinely in this type of workforce assessment.



FIGURE 13 RMNCAH workforce distribution in 15 Pacific island countries, 2016

Based on these cadre groupings, Figure 13 shows the distribution of the RMNCAH workforce in the 15 participating countries. The left-hand chart shows the composition of the workforce by headcount. The right-hand chart shows the composition by 'dedicated RMNCAH equivalent' (DRE), which was calculated by multiplying the headcount by the percentage of clinical working time spent on RMNCAH. The main difference between these two graphs is that nurse-midwives account for just 10% of the headcount, but 19% of the DRE workforce, because they spend all or most of their time on RMNCAH. These graphs clearly show that nurses and midwives are the backbone of the RMNCAH workforce in the region.

Availability

The first dimension of effective coverage is availability, i.e. are there enough health workers to meet the need for RMNCAH services?

Workforce size

Across the 15 participating countries, just under 15,000 health professionals were engaged in providing RMNCAH services3. However, headcount alone is an inadequate measure of the size of the RMNCAH workforce, because some cadres provide other health services in addition to RMNCAH services. Figure 14 shows the difference between the headcount and the size of the 'dedicated RMNCAH equivalent' (DRE) workforce. The smaller column gives a more accurate estimate of availability of health workers for the provision of RMNCAH care: the DRE workforce in the region is just half the size of the headcount. Most of this difference is due to nursing, auxiliary and generalist doctor cadres, who spend a relatively small proportion of their time on RMNCAH.

It is clear from Figure 13 that there are very few specialist RMNCAH doctors (obstetricians/gynaecologists and paediatricians) working in the region.

3 The extent to which this figure includes both public and private sector workers is not clear. Countries were asked to include both, and some did, but others were unable to obtain figures for the private sector.

FIGURE 14 RMNCAH workforce in 15 Pacific island countries: headcount versus dedicated RMNCAH equivalent



Furthermore, Figure 15 shows that the ratio of these specialist cadres to the population that they serve varies considerably by country. For example, Palau has 5 obstetricians/gynaecologists and 2 paediatricians serving 4,186 WRA and 4,384 children aged under 18 years, whereas Vanuatu has 4 obstetricians/gynaecologists and one paediatrician serving a population of 68,006 WRA and 113,578 children. Figure 15 converts these figures to a number of specialists per 100,000 population, so that relative densities may be compared, although it should be noted that this is for comparison purposes only: many countries have populations smaller than 100,000, so the number of specialists shown per 100,000 population is larger than the actual number of specialists. Some countries have none of these specialists at all, which means either that the services must be provided by other cadres (in which case the scopes of practice of these cadres should include these additional competencies and their education/training should include them), or that service users must travel to other countries if they need to access specialist care. In recognition of this, some Pacific island countries have made arrangements with neighbouring countries.

Health worker retention

Many countries in the region experience high turnover of RMNCAH workers, which puts them under pressure to recruit new workers just to maintain current levels of availability. Figure 16 shows the number who have left their position in the past five years (excluding retirements and deaths) expressed as a percentage of the current headcount. There is a great deal of variation across the region, ranging from FSM States Pohnpei and Yap (which

FIGURE 15 Obstetricians/gynaecologists per 100,000 women of reproductive age and paediatricians per 100,000 children, 15 countries



FIGURE 16 Number of workers who left health workforce in the last 5 years, as percentage of current headcount, 13 countries*





^{*} No data available for Kiribati or PNG

collectively reported just a single voluntary leaver in the past five years), to Nauru (which reported a large number of doctors leaving the workforce in the past five years).

The current age distribution of the workforce is important for future workforce availability: a high proportion of older workers indicates a future availability problem when that cohort reaches retirement age. Figure 17 shows the age distribution of nurse-midwives in the participating countries. Kiribati, Fiji and Palau have a relatively young nurse-midwife workforce, with 2%, 20% and 20% respectively aged over 50 in 2016. Conversely, 13 of the 19 nurse-midwives in Tuvalu, where the statutory retirement age is 55, were aged over 50 in 2016. Across the region, the statutory retirement age is 55 in 6 countries: Fiji⁴, Kiribati, Samoa, Solomon Islands, Tuvalu and Vanuatu. The age profile for nurses (Figure 18) shows a more even age distribution than for midwives. Only in Vanuatu and Palau were more than 25% of nurses aged over 50 in 2016.

The age profile of doctors in Figure 19 includes medical officers, obstetricians/gynaecologists and paediatricians. In Kiribati and Tuvalu, there were no doctors aged over 50 in 2016, while in RMI, two-thirds were aged over 50.

Focus on availability of nurse-midwives

Although nurse-midwives are not the only type of health worker needed to provide RMNCAH services, they are an essential element of the workforce due to their unique contribution to the physiological process of childbirth and the fact that they provide services across the entire continuum of RMNCAH care [54]. Research has shown that even a modest scale-up of midwife numbers can save many lives [25]. Furthermore, given the

However, there is provision for RMNCAH workers to keep working on short-term contracts after they reach statutory retirement age – see Box 6.



FIGURE 17 Age profile of nurse-midwives in 14* countries, 2016





* No data available for Marshall Islands or PNG.

FIGURE 19 Age profile of doctors in 10* countries



* No data available for Nauru, Niue, Samoa, Tokelau and Vanuatu.

shorter duration of education for midwives and nurse-midwives compared to doctors, the impact of scaling up these cadres can be realised in a relatively short time-frame.

Scaling up of midwife numbers can be achieved more easily if the profession is viewed as an attractive one, because this will help to encourage high-calibre school leavers to consider it as a career, and/or nurses to consider it as a good career development pathway. It is therefore encouraging that, in 9 of the participating countries, being a midwife or nurse-midwife is perceived as a much more attractive or a more attractive career choice than others open to people with a similar level of education (Figure 20). Reasons given for this rating include the perceived respect for midwives in the community (Cook Islands) and that midwives are mentioned in the Bible and they are the first receiver of God's creation (Nauru). In Vanuatu, interest has grown since midwifery became an accredited course and those working in the field have noticed anecdotally that "these graduates appear to be more competent and have [a] much better work ethic". In FSM, Kosrae and Yap states reported that it is less attractive

to be a midwife, but Chuuk and Pohnpei states said it was much more attractive. None of the other countries reported that it is less attractive to be a midwife.

Data requirements and data gaps

The analysis of current and future workforce availability depends on 10 essential pieces of information that all countries should collect (Box 3). The routine collection of these 10 data items is essential to facilitate effective workforce planning. Experience in other countries has demonstrated that the process of obtaining workforce data can be challenging, so for this report UNFPA employed a team of three consultants to facilitate the process. As a result, the data supplied for this report are far more complete than has been possible for earlier comparable studies. It should be noted, however, that the process was lengthy and often required considerable effort from the consultants and national stakeholders. Countries tend not have an accessible central database containing all the requested data, and the available sources of data were often contradictory or incomplete. This indicates that there is much room for

FIGURE 20 Perceptions among survey respondents of the comparative attractiveness of a career as a midwife, 14* countries



"Midwives are visible in the community and are revered for their empathetic care as they work across the wide continuum of pregnancy, labour and the postnatal period" (Cook Islands)

"Midwives are recognised in Tokelau as being different from nurses and as having separate "special" skills that are valued, particularly from women who have had children" (Tokelau)

"Midwifery knowledge and skills are attractive but there is no pay incentive. (Midwives are) overworked with very little time for other things" (Solomon Islands)

* Excluding FSM because the four states gave different answers.

BOX 3

10 essential data items for SRMNAH workforce planning:

- 1 Headcount
- Percentage time spent on RMNCAH
- (3) Roles of each cadre
- 4 Age distribution of current workforce
- 5 Retirement age
- 6 Duration of education
- Number of students enrolling per year
- 8 Education attrition rate
- 9 Number of new graduates joining the workforce each year
- 10 Voluntary attrition from the workforce

Source: Adapted from World Health Organization [55]

improvement in the availability and transparency of data, which would allow for improved quality of health workforce analysis, modelling and planning.

Workforce planning requires an understanding of the education and migration pipelines, as these directly determine the future availability of health workers. The data items most commonly missing were the numbers of new recruits joining the workforce each year (including new graduates and overseas recruits). It is important to establish a connection between HRH management systems and health education and migration planning systems, but this is complicated in the region because not all countries have their own health worker education institutions, making it more difficult to monitor and record the number of nationals enrolling in, and graduating from, health worker education programmes. While 12 of the 15 countries have nursing education institutions (the exceptions are Niue, Tokelau and

Tuvalu), only 7 educate midwives in-country (Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu) and only 3 educate their own doctors (Fiji, PNG and Samoa).

The next two key data items most commonly missing were voluntary attrition (i.e. the number of workers leaving the workforce each year for reasons other than death or retirement) and the age distribution of the current workforce. Voluntary attrition data were not available for 20 of the 82 reported cadres, reducing the accuracy of future workforce availability projections. Furthermore, many of those countries that did provide numbers, indicated that their responses were based on expert estimates rather than empirical data. Recent research indicates that lack of data on voluntary attrition is a widespread issue requiring urgent attention for effective workforce planning [56].

Countries in the region have recognised that data availability is a crucial component of health service (including workforce) planning: 11 of the 15 participating countries reported that at least one national policy document specifically addresses how the country will improve the data, information systems, monitoring and accountability of RMNCAH services (the exceptions are Nauru, Niue, Tokelau and Tuvalu). Many countries reported policies focusing on strengthening existing health management information systems. The focus now must be on strategies for putting the policies into practice [12], and countries in the region are already taking action on this: 9 of the 15 countries reported that their health information system is new or recently updated and 6 have provided training for health workers in data collection, management and analysis.

Accessibility

Even if there are enough health workers, people still need to be able to access the care that they provide. Accessibility is a multi-dimensional concept [57], and two of these dimensions are: geographical accessibility (i.e. whether or not
Availability

- The availability of RMNCAH workers should not be estimated using headcounts, because several RMNCAH cadres spend some of their time on aspects of healthcare other than RMNCAH. The 'dedicated RMNCAH equivalent' workforce is only half the size of the headcount. Nurse-midwives and nurses account for two-thirds of the available RMNCAH workforce.
- Most countries in the region have sufficient nurses to meet the need for the elements of RMNCAH care that nurses are competent to provide.
- In 10 of the 15 participating countries, there is an overall shortage of nurse-midwives. There is also a severe shortage of specialist RMNCAH doctors (obstetrician/gynaecologists and paediatricians) affecting most countries in the region. PNG has a severe shortage of all RMNCAH cadres.
- Scaling up the availability of midwives and nurse-midwives would be a cost-effective method of improving RMNCAH worker availability. Being a nurse-midwife is generally viewed as an attractive career option in the region.
- In many countries in the region, future workforce availability is threatened by high levels of staff turnover (especially doctors) and/or an ageing workforce (especially nurse-midwives).
- The region faces particular challenges to the education and recruitment of sufficient RMNCAH workers, including the fact that many smaller countries do not have their own education institutions and are dependent on other countries for the supply of at least some RMNCAH cadres. It is therefore important to take a regional, co-operative approach to RMNCAH worker availability.

people can physically get to a health worker (or vice versa), quickly in cases of emergency) and financial accessibility (i.e. whether or not people can afford to pay the direct or indirect costs of consulting a health worker).

It is encouraging that 11 of the 15 participating countries report that at least one of their national policy documents specifically addresses how the country will reduce or remove financial, geographical and other barriers to accessing RMNCAH care. The exceptions are Cook Islands, RMI, Nauru and Niue.

Financial accessibility/affordability

In many countries, financial barriers are known to have a significant impact on accessibility, so it is encouraging that all 15 countries reported the existence of a minimum guaranteed benefits package for RMNCAH, defined as "a set of health services that the government has committed itself to making available to all, free at the point of access". This indicates that, in general, affordability of RMNCAH services is not a significant barrier to access, but it should be noted that the assessment did not consider indirect costs such as travel, accommodation and prescription charges.

Furthermore, effective coverage is influenced by the content of the benefits package as well as its existence. The Global Strategy for Women's, Children's and Adolescents' Health includes a list of essential interventions [11], of which 124 were considered to be relevant to RMNCAH in the Pacific region. Figure 21 shows that, of the 15 participating countries, none has a package that includes all 124 of these interventions. Cook Islands achieves 99%, covering everything on the list except continuous positive airway pressure (CPAP) to manage babies with respiratory distress syndrome. The packages of Tokelau and the RMI, on the other hand, include fewer than 80% of the essential RMNCAH interventions. The figure of 84% for FSM is the percentage of the essential interventions included in the package of all four states. Individually, however, each state reported that over 90% of the 124 interventions were included.

In many cases, exclusion of an intervention from a country's minimum benefits package can be defended on the grounds of relevance, e.g. if there is low or zero incidence of HIV or malaria, the exclusion of malaria or HIV interventions can be defended. Table 3 lists the interventions that are most commonly excluded from the minimum benefits packages of countries in the region even though they are or may be relevant. For example, early marriage is prevalent in several countries in the region [58], so the fact that 12 out of 15 countries do not include interventions to prevent harmful practices such as this is of concern. In addition, several countries do not include detection or management of genetic conditions (antenatal and postnatal) or identification and response to intimate partner violence (IPV). IPV is known to be prevalent in the region (Figure 10), making it important for these interventions to be accessible to all women.

Geographical accessibility

The accessibility of the RMNCAH workforce is underpinned by an adequate geographical spread of health facilities (and, by extension, health workers), backed up by good transport and communication networks. Achieving this geographical spread depends heavily on good information and effective planning. Good information includes knowing where the country's health workers are located, so that assessments can be made of how well the supply of health workers meets the need (as measured by, for example, population density, number of women of reproductive age, fertility rates), taking into account travel times which can be influenced by topography and transport networks as well as physical distance.



FIGURE 21 Percentage of 124 essential RMNCAH interventions included in minimum guaranteed benefits package, 15 countries

TABLE 3

Essential RMNCAH interventions excluded from the minimum benefits package by 5 or more countries/states

Intervention	Countries without this intervention in minimum benefits package
Prevention of harmful practices such as early and forced marriage	Federated States of Micronesia, Fiji, Marshall Islands, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu
Response to harmful practices such as early and forced marriage	Federated States of Micronesia, Fiji, Marshall Islands, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu
Detection of risk factors for genetic conditions (antenatal)	Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Niue, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu
Management of genetic conditions (antenatal)	Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu
Detection of genetic conditions (postnatal)	Federated States of Micronesia, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu
Management of genetic conditions (postnatal)	Federated States of Micronesia, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu
Continuous positive airway pressure (CPAP) to manage babies with respiratory distress syndrome	Cook Islands, Federated States of Micronesia, Niue, Papua New Guinea, Tokelau, Tuvalu
Parent skill training, as appropriate, for managing behavioural disorders in adolescents	Kiribati, Marshall Islands, Nauru, Niue, Papua New Guinea, Solomon Islands
Safe abortion (wherever legal*)	Federated States of Micronesia, Palau, Papua New Guinea, Tokelau, Tuvalu
Identification of intimate partner violence	Federated States of Micronesia, Marshall Islands, Nauru, Papua New Guinea, Samoa, Tuvalu
Response to intimate partner violence	Federated States of Micronesia, Marshall Islands, Nauru, Tokelau, Tuvalu

*Abortion is legally restricted throughout the region, but in most countries it is permitted in certain circumstances, e.g. if the pregnancy would endanger the woman's life [59]. Note: FSM is included in the table if at least one of the four states excludes that intervention.

Chapter 4 of this report presents a set of maps to illustrate the geographic distribution of the pregnancies in each country and the time it takes to travel from different parts of each country to the nearest health facility that can provide comprehensive emergency obstetric and newborn care (CEmONC). For each country there are two maps: (1) travel time to the nearest CEmONC facility using motorised transport, and (2) travel time to the nearest CEmONC facility using non-motorised transport. The green sections of these maps represent relatively short travel times (under 30 minutes), and the blue sections relatively lengthy travel times (over 2 hours). Used in conjunction with the pregnancy heatmaps, these maps can be used to identify geographic areas that are underserved by health facilities (and by extension, RMNCAH workers). They reflect the very specific challenges to geographical accessibility of RMNCAH workers and provide evidence to support the design of creative solutions to these challenges such as community outreach work and effective referral systems in case of emergencies. Planning should address the allocation of resources according to need. Four countries reported that they make decisions about where to deploy their RMNCAH workforce according to population distribution. A further 4 countries base this decision on population size combined with the type of health facilities existing in various locations. The remaining 7 countries use a different method.

Of the 8 countries who said that decisions were at least partly based on population size, the stated ratios ranged from 1.3 nurse-midwives per 10,000 population in Vanuatu to 16 per 10,000 population in Fiji. Despite stating that workforce deployment was based at least in part on population, PNG, RMI, Solomon Islands and the FSM State of Kosrae did not provide a ratio for nurse-midwives. Fiji also has the highest ratio for medical officers, basing deployment on a threshold of 10 per 10,000 population. This contrasts with PNG, where the target level is 0.7 per 10,000 population. Solomon Islands, RMI and FSM did not provide a threshold.

Global guidance recommends a minimum of five fully functioning emergency obstetric and newborn care (EmONC) facilities per 500,000 population, including at least one comprehensive EmONC (CEmONC) facility [60]. Although this is an established benchmark, improved information on births and pregnancies has led to discussion about revising these standards, and extending them to include signal functions relating to non-emergency care [61]. Across the region, 14 of 15 responding countries reported at least one CEmONC facility per 500,000 population (the exception being Tokelau, which reported no CEmONC facilities). However, it is clear from the information in Chapter 4 that global benchmarks such as this have limited applicability in the region, due to populations being highly dispersed. Even if EmONC facilities exist, they may not be accessible.

Seven countries responded that they base their workforce deployment on an alternative method. Niue, Nauru and Tokelau have small, stable populations with a limited number of health facilities, so do not experience the same deployment challenges as the other countries in the region. Cook Islands, Tonga and Tuvalu each employ an individual approach, designed for their particular situation. Cook Islands take population and health facilities into account, but also deploy staff according to the pattern and burden of disease, existing health staff, availability and expertise of the staff and personal preferences. In Tonga, the policy is to deploy to each outer island health centre, one health officer and at least one senior nurse who has either a midwifery qualification or a nurse practitioner qualification including midwifery. Tuvalu's strategy is to staff each outer island health centre with a midwife and a nurse, regardless of population size. There are also plans for each island in Tuvalu to have one medical officer, although this will take some time to achieve.

Island nations face specific issues in relation to accessibility of health services and health workers, most notably in relation to geographical isolation and the presence of many small islands which make transport and communication difficult and expensive [62]. Many have developed effective systems to address these issues (see Box 4), but significant challenges remain. To determine whether the RMNCAH workforce has the capacity to deliver universal coverage, it is necessary to examine the need for RMNCAH services and how this varies. This need is driven by multiple demographic and epidemiological factors (e.g. fertility rate, disease prevalence), and therefore cannot be reduced entirely to global benchmarks. Workforce planning in relation to need must take account of the national and sub-national context.

The country profiles in Chapter 3 present country-specific needs-based analyses of the availability and geographical accessibility of the RMNCAH workforce, expressed as a 'potential met need' (PMN) percentage. It should be noted that this estimate does not indicate the proportion of the country's need that is *actually* being met. It is a measure of the *potential* of the workforce to meet the need for essential RMNCAH services: in other words, the percentage of the clinical time required to provide the essential RMNCAH interventions that could be provided by the current workforce - in its current locations and with its current skill-mix - if the workload were allocated in an economically efficient manner (i.e. every task is given first to the least expensive cadre competent to perform it). They therefore almost certainly overestimate the actual amount of need being met, because (a) it is unlikely that the entire workload is allocated according to economic efficiency, and (b) met need is affected by acceptability and quality of care as well as by workforce availability and accessibility. Comparable data on acceptability and quality of care are not available for all the participating countries, and it is recommended that harmonised measures of these domains of effective coverage be introduced across the region so that future workforce modelling exercises can build them into the estimates of met need.

A full explanation of how the PMN estimates were calculated can be found in Annex 1. To reflect the unique geographic challenges in the region, the national PMN has been estimated as a weighted average of the PMN in each of the sub-national areas. Sub-national population counts disaggregated by age and gender are therefore an essential item of input data, but these were not available for RMI or PNG. Because PNG is mostly a single landmass (in contrast to most of the other countries in the region), it was possible to make a PMN estimate at a national level, but this should be interpreted carefully because it does not take accessibility into account. For RMI, a PMN estimate was not possible. Figure 22 shows the PMN estimates for the remaining 14 countries. The estimates range from 99% in Nauru to 24% in PNG. It is notable that the high PMN figures achieved by very small countries are highly vulnerable to change: the loss of only one or two health workers would seriously affect the PMN estimate.

Figure 23 makes it clear that every country in the region relies heavily on nurses for the provision of RMNCAH care. Across the 14 countries with a PMN



FIGURE 22 Estimates of 'potential met need' for RMNCAH workers for 14* countries, 2016

* Estimate not possible for Marshall Islands.

estimate (i.e. excluding RMI), the average proportion of PMN that can be provided by nurses is 72%. Only in PNG, Samoa and Vanuatu can nurse-midwives provide more than 20% of the PMN, despite the fact that half of the need for RMNCAH care workers is for midwifery interventions relating to reproductive, maternal and newborn health (see Figure 11). Furthermore, nurses are less likely than midwives to have all of the competencies associated with a skilled birth attendant (see Figure 28).

The 'accessibility' graphs in the country profiles in Chapter 3 show that, in many countries, RMNCAH professionals tend to be clustered on the main islands, leaving the outer islands underserved in relation to population size, and often heavily reliant on auxiliary cadres and non-physician clinicians. It is mainly for this reason that most countries have a higher PMN estimate for interventions that can be provided at the primary level than for those that need higher-level care.

Maintaining accessibility in challenging conditions

Effective coverage of health services can also be affected by climatic conditions in the region, both in terms of the impact on health infrastructure of extreme weather events and natural disasters (see Box 5), and this representing a 'push' factor for health workers migrating to other countries [63].

Equity of access

To tackle inequity of access, countries need strategic intelligence to identify existing inequalities, and effective planning to address them. Of the 15 countries covered by this report, 11 reported that at least one of their national policy documents specifically addresses how the country will increase access to RMNCAH care for vulnerable and disadvantaged groups, such as those living in remote areas, adolescents, ethnic minority groups and those living in poverty (the



FIGURE 23 Proportion of need for RMNCAH worker time that could be met by each cadre, 14* countries

* Estimates not possible for Marshall Islands



Responding to geographical challenges to effective coverage of RMNCAH workers

The only referral hospital in the Cook Islands is on the main island of Rarotonga. Some islands have no air access, and journeys by boat can take several days depending on the weather conditions. For this reason, pregnant women from the outer islands are encouraged to travel to Rarotonga to give birth. Most do so, but some choose to give birth on their home island, attended by a midwife or nurse. Usually the labour and birth go well and the outcomes are good, but on occasion there are emergencies, such as the one described below by the Cook Islands' obstetrician/gynaecologist:

"I received a phone call from a midwife from Pukapuka, one of the far-most islands. A woman was experiencing a prolonged and suspected obstructed labour and the midwife was concerned. After listening to her assessment I decided the best option was to travel to the island with a surgical team to expedite the birth as soon as possible: two lives were at immediate risk. This is not a decision made lightly: it is a considerable distance to travel and requires permission from the highest level of government as it is not a cheap exercise to charter a small plane and assemble the medical team and equipment necessary for a surgical birth.

"Some seating had to be removed from the small plane to fit in the team and its supplies. Pukapuka has no air access, so we landed on a nearby island and made our way by boat to the health centre on rough seas. Upon arrival we worked quickly to prepare a makeshift operating theatre, our anaesthetist gave the woman a spinal epidural and I performed a caesarean section. Conditions were not ideal for this surgery, but it progressed smoothly and a healthy baby was born to the relief of everyone. Our relief was shortlived as a phone call from the pilot on the neighbouring island informed us the weather was changing and we needed to leave. Transporting a newborn baby and a post-surgical woman on a small boat was no easy task but we worked well as a team and both remained stable during the trip back to Rarotonga Hospital."

Source: Dr Yin Yin May (Cook Islands), Felicity Copeland (UNFPA consultant)

BOX 5

Maintaining effective coverage of RMNCAH services after natural disasters

Two countries in the region were affected by natural disasters in February 2018: an earthquake in PNG and a cyclone in Tonga. UNFPA and other stakeholders provided support to maintain RMNCAH services in the aftermath of these events.

As a result of cyclone Gita, the only hospital in Tonga's capital city of Tongatapu sustained structural damage and interrupted supplies of water and power. Further, its human resources were depleted due to transportation difficulties and staff needing to attend to the damage to their homes. Within 4 days of the cyclone, UNFPA deployed a humanitarian mission to Tonga to assess and support the reproductive health needs of women and adolescents. With the support of the Australian government, critical supplies such a clean delivery kits and personal hygiene packages ('dignity kits') were distributed at the hospital and in local communities.

After the immediate humanitarian mission, UNFPA Fiji in collaboration with UNDP in Tonga and the Tongan MoH deployed six recently retired Fijian midwives to the hospital's maternity unit for a month. Many of the Tongan nurses and midwives had been working long hours to respond to the emergency, and this additional staffing enabled them to take some time off to recover. In addition, the Fijian midwives were able to share their extensive midwifery knowledge with Tongan colleagues. The deployment of retired midwives for short-term relief is an innovative and cost-effective way to maintain RMNCAH services following an emergency, and it also creates goodwill and an ethos of partnership between Pacific island countries.

Source: Felicity Copeland (UNFPA consultant)



A woman affected by Cyclone Gita receives a UNFPA dignity kit. Image: UNFPA Pacific/Tomoko Kurokawa

exceptions are Cook Islands, Nauru, Palau and Tokelau). Responses to the questions on workforce planning and deployment (see above) also indicate that some countries plan their RMNCAH workforce deployment according to population distribution, but few do so according to the level of need for RMNCAH services, which is not necessarily directly correlated with population size.

Legal or policy restrictions on access to RMNCAH services can also reduce accessibility, e.g. if there is a policy to restrict access to family planning services just to married people or those over a certain age. Most countries in the region have restrictive abortion laws, but the assessment did not request information on legal or policy restrictions on access to family planning services. It is, however, evident that countries in the region have high levels of unmet need for contraception: the SDG database shows that, in 2017, 78% of the world's women of reproductive age who were married or in a union had their need for family planning satisfied with modern methods; this figure was 44% in Polynesia (Samoa, Tonga, Cook Islands, Tuvalu, Tokelau, Niue), 52% in Melanesia (Fiji, Papua New Guinea, Solomon Islands and Vanuatu) and 60% in Micronesia (Federated States of Micronesia, Palau, Kiribati, RMI and Nauru) [5].

One way to improve accessibility of RMNCAH services is to integrate them with related health services such as services for women and children with non-communicable diseases. Countries were asked whether there was a national policy or plan that included such integration of services, and 9 countries indicated that such a policy or plan existed. Samoa and Tokelau gave no response and Kiribati, RMI, Niue, Palau indicated that existing

• REY MESSAGES

Accessibility

- Most countries in the region have an official policy to remove financial, geographical and other barriers to accessing RMNCAH care.
- All countries have a minimum guaranteed benefits package, but none has a package that covers all the RMNCAH interventions considered to be essential in the Global Strategy for Women's, Children's and Adolescents' Health. Essential interventions that are commonly missing from the package include: response to intimate partner violence, prevention of harmful practices such as early and forced marriage, and detection and management of genetic conditions.
- Accessibility is a particular challenge in the region due to its geography and climate. Most countries have a policy to deploy RMNCAH workers according to population size, but remote areas tend to have fewer RMNCAH workers per head of population, and are often heavily reliant on auxiliary cadres and non-physician clinicians rather than fully-qualified doctors, nurses and nurse-midwives. Extreme weather events can also make accessibility more difficult.
- A needs-based analysis of RMNCAH workforce availability and accessibility shows that no country in the region has sufficient qualified and equitably-distributed health workers to meet all of the country's need for RMNCAH care. Five countries come close: Nauru, Niue, Tokelau, Tonga and Cook Islands, but a lack of specialist doctors in these countries means that the workforce does not have the capacity to meet all of the need. PNG's workforce, on the other hand, has the potential to meet just 25% of the need for essential RMNCAH care.
- At a policy level, most countries in the region recognise the importance of equitable access to RMNCAH care, and see integration of RMNCAH services with other health services as one method of improving equity of access. However, barriers to such integration include staff shortages and the need for further health worker training.

plans do not include integration of services. Twelve countries identified that one of the key challenges to the successful integration of services is the lack of necessary competencies among health workers. Seven countries also cited a lack of the necessary equipment. Six countries said that health workers did not realise that they are supposed to provide integrated services, and five countries said that they did not have time to do so. PNG also commented that the large number of languages spoken in the country "*is a huge barrier in implementing most programmes*".

Acceptability

Even if care is available and accessible, effective coverage of RMNCAH care is reduced if either the care or the workforce is unacceptable to women, their families or communities. Even in countries with high levels of coverage for RMNCAH services, lack of respect for service users and/or lack of sensitivity to social or cultural needs can be a disincentive to access [64]. Acceptable care requires that all health facilities, goods and services should be ethical, respectful, culturally appropriate and safe [33]. Respectful care should be sensitive to gender and life-cycle requirements, and designed to ensure confidentiality and improve the health status of service users.

Of the 15 participating countries, 10 said that at least one national policy document specifically addresses how the country will deliver RMNCAH care that is sensitive to social, cultural and traditional needs, e.g. in relation to age, gender, ethnicity, religion and language. The exceptions are: Nauru, Niue, PNG, Tokelau and Tuvalu. Examples provided by countries include the Obstetrics and Gynaecology Clinical Practice Guidelines in Fiji, which discusses the need to take Ramadan fasting into account when testing Muslim women for gestational diabetes. Another example is the Vanuatu Reproductive Health Policy and Implementation Plan (2015) which specifically calls for the use of social media to provide relevant messages to young people.

Improving acceptability involves listening to women, adolescents and their communities – preferably through participatory approaches - and building their preferences into policy and capacity-building initiatives, feedback loops and accountability measures. Of the 15 participating countries, only Fiji and PNG reported that public perceptions of midwives/ nurse-midwives had been studied in their country. This suggests that countries in the region could do more to understand what RMNCAH service users want and need.

Countries were asked to describe any reasons why a woman might be uncomfortable seeking care from a midwife/nurse-midwife or a doctor and the results are shown in Figure 24. The most common reasons were: gender barriers, the lack of privacy and anonymity in a small community, the perception that doctors provide better quality care than midwives, and the attitude of service providers themselves. It is clear therefore that in many countries in the region there is a need for: public education about midwifery, efforts to educate RMNCAH workers about the importance of being approachable and respectful, and advocacy for enabling environments that will motivate them to deliver respectful care.

Additionally, it was noted in a recent study of small island states that qualified midwives tend not to take up key decision-making and leadership roles within health systems [31]. This lack of visibility and leadership is likely to impact negatively on perceptions of the profession. The relatively lowly position of nurse-midwives in the health service hierarchy is emphasised in Figure 25, which shows that very few of the health facilities that offer delivery services have midwife-led units, except in Nauru, Palau and Samoa. Box 6 describes the opening of





FIGURE 25 Number of health facilities that have a midwife-led unit, 2016



* Data not available for PNG, Solomon Islands and Vanuatu

a midwife-led maternity unit in Fiji, which may help to change perceptions of nurse-midwives and midwifery.

Vulnerable and marginalised groups such as adolescents and people with disabilities often have additional needs from health workers. If these needs are not met, they may find the care on offer to be unacceptable. They need to feel accepted and supported across the entire continuum of care [65]. Box 7 describes an approach to the provision of child- and youth-friendly health services. Of particular note in some Pacific island countries are: the large adolescent population (Table 2), the high adolescent fertility rate (Figure 26) against a global average of 44 adolescent births per 1,000 women aged 15-19 [66], and the high prevalence of sexually transmitted infections among adolescents [42].

The health needs of adolescents and youth are important, because (a) they are a relatively large sub-population in most Pacific countries, (b) the health choices and behaviours that impact on future health are often forged in adolescence, and (c) this is the transition period during their development into adulthood with its attendant biological, emotional and social changes. However, adolescents may choose not to consult a health worker

BOX 6

A new midwife-led maternity unit in Fiji

Over 7,000 babies are born each year at the Colonial War Memorial hospital in Suva, Fiji, and its maternity services are over-stretched. To help ease the pressure and improve quality of care, the country's first midwifery-led unit (MLU) was recently opened at Makoi Hospital, for women with low-risk pregnancies. With the appropriate referral systems and support, midwife-led care is known to benefit women and their families and result in excellent health outcomes [26].

The Makoi MLU is supported by twiceweekly visits from obstetricians who work in collaboration with the midwives to identify and manage potentially complex cases. It has three private birthing rooms that allow space for partners to support women through labour and birth; something that is not always possible in the main hospital. The MLU plans to offer childbirth care to all low-risk women who attend the Makoi Hospital antenatal clinic, as well as a home visiting programme to support women and their families in the early postpartum period. It will thus provide continuity of care through pregnancy, birth and the postnatal period, which is known to benefit women and their families.

To achieve this aim, the unit will require more midwives to join the staff. In



Prime Minister Voreqe Bainimarama with Health Minister Rosy Akbar (second from right) and Aliote Galuvakadua, Registered Midwife (right) while visiting Makoi Maternity Unit on February 22, 2018. Image courtesy of the Ministry of Health and Medical Services, Fiji.

Fiji, midwives in the public sector are required to retire at age 55, after which they can be re-employed only on 3-month temporary contracts. However, the Prime Minister recently announced a pledge to change this rule and allow longer contracts after the age of 55 so that the midwifery workforce can grow to meet the need. As a result, Makoi Hospital is seeking to employ 27 previously retired midwives in its MLU, which will allow it to provide services across the full continuum of maternity and postnatal care. Furthermore, the MLU is located alongside a busy maternal and child health clinic run by public health nurses, which will allow further continuity of care after the immediate postnatal period.

The re-employment of retired midwives means that their wealth of knowledge and experience can continue to be utilised for the benefit of Fijian women and their families.

Source: Sr Sera Tuvakei (Makoi MLU in-charge midwife), Litea Meo-Sewabu (UNFPA consultant)

FIGURE 26 Adolescent birth rate in 15 Pacific island countries, most recent available year





BOX 7

Tokelau school health education programme

Tokelau is one of the world's smallest countries, consisting of 3 atolls with a population of approximately 1,500. Traditionally, health education has not been included in the country's education curriculum, but in January 2018 a new initiative began at Matiki school in Nukunonu Atoll. The public health team from St Joseph's hospital designed a series of school visits to address the health needs of all school-aged children. First, they carried out a 'head to toe' screening programme to identify physical health problems such as poor vision or hearing, skin infections, over- or underweight and poor personal hygiene. Then they analysed the results of the screening programme and compiled a report for the school to share with teachers and parents. Together they identified areas requiring attention. The health team

continued to visit the school weekly, conducting health information sessions with the objective of making students aware of healthy lifestyle choices.

The team is now planning a health education package specifically for the older students, which will include mental health and sexual and reproductive health. Youth suicide is a significant concern in Tokelau and requires a sensitive approach. The team hopes that, by addressing mental health issues early, less stigma will be attached to poor mental health and there will be less resistance to seeking help when it is needed.

> Source: Felicity Copeland (UNFPA consultant)



A school visit. Image: Asena Kauyaca

– especially about sexual and reproductive health matters – if they are worried about confidentiality or the attitudes of health workers towards them and their needs, or if they are unaware or embarrassed of bodily changes that are happening to them. One way to address this is to provide and promote 'youth-friendly' services, staffed by health workers with specific training in working with this age group.

Countries were asked how many of their health facilities provide integrated youth-friendly services such as 'youth corners' within the facility, and 12 countries provided a response (the exceptions being PNG, Samoa and Solomon Islands). These countries reported a total of 885 health facilities, but only 11⁵ of these facilities (1%) provide integrated youth-friendly health services⁶: 3 in Kiribati, 2 in Nauru, 2 in Palau, 2 in FSM, 1 in the RMI and 1 in Niue. Where integrated youth-friendly services are provided, they tend to be provided on site by the same provider (7 of the 11 facilities with these services). However, in Palau, one is provided on site by a different provider and one is referred to another facility. In Niue, youth-friendly facilities are available by referral to a different site within the facility. In addition, some countries in the region (including Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu), have entered into an agreement with an external provider (IPPF member affiliates) to provide youth-friendly services.

It is clear, therefore, that there is much work to be done to provide focused services for adolescents.

6 Countries used their own definition of 'integrated youth-friendly services' to answer the question, so it is possible that the phrase was interpreted in different ways by different countries.

BOX 8

Kiribati YPEER network: improving adolescent sexual and reproductive health and rights

Part of the global YPEER network, Kiribati's YPEER group was established in 2015 with the support of UNFPA, and with administrative support from the Ministry of Youth, Sport and Social Affairs. In Kiribati there are 230 youth peer educators who work with other adolescents in the main and outer islands to improve their sexual and reproductive health and rights. The picture on the right shows a YPEER educator demonstrating how to use a condom during an RMNCAH awareness programme.

YPEER educators work closely with the RMNCAH team of the Ministry of Health and Medical Services. When the RMNCAH team makes monitoring visits to the outer islands, YPEER educators accompany them to lead awareness-raising activities among young people, and support health care providers to work effectively with adolescents and youth. Their work is particularly important because the ministry does not currently have a dedicated adolescent health staff.



The network is building its capacity to provide a youth perspective to national policy- and decision-making forums for adolescent health. Recently it was part of the team that developed the National Youth Policy (2018-2022), and a member of the working group that validated the Youth Friendly Health Services guidelines in 2018. As well as supporting their peers, their work enables YPEER educators to develop skills and experience that help them to make rewarding and fulfilling career choices. One has recently taken up employment with the RMNCAH team of the Ministry of Health and Medical Services, and another has joined UNWomen.

Source: YPEER Kiribati

⁵ Vanuatu reported the existence of three facilities with integrated youth-friendly facilities, but stated that none was currently functional so they are not counted here.

Box 8 describes an initiative to address adolescent health in Kiribati.

Quality

Even if the RMNCAH workforce is available, accessible and acceptable to the population, poor quality care can substantially limit its effectiveness. Quality of care is a multi-faceted concept [69] which has tended to be the last domain of effective coverage to be considered by countries working towards improved RMNCAH outcomes [70], but there is increasing recognition of its vital role [71]. In April 2018, WHO convened a Western Pacific regional meeting in Cambodia to focus on clinical training and competencies of health professionals as part of a wider strategy to improve the quality of health services. The meeting emphasized the importance of inter-sectoral collaboration to produce competent and responsive health professionals who support UHC [72].

February 2017 saw the launch of the Network for Improving Quality of Care for Maternal, Newborn and Child Health [73]. The Network aims to strengthen the capacity and motivation of health professionals to plan and manage quality improvement based on new WHO guidance for quality of care [74]. The quality of care framework has "competent, motivated human resources" as one of its building blocks, and the Network is using a 'Quality, Equity and Dignity' (QED) framework to coordinate its efforts [75]. ICM has developed a Midwifery Services Framework tool to assist countries wishing to address quality of midwifery care [76].

It is encouraging that 14 of the 15 participating countries have a policy to address continuous improvement of the quality of RMNCAH services. The exception was PNG, which did not provide a response.

Competent, motivated human resources are reliant on many factors, including high-quality education and training, staffing levels, resources and work environment. For midwives, ICM has identified education, regulation and association as the three pillars of a strong midwifery profession [30]; all three must be strong if countries are to provide high-quality midwifery care. An enabling policy environment is also important, and is also discussed in this section.

• 🗩 KEY MESSAGES

Acceptability

- About half of the countries in the region have developed national policy documents that state how they will deliver RMNCAH care that is sensitive to social, cultural and traditional needs.
- Most countries gave at least one reason why a woman might be uncomfortable seeking care from a nurse-midwife or doctor. Gender barriers are significant: many women feel uncomfortable consulting a male health worker about RMNCAH matters. In the smaller countries, there were also concerns about confidentiality, because health workers were often known personally to the family.
- In many countries, there is a widespread perception that a doctor's knowledge is superior to that of a nurse-midwife, and this can be a barrier to consulting a nurse-midwife even if they are the most appropriate health professional to provide the required intervention. This perception is likely to be strengthened by a lack of midwives in visible leadership positions in the region.
- Vulnerable and marginalised groups such as adolescents and people with disabilities often have additional needs, which must be met if they are to find the care on offer to be acceptable. However, the provision of integrated youth-friendly RMNCAH services is rare in the region.

Cadre	Number of countries with this cadre in RMNCAH workforce	Number of countries with school(s) for this cadre	Standard curriculum followed by all schools	Standard curriculum updated within last 5 years (since 2011)
Midwife/nurse-midwife	15	6	6	4
Nurse	15	12	10	8
Auxiliary cadre	12	3	3	2
Non-physician clinician	8	4	4	2
Medical officer	15	3	3	1
Obstetrician/ gynaecologist	13	3	3	1
Paediatrician	13	3	3	2

Standard education curricula for RMNCAH cadres (15 countries)

Education

Global standards for midwifery education suggest a minimum of 3 years for direct entry midwifery programmes and 1.5 years for post-nursing programmes [77]. No country in the region has a direct entry midwifery pathway, and only 4 require at least 1.5 years of study on their post-nursing midwifery programmes: Kiribati, Palau⁷, Solomon Islands and Vanuatu. The FSM state of Kosrae also meets this standard, but the other three FSM states do not. (Since data collection took place, PNG has also implemented an 18-month programme).

The small size of many Pacific island countries leads to a degree of reliance on larger countries for educating most cadres of RMNCAH worker. The main exception is nurses: Table 4 shows that 12 of the 15 countries have at least one nursing education establishment, the exceptions being Niue, Tokelau and Tuvalu. However, at the time of data collection only 3 countries (Fiji, PNG and Samoa) had their own medical schools and 6 educated their own midwives (Fiji, Kiribati, PNG, Samoa, Solomon Islands and Vanuatu). Since data collection took place, Tonga has also started its own midwifery education programme.

Of the 12 countries with nursing schools, 10 have a standard curriculum that is followed by all schools (Solomon Islands has a standard nursing curriculum, but not all schools follow it, FSM has no standard nursing curriculum). For the other cadres, a standard curriculum applies in all countries.

ICM recommends regular reviews of the midwifery curriculum, but just four of the six countries with midwifery schools said the curriculum had been updated in the last 5 years (the exceptions were Fiji (2009) and Solomon Islands (no response)). Indeed, Table 4 shows that across all cadres, only just over half of education programmes (20 of 34) had updated their standard curriculum within the past five years (7 were updated earlier than this and 7 were not able to say when it was last updated).

Additionally, there remain significant challenges to the provision of high-quality health worker education in the region, as illustrated by Figure 27. The availability of competent teaching staff is a problem for most countries, and most also report that it is difficult for teaching staff to keep their

TABLE 4

⁷ However, to qualify as a nurse in Palau requires only two years of post-secondary education, compared to at least three in most of the other countries.



FIGURE 27 Perceived challenges to providing high-quality education to nurse-midwives and doctors

Number of countries for which this is a challenge (out of 15)

skills and knowledge up-to-date. Another common problem is a lack of opportunity for student nurse-midwives to gain practical experience. These issues limit the quality of the education provided and leads to schools relying too heavily on lectures and didactic teaching styles rather than practical experience, so that new graduates may not always have the full range of skills and competencies. These data indicate that, in terms of improving the education of key RMNCAH workers, the focus should not only be on the curriculum, but also on how best to deliver it using contemporary teaching and learning approaches.

The number of births a nurse-midwife must conduct under supervision prior to graduation ranges from 40 in Fiji to 20 in PNG, Samoa, Solomon Islands and Vanuatu. However, 9 countries were unable to provide this information. The range for nurses is from 25 in RMI to 2 in Samoa, although 5 countries were unable to provide this information. As a guideline, ICM suggests at least 50 supervised births [78] although some students will require more and some fewer than this. Figure 28 shows that none of the 9 countries that answered the question require at least 50 supervised births before graduation for nurse-midwives or nurses.

Legislation, regulation and licensing mechanisms, including scope of work

The International Labour Organisation publishes guidance on the International Standard Classification of Occupations (ISCO), specifying the tasks within the scope of midwifery professionals [79]. Figure 29 shows, for each cadre of RMNCAH worker, how many countries with that cadre have all the ISCO midwifery tasks in the cadre's job description. Thirteen countries declared that all the nurse-midwife cadres in their country have all these ISCO midwifery tasks in their job descrip-





FIGURE 29 Job descriptions for RMNCAH cadres in 15 countries: do they include all midwifery tasks specified in International Standard Classification of Occupations (ISCO)?



tions (the exceptions being Kiribati and FSM). It is of concern that in Kiribati, neither nurse-midwives nor obstetricians/gynaecologists have all the ISCO midwifery tasks in their job description, while nurses, medical assistants and general medical officers do. This may be indicative of gaps in the midwifery competencies of these key RMNCAH cadres, or it may simply be that their job descriptions do not adequately describe their scope of practice. The lack of midwifery competencies among auxiliary and NPC cadres is also of concern, since in many countries the outer islands rely heavily on these cadres to provide RMNCAH care.

Supporting and protecting midwives and consumers by law (providing a legal right to practise) is an important acknowledgement of the worth of the profession. Nine of the 15 countries in this report have legislation that recognises midwifery as an autonomous profession, although in two of them (Nauru and RMI) the legislation is not applied, and in FSM it is applied in three of the four states (exception: Kosrae). The remaining 6 countries (Niue, Palau, Solomon Islands, Tokelau, Tonga and Tuvalu) said that such legislation does not exist, although it is being created in Solomon Islands, Tokelau and Tonga.

Most countries (12 out of 15) have at least one organisation with responsibility for regulating the practice of midwives/nurse-midwives. The other three— Niue, Tokelau and Tuvalu — all say that a responsible regulatory body is being set up. Where there is one already, the responsible organisation is usually a government-approved regulatory board or council, but in Solomon Islands and the FSM states of Chuuk and Yap this function is performed by the ministry of health.

The existence of a regulatory body is necessary, but not sufficient, to ensure effective regulation. The 12 countries with a regulatory organisation were asked to state its responsibilities, and the results can be seen in Table 5. Overall, regulatory bodies in the region perform a wide range of functions, although in a few countries (Nauru and Niue, and also in the FSM states of Kosrae and Pohnpei) they perform only a small number of functions. The scope of practice for different cadres of the RMNCAH workforce should be laid down by regulatory mechanisms. Countries were asked which of the nine EmONC signal functions8 RMNCAH workers were authorised to perform. It would be reasonable to expect nurse-midwives, medical officers and obstetricians/gynaecologists to be authorised to perform all 7 BEmONC functions, and obstetricians/gynaecologists to perform all 9 functions. However, Table 6 shows that this is not always the case in the region. Nurse-midwives are not always authorised to perform manual removal of the placenta, manual vacuum aspiration and assisted instrumental delivery by vacuum extractor. Therefore, even if they have learned these skills prior to qualification, there will be little or no opportunity to put them into practice.

Countries were also asked to indicate which of the RMNCAH cadres actually do carry out the nine EmONC signal functions, whether or not they are authorised to do so. These results are presented in Table 7. This shows that, even when a cadre is officially authorised to perform a signal function, they do not always do so, which again calls into question the extent to which RMNCAH workers are able to keep their skills and competencies up to date.

Conversely, there are occasions when RMNCAH workers need to perform interventions that are beyond their scope of practice and for which they may not be fully competent. For example, the completed questionnaire from Fiji noted that nurse-midwives and medical officers are sometimes required to deal with life-threatening situations in the absence of a specialist doctor. Likewise, RMI and Solomon Islands reported that auxiliary cadres in remote areas perform roles normally performed by midwives and nurses. Contributors from Tuvalu and Vanuatu noted that nurses are often expected to perform midwifery tasks even if they have had no formal midwifery education or experience. Five countries (Cook Islands, Kiribati,

⁸ The nine EmONC signal functions are: parenteral administration of antibiotics, administration of anticonvulsants, administration of oxytocics, manual removal of placenta, manual vacuum aspiration for retained products of conception, assisted instrumental delivery by vacuum extractor, newborn resuscitation with bag and mask, blood transfusion and surgery (e.g. caesarean section). The last two are CEmONC functions, and the first seven are BEmONC functions.

Functions and responsibilities of regulatory bodies for nurse-midwives

Function/responsibility	Number of countries with a regulatory body that performs this function	Countries with a regulatory body that does <i>not</i> perform this function
Registration of practising nurse-midwives	11	FSM (Kosrae State only: the other three states do)
Verification of nurse-midwives joining the workforce from other countries	11	FSM (Chuuk & Pohnpei States only: the other two states do)
Applying sanctions to nurse-midwives found to have been guilty of misconduct	11	FSM (Chuuk & Pohnpei States only: the other two states do)
Investigating alleged misconduct or incompetence	10	FSM (Pohnpei State only: the other three states do) & Vanuatu
Setting standards for midwifery practice	10	Nauru & Palau
Setting standards for professional ethics	10	FSM (Pohnpei State only: the other three states do) & Nauru
Continuing professional development	9	FSM (Pohnpei State only: the other three states do), Marshall Islands & Nauru
Protection of the professional title 'midwife'	9	Marshall Islands, Nauru & Palau
Setting standards for education	9	FSM (Kosrae & Yap States only: the other two states do), Nauru & Tonga
Assessing competency prior to registration	9	FSM (Kosrae & Pohnpei States only: the other two states do), Nauru & Palau
Establishing the scope of midwifery practice	8	FSM (Pohnpei State only: the other three states do), Nauru, Palau & Tonga
Ensuring the quality of education	8	FSM (Pohnpei State)*
Accreditation of education providers	8	FSM*
Advising the government on maternal and newborn health (MNH) care policy	5	FSM (Chuuk, Kosrae & Yap States), Kiribati, Marshall Islands, Nauru, Palau, Tonga & Vanuatu

* Countries are only listed here if they have their own education institution(s).

Niue, Tokelau and Tuvalu) reported no paediatrician, and two (Niue and Tokelau) reported no obstetrician/gynaecologist in the country, which means that their medical officers have had to develop paediatric and/or obstetric competencies while in service, and very serious cases need to be airlifted to other countries.

In nearly all of the responding countries, nurse-midwives are authorised to provide a wide range of family planning products. In all 15 countries, nurse-midwives are authorised to provide injectables and oral contraceptives. They can provide intra-uterine devices (IUDs) in 12 countries. Contraceptive implants can be provided by nurse-midwives in 10 countries (exceptions are Niue, Palau, Tokelau, Tonga and FSM states Kosrae and Pohnpei). Emergency contraceptives (the "morning-after pill") can be provided by nurse-midwives in 13 countries (the exceptions are Niue and the FSM state of Kosrae – it is authorised in the other three FSM states).

Appropriate regulation, registration and licensing is necessary for the protection and support of both service users and health workers. Licensing systems for midwives and nurse-midwives exist in 8 of the 15 participating countries. Of the 8 countries with a licensing system, all report that a midwife is required to have a licence before (s)he can begin to practise and must re-license on a regular basis. FSM and PNG require re-licensing every two years, while it is required annually in Cook Islands, Fiji, RMI, Samoa, Tonga and Vanuatu. Most countries with a licensing system say that continuing professional development is a condition of re-licensing (the exceptions are PNG and Vanuatu). Box 9 describes an innovative child health continuing professional development programme in Tuvalu.

EmONC signal functions which cadres are authorised to provide

Signal Function	Midwives/ nurse- midwives	Nurses	Nurse aides	Non-physician clinicians	Medical officers	Obstetricians/ gynaecologists	Paediatricians
Parenteral administration of antibiotics	100%	100%	18%	100%	100%	100%	60%
Administration of anticonvulsants	100%	100%	18%	100%	93%	100%	70%
Administration of oxytocics	100%	93%	18%	100%	92%	100%	40%
Manual removal of placenta	73%	23%	18%	75%	77%	100%	0%
Manual vacuum aspiration for retained products	29%	23%	0%	63%	77%	83%	0%
Assisted instrumental delivery by vacuum extractor	36%	15%	0%	38%	54%	100%	0%
Newborn resuscitation with mask	100%	85%	9%	100%	92%	92%	100%
Surgery (e.g. caesarean) including anaesthesia	0%	0%	0%	0%	46%	100%	10%
Blood transfusion	71%	62%	0%	63%	100%	100%	100%

Percentage of countries with that cadre in which that cadre is authorised to perform that function

Note: FSM was only counted if all four states authorised that cadre to perform that function

TABLE 7

EmONC signal functions which cadres actually carry out

Percentage of countries with that cadre in which that cadre ever performs that function

Signal Function	Midwives/ nurse- midwives	Nurses	Nurse aides	Non-physician clinicians	Medical officers	Obstetricians/ gynaecologists	Paediatricians
Parenteral administration of antibiotics	100%	100%	18%	100%	93%	100%	60%
Administration of anticonvulsants	100%	92%	18%	100%	100%	100%	50%
Administration of oxytocics	100%	92%	18%	100%	93%	100%	40%
Manual removal of placenta	80%	46%	18%	86%	85%	100%	0%
Manual vacuum aspiration for retained products	29%	31%	9%	63%	71%	83%	0%
Assisted instrumental delivery by vacuum extractor	29%	21%	9%	43%	50%	100%	0%
Newborn resuscitation with mask	93%	77%	9%	100%	100%	100%	100%
Surgery (e.g. caesarean) including anaesthesia	0%	0%	0%	0%	46%	100%	0%
Blood transfusion	79%	77%	0%	63%	92%	100%	100%

 $\ensuremath{\textit{Note:}}\xspace$ FSM was only counted if that cadre performs that function in all four states

Continuing professional development in Tuvalu with the INFANTS training programme

Tuvalu's MoH recently implemented the INFANTS 'train the trainer' programme which aims to provide health workers with foundation knowledge and skills in providing high quality neonatal care, that they can both use themselves and pass on to their colleagues. The programme follows the Integrated Management of Childhood Illnesses approach, which is supported by WHO and based on the principles shown in the box on the right:

In May 2018, 12 nurses, midwives and nurse practitioners participated in a 5-day INFANTS workshop. This was the first of a series of four specific training packages, with the others scheduled to take place in 2019. Feedback from participants indicated that the workshop left them feeling more confident in their ability to provide high quality neonatal care.

Most of Tuvalu's 11,000 citizens live on the main atoll, Funafuti, which is where the country's only hospital (and most of the RMNCAH workforce) is located. RMNCAH workers who are deployed to health centres in the outer islands can

Women arriving at a Child and Family Health Clinic in Tuvalu for infant health checks. Image: Felicity Copeland

Т	Infection	Prevention of infection
N	Nutrition	Focus on breastfeeding
F	Family	Importance of family support, including fathers
Α	Airway and oxygen	Identifying and managing respiratory problems
N	No pain	Assessment and management of pain
т	Temperature regulation	Ambient temperature in health facilities should suit the newborns, not the health workers
S	Support health literacy	Education of families about neonatal health

find it challenging to access continuing professional development to keep their skills up to date. After the workshop the MoH decided to deploy four of the twelve workshop participants to the outer islands. They were able to bring their new knowledge and skills to some of the more isolated parts of the country, thus bringing up-to-date, high-quality neonatal care practices to these areas.

Source: Felicity Copeland (UNFPA consultant)

A register of licensed midwives exists in 11 of the 15 participating countries, of which 6 are electronic and 5 are solely paper-based. A further two countries (Kiribati and Solomon Islands) have plans to create a register, leaving Palau and RMI with no register and no plans to create one. The frequency with which the registers are updated is variable: Cook Islands, Fiji, Niue, Tokelau and Tonga all update their register at least once a month, but Nauru, Vanuatu and the FSM States of Chuuk and Pohnpei update them less than once a year.

Professional associations

Professional association are an important component of quality care and such associations may include those for medical, nursing, midwifery and allied health workers. This section particularly focuses on professional associations that are open to midwives.

According to ICM, "midwives associations need to be strong and empowered organisations. They are powerful stakeholders for their country's ministry/department of health and can work collaboratively and advise the ministry/department of current trends in maternal, newborn and child health" [80]. It is therefore encouraging that 13 of the 15 participating countries have at least one professional association, college or union that is open to midwives/nurse-midwives (the exceptions are Nauru and Tokelau). One country (PNG) has a professional association that is a member of ICM (with others keen to join especially Solomon Islands, Vanuatu and Fiji), and five (Cook Islands, Fiji, Samoa, Solomon Islands and Tonga)



FIGURE 30 Functions of professional associations open to midwives and nurse-midwives

have a professional association that is a member of the International Council of Nurses [81].

Several countries (Cook Islands, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) have more than one professional association, and the total number mentioned is 27. It is worth noting, however, that only 5 of these associations are exclusively for midwives/ nurse-midwives; most are nursing associations that midwives are also eligible to join. Figure 30 shows the main functions performed by these associations. Most advise members of quality standards for RMNCAH care and continuing professional development, but only about half advise the government about RMNCAH policy.

Policy and planning

Cohesive policy and planning instruments are essential to deliver effective coverage of highquality RMNCAH care. Across the 15 countries,



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Quality

- Education curricula in the region generally align with global standards, but there are numerous challenges to the delivery of these curricula, including: a shortage of qualified teaching staff, a lack of opportunities for teaching staff and students to develop or maintain their practical skills and competencies as well as their theoretical knowledge, lack of faculty development and limited teaching facilities.
- No countries in the region require their nurse-midwives to conduct at least 50 births under supervision before qualification. The requirements for nurses are usually even lower.
- Most countries include all the skilled birth attendant competencies in the job descriptions and scope of practice of nurse-midwives, medical officers and obstetricians/ gynaecologist, but a few do not. Similarly, most (but not all) authorise their nurse-midwives to perform all BEmONC signal functions, and all their medical officers and obstetricians/gynaecologists to perform all EmONC signal functions.

- Just 9 of the 15 participating countries have legislation that recognises midwifery as an autonomous profession (in many cases, however, under a Nursing Act), and an additional 3 countries are creating such legislation.
- All countries either have a regulatory body for nursemidwives or are currently establishing one, but in some countries these bodies have a restricted role: very few advise the government on RMNCAH policy.
- Just 8 of the 15 participating countries have a licensing system for nurse-midwives, most of which have continuing professional development as a condition of re-licensing.
- Most countries have a professional association that is open to nurse-midwives, but only 5 of the reported 24 associations are specifically for midwives/nurse-midwives: most are nursing associations.
- The policy environment for RMNCAH is fairly strong in most countries in the region, but policy and planning documents are often out of date and rarely fully costed.

respondents reported 54 different policies, plans and strategies for organizing, delivering and monitoring RMNCAH services (3.6 per country on average). All countries except FSM reported a national health plan, although the FSM State of Pohnpei has a State Health Plan. All except Nauru have at least one additional policy/plan/statute currently in force. Most (12 countries) reported a national RMNCAH plan/strategy/roadmap or a document that includes one (the exceptions were Nauru, Niue and Tokelau). National HRH plans were reported in 12 countries (the exceptions being FSM, Nauru and Vanuatu), and of these, 8 reported that the targets in the HRH plan are based on or linked to the RMNCAH service coverage targets in the national RMNCAH or health plans.

The policies, plans and statutes reported by respondents are not always recent: just over half of them were published in or after 2013, and just 70% were still current at the time of data collection. Similarly, costed plans are important in order to help guarantee the allocation of resources to deal with the priority RMNCAH issues and make sure that policy is put into practice. Of the 54 policy documents reported, just 22 contain plans that are fully costed, with national health plans and national RMNCAH plans the most frequently costed.

Conclusion

A strong RMNCAH workforce is essential if countries are to achieve global and national targets for improved RMNCAH. In order to provide universal, effective coverage of RMNCAH services to all women and newborns, action is needed to address the availability, accessibility, acceptability and quality (AAAQ) of these services and the health workers providing them. The analysis in this report shows that most countries in the region have good availability of nurses (the exceptions being PNG, Tuvalu and Vanuatu), but there is a pervasive shortage of specialist RMNCAH cadres such as midwives, obstetricians/gynaecologists and paediatricians.

The geography of the region presents a significant challenge to the accessibility of RMNCAH workers, and many countries are taking active and innovative steps to address this challenge. Poor accessibility in outer islands and other remote areas is a significant barrier to the workforce's ability to meet all of the need for RMNCAH care. Additional barriers stem from socio-cultural issues such as a reluctance to consult a health worker of the opposite sex, embarrassment about reproductive and sexual health issues and a lack of youth-friendly services for adolescents. There are also challenges to the provision of high quality RMNCAH care in many countries in the region, including: inadequate pre-service education, insufficient opportunities for continuing professional development, restrictive scopes of practice and inadequate regulation and licensing systems. In many countries there is a lack of recognition of the key role that midwives have to play in improving RMNCAH outcomes.

This analysis starts to unpack the gap between workforce numbers and effective coverage. Reducing the size of this gap requires the collection and use of data on: the proportion of time spent on RMNCAH, the number of new graduates or inmigrants likely to join the workforce in the future, where health workers are located, how women and adolescents (and their communities) feel about the available RMNCAH services, and how the HRH plan furthers RMNCAH strategies. To achieve this, strong leadership is needed to prioritise RMNCAH (and midwifery as a vital ingredient for RMNCAH) and to secure resources to implement a needsbased approach to workforce and service planning.



COUNTRY PROFILES

How to use the country profiles
Cook Islands
Federated States of Micronesia (FSM)56
FSM - Chuuk State
FSM - Kosrae State
FSM - Pohnpei State
FSM - Yap State
Fiji
Kiribati
Marshall Islands, Republic of the
Nauru72
Niue
Palau
Papua New Guinea
Samoa
Solomon Islands
Tokelau
Tonga, Kingdom of
Tuvalu
Vanuatu

HOW TO USE THE COUNTRY PROFILES

First page: Where are we now?

The first page of the country profile can be used as a basis for discussing the extent to which the workforce is currently able to deliver RMNCAH services for all women, adolescents, children and newborns who need them. Indicators relating to current availability, affordability, accessibility and quality are presented to facilitate discussions.

WHAT DO WOMEN, ADOLESCENTS, CHILDREN AND NEWBORNS NEED?

The profile starts by showing the **'Need for RMNCAH Services'** in the population for 124 essential RMNCAH interventions, expressed as the health worker hours required per annum. The total need is split between six stages along the continuum of care from sexual and reproductive health, through antenatal care, childbirth care, postnatal care, child health and development, to adolescent health and development. The largest sections in the pie chart indicates the stages on the continuum of care for which the need is greatest. The total is also divided into the **'Level of Care Required'** to show the need for interventions which can be delivered at the primary level of care and the need for interventions which should be delivered at a secondary or tertiary health facility.

RMNCAH WORKFORCE AVAILABILITY

The profile then lists how many health workers are available to meet this need, using data from the country survey. In this section, health workers are grouped by broad category, with details of the country cadre names included in each category provided in the footnote on the first page.

The number (headcount) of all the workers reported and the percentage time each cadre spends (on average) on RMNCAH services are shown in the first two columns. The third column is the result of multiplying the first two columns together and is entitled 'Dedicated RMNCAH Equivalent (DRE)'. For example, if there are 10 midwives in the country, each spending 80% of their clinical time on RMNCAH, this equates to 8 DRE midwives. Only by considering the number of dedicated RMNCAH equivalent workers in this way can a true picture of availability be obtained.

The fourth column in this section indicates whether or not there is an educational institution in-country for that cadre. The final column shows the number of workers who have left the workforce in the past five years for reasons other than death or retirement, expressed as a percentage of the current headcount. So, if 3 nurses have left the workforce in the past five years and there are currently 100 nurses, this figure will be 3%.

AFFORDABILITY

Even if there are sufficient health workers, the services they provide may not be affordable. This pie chart shows the proportion of the 124 essential RMNCAH interventions that are included in the country's minimum guaranteed health benefits package (and therefore should be available free at the point of delivery) as an indication of the degree of financial protection offered to women, newborns, children and adolescents in accessing RMNCAH care. A high percentage is indicative of high levels of affordability. The data are from the survey.



POTENTIAL MET NEED

The 'potential met need' (PMN) graph provides an estimate of the extent to which the current RMNCAH workforce can meet the need for the 124 essential RMNCAH interventions, taking into account which health workers can provide which services and where each one is located geographically. The PMN calculation is made for each sub-national area (province, atoll or island as appropriate) within a country - comparing the population need in each sub-national area with the health workers located in that sub-national area - and then the national aggregate estimate is an average of the sub-national areas, weighted by population size. The first bar shows the national aggregate

estimate. The 2nd and 3rd bars show the sub-national areas with the highest and lowest PMN. The 4th and 5th bars show the amount of need that can be met at primary and secondary level respectively. The 6th and 7th bars show the sub-national areas with the highest and lowest PMN for primary level care.

The PMN calculation is highly sensitive to the package of care (i.e. the 124 essential RMNCAH interventions), the number of health workers reported, the percentage of time they spend on RMNCAH services, their roles and competencies, and the health facilities available (i.e. secondary level need cannot be met in the sub-national area if there is no secondary level health facility). Full details of the methodology are in Annex 1. It is important to note that PMN is an indicator of availability and accessibility, but is still calculated at a sub-national level. As such, it does not take into account, firstly, local variations or inequities, and secondly, whether the RMNCAH workforce and services are financially accessible to the population, acceptable, and of high quality.

5 ACCESSIBILITY

Health workers, and the facilities in which they work, may not be distributed where they are most needed. This graph shows the percentage split between main island(s) and outer islands for health workers, grouped as nurses & midwives, auxiliaries & non-physician clinicians and then doctors. To provide a proxy indicator for need as a comparison, the graph also includes the percentage of the population in the main and outer islands (grey bars). The data for health worker location are from the survey and for population from a number of sources including UN Population Division and national census data. If the population percentage is much higher than the health worker percentage, this indicates poor accessibility to that cadre of health worker.

QUALITY

6

This section provides information on the strength of the enabling environment for quality care within a country. Each item is crucial to support the health workforce in delivering quality RMNCAH care. Data are from the survey.

The country profiles have been designed to prompt and inform policy discussions on how the composition, skill-mix, deployment and enabling environment of the RMNCAH workforce impacts on the delivery of RMNCAH services for all women, adolescents, children and newborns who need them.

Second page: What might 2030 look like?

The second page of the country profile aims to prompt policy discussion concerning the future evolution of the RMNCAH workforce compared with the future scale of population need. The last section 'Projections to 2030: What if...?' compares the forecast RMNCAH workforce with the estimated workforce required to deliver the projected need, in a variety of scenarios. Given the absence of data in some countries and the nature of projections, this analysis includes a number of assumptions, so it should be seen as a starting point for policy discussion (including around the availability and quality of national data) rather than as a statement of fact.

CHANGING NEED

Achieving universal coverage of RMNCAH services means anticipating and responding to future needs. This first graph shows the evolution of need, expressed as the total number of health worker hours per annum, in the period 2016 – 2030, based on national-level population projections. The need is divided into the six stages of the continuum of care, with each stage represented by a different colour. An 'uphill' pattern in the graph means that need is expected to grow, a 'downhill' pattern indicates decreasing need, and a 'flat' pattern indicates little or no anticipated change in the amount of need for RMNCAH worker time.

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016 - 2030

This section illustrates the likely evolution of the RMNCAH workforce under its current trajectory. The graph shows four pairs of bars. Each pair has a bar showing the required DRE workforce and another bar showing the actual (2016) or forecast (future years) DRE workforce. The first pair of bars shows the situation in the baseline year and then subsequent pairs of bars show projections for 2020, for 2025 and for 2030.

If the **'actual/forecast'** bar is smaller than the **'required'** bar, this indicates an overall shortage of RMNCAH workers. However, if the 'actual/forecast' bar is equal to or larger than the 'required' bar, this does not necessarily mean that the workforce can meet all of the need. This is because, to achieve 100% met need, the composition of the workforce must be right as well as the total number of RMNCAH workers. For example, there are some essential RMNCAH interventions that only doctors are competent to provide. If a country has a lot of nurses but not enough doctors, its 'actual' bar could be larger than its 'required' bar, yet at the same time its potential met need estimate could be below 100%. To illustrate this, the differently coloured sections of the bars represent different cadres within the workforce. If an individual section of the 'actual/forecast' bar is smaller than the equivalent section in the 'required' bar, this indicates a shortage of that particular cadre.

The **'workforce required'** number is a calculation which starts with the estimated need for RMNCAH services and then allocates this need to a preferred cadre with the necessary competency (e.g. routine antenatal care to midwives, child vaccination to nurses, caesarean section to obstetricians/gynaecologists). The need allocated to each cadre is then converted to the DRE workforce which would be required to satisfy it, based on a standard assumption of hours worked, efficiency and the country's estimate of percentage time spent on RMNCAH by this cadre. A full methodology is included in Annex 1.

The workforce actual DRE number for 2016 is the same as reported on page one in the 'RMNCAH Worker Availability' section, third column. The forecasts for 2020, 2025 and 2030 are estimated as the aggregate of expected inflows and outflows. Inflows will come from forecasts of the number of graduates and overseas recruits. These data are from the survey and extrapolations based on current levels. Outflows are estimated from expected retirements and age specific mortality rates, as well as the current voluntary attrition rate reported in the survey.



COVERAGE OF KEY

Set of RMNCAH coverage indicators providing an overview of the RMNCAH situation along the continuum of care in each country. These highlight the percentage of women, children and adolescents reached with selected interventions with low coverage of interventions signifying areas the country needs to strengthen.

9 WORKERS OVER 50

To help anticipate future changes in the RMNCAH health workforce, this section indicates the percentage of each cadre who are currently aged over 50. The data are from the survey. Retirement ages vary around the region, but this chart gives an indication of how many are likely to retire from the workforce in the near future. A high proportion is an indication that the country needs to consider whether its current recruitment plans will be sufficient to plug the gap left by retiring RMNCAH workers.

PROJECTIONS TO 2030: WHAT IF ... ?

The 'What if ...?' section presents examples of different future trajectories. For ease of comparison, the graphs are presented in the same format as the previous section, so the potential impact of different trajectories can be compared against the current trajectory. They illustrate the potential impact of policy decisions and the changes in DRE required and DRE forecast that could be realised through three different scenarios. The 2016 bars are the same as in the preceding chart.

Scenario 1: Halve annual voluntary attrition rate in the next 5 years

This first scenario estimates the impact if the current annual voluntary attrition rate (AVAR) can be reduced by 50% over the next five years. The current AVAR can be estimated from the number of leavers in the past five years, which is shown on opposite one. So, if there were 30% leavers in the past five years, then AVAR = 30/5 = 6% per annum. This scenario progressively reduces the current AVAR until it is halved by 2021 and then maintained at that level to 2030. Depending on the current AVAR for each cadre, this should show an increase in forecast DRE in the future.

Scenario 2: increase recruitment by 50% by 2025

This scenario looks at the current number of graduates and overseas recruits expected to join the RMNCAH workforce and progressively increases the number until it is 50% higher in 2025, then maintained at that level until 2030. The resulting impact should show an increase in the forecast DRE numbers.

Scenario 3: Improved efficiency: +2% time on clinical work per annum

In the baseline scenario, it is assumed that all cadres spend 70% of their work time on clinical activities (i.e. 30% of their time is needed for training, paperwork, meetings etc). This scenario assumes that the available time for clinical work is progressively increased by 2% per year, rising to 94% in 2030. This will definitely produce an increase in the DRE forecast in the future.



Estimated 2016 population: 17,459

Children aged 0-9: 3,064 (18%) Children aged 10-19: 2,942 (17%) Women of reproductive age: 4,520 (26%)

Total fertility rate: 2.70 Live births (est.): 252

2016 / 2017 BASELINE



Dedicated RMNCAH Headcount % time on Educated Leavers in RMNCAH (B) (A) Equivalent (DRE) (A*B) in country? last 5 years† Nurse-midwives 39 100 39 NO 15% 51 43 22 NO 39% na na na na na Non-physician clinicians (NPCs) na na na na na 65% Medical officers 23 15 3 NO 100 1 NO 0% 1 Paediatricians 0 100 0 NO 0%

POTENTIAL MET NEED (PMN)



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Nurse-midwives, Nurse Practitioner Midwives; Nurses includes Registered Nurses, Public Health Nurses, Nurse Practitioners; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	14
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	1
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
		Nurse-midwives	100%

Obstetricians/gynaecologists

100%



PROJECTIONS TO 2030 - CURRENT TRAJECTORY

CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?



NØ

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CHAPTER 3: COUNTRY PROFILES 55

FEDERATED STATES OF MICRONESIA Children aged 0-9: 22,812 (22%) Estimated 2016 population: Children aged 10-19: 23,434 (23%) 102.453 Total fertility rate: 3.33 Women of reproductive age: 25,143 (25%)

2016 / 2017 BASELINE



	(A)	RMNCAH (B)	Equivalent (DRE) (A*B)	in country?	last 5 years†
Nurse-midwives	15	94	14	NO	0%
Nurses	186	30	55	NO	0%
Auxiliary cadres	6	100	6	NO	0%
Non-physician clinicians (NPCs)	135	67	91	NO	0%
Medical officers	37	49	18	NO	5%
Obstetricians and gynaecologists	8	96	8	NO	0%
Paediatricians	4	100	4	NO	50%



Live births (est.): 2,485

workforce time needed

† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives & Nurse-midwives; Nurses includes Nurses, Graduate Nurses, Practical Nurses, Registered Nurses; Auxiliary cadres includes Certified Birth Attendants; Non-Physician Clinicians (NPCs) includes Health Assistant, Non-Physician Clinicians, Medex; Medical Officers includes General Physicians, Medical Officers; Obstetricians & Gynaecologists includes Obstetrician, Physicians (Ob / Gyn); Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	67
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	4
Duration of pre-service education program (years)		Number of BEmONC only facilities	40
Nursing	-	Number with integrated youth friendly services	2
Post nursing midwifery	_	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	1.0	included in job description:	
,		Nurse-midwives	95 %
		Obstetricians/gynaecologists	95%

FEDERATED STATES OF MICRONESIA – a brief for policy discussion

PRE-PREGNANCY

Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY





CONTINUUM OF CARE COVERAGE



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 46,688

Children aged 0-9: 10,920 (23%) Children aged 10-19: 11,097 (24%) Women of reproductive age: 11,080 (24%)

Total fertility rate: 3.33 Live births (est.): 927

2016 / 2017 BASELINE



	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	5	100	5	NO	0%
Nurses	116	25	29	NO	0%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	82	75	62	NO	0%
Medical officers	10	75	8	NO	10%
Obstetricians and gynaecologists	4	100	4	NO	0%
Paediatricians	2	100	2	NO	0%

6%

94%



POTENTIAL MET NEED =

workforce time needed

95%



NOTES:

na not applicable

† Expressed as a % of current headcount

AFFORDABILITY

Percentage of 124

recommended

interventions

benefits package

RMNCAH

included in

minimum guaranteed

Included

Not included

missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Nurse mid-wife; Nurses includes Nurses (Graduate nurse or GN nurse & practical nurse); Non-Physician Clinicians (NPCs) includes Health Assistants / Nurse Practitioner; Medical Officers includes Physicians; Obstetricians & Gynaecologists includes Ob-Gyn; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	29
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	23
Nursing	2.0	Number with integrated youth friendly services	1
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
		Nurse-midwives	95%

Obstetricians/gynaecologists

Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY



Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

Percentage of RMNCAH workers aged over 50 Nurse-midwives 40% Nurses 13% Auxiliary cadres NA NPCs 39% Medical officers 50% Ob/gyns 100% Paediatricians 50% 80 20 40 0 60 100

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



PRE-PREGNANCY



Estimated 2016 population: 6.227

Children aged 0-9: 1,445 (23%) Children aged 10-19: 1,518 (24%) Women of reproductive age: 1,365 (22%)

Total fertility rate: 3.33 Live births (est.): 132

workforce time available

workforce time needed

2016 / 2017 BASELINE



Nurses	22	50	11	NO	0%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	2	70	1	NO	0%
Medical officers	7	50	4	NO	14%
Obstetricians and gynaecologists	1	90	1	NO	0%
Paediatricians	0	100	0	NO	0%



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



POTENTIAL MET NEED =

NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives & Nurse-midwives; Nurses includes Nurses; Auxiliary cadres includes Practical Nurse; Non-Physician Clinicians (NPCs) includes Non-Physician Clinicians; Medical Officers includes General Physician; Obstetricians & Gynaecologists includes Physicians (Ob / Gyn); Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	NO	Number of health facilities	4
National Human Resources for Health Plan?	NO	of which:	
Policy to address continuous quality improvement?	NO	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	0
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	1.5	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
,		Nurse-midwives	100%
		Obstetricians/gynaecologists	100%

Obstetricians/gynaecologists



PROJECTIONS TO 2030 - CURRENT TRAJECTORY



Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

Percentage of RMNCAH workers aged over 50 Nurse-midwives 50% Nurses 41% Auxiliary cadres NΔ NPCs 50% Medical officers 71% Ob/gyns 100% Paediatricians 0 40 80 100 0 20 60

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 37,893

Children aged 0-9: 8,195 (22%) Children aged 10-19: 8,398 (22%) Women of reproductive age: 9,800 (26%)

Total fertility rate: 3.33 Live births (est.): 815

workforce time available

workforce time needed

2016 / 2017 BASELINE



	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) <i>(A*B)</i>	Educated in country?	Leavers in last 5 years†
Nurse-midwives	4	100	4	NO	0%
Nurses	30	35	11	NO	0%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	51	55	28	NO	0%
Medical officers	11	55	6	NO	0%
Obstetricians and gynaecologists	2	100	2	NO	0%
Paediatricians	2	100	2	NO	0%



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



POTENTIAL MET NEED =

NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurses includes Registered Nurse; Auxiliary cadres includes Health Assistant; Non-Physician Clinicians (NPCs) includes Medex

QUALITY

National RMNCAH plan?	YES	Number of health facilities	12
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	NO	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	0
Nursing	2.0	Number with integrated youth friendly services	1
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
,		Nurse-midwives	100%
		Obstetricians/gynaecologists	100%


CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 11,645

Children aged 0-9: 2,252 (19%) Children aged 10-19: 2,421 (21%) Women of reproductive age: 2,898 (25%)

Total fertility rate: 3.33 Live births (est.): 611

Primary level care

workforce time needed

100%

Secondary level care

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	2	55	1	NO	0%
Nurses	18	25	5	NO	0%
Auxiliary cadres	6	100	6	NO	-
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	9	10	1	NO	0%
Obstetricians and gynaecologists	1	75	1	NO	0%
Paediatricians	0	90	0	NO	0%

POTENTIAL MET NEED (PMN)

42%

LEVEL OF CARE REQUIRED



58%

† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Auxiliary cadres includes Certified Birth Attendants

QUALITY

National RMNCAH plan?	YES	Number of health facilities	22
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	NO	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	17
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	0.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	1.0	included in job description:	
		Nurse-midwives	100%

Obstetricians/gynaecologists



Percentage of those in need receiving coverage of key interventions

PRE-PREGNANCY



PROJECTIONS TO 2030 - CURRENT TRAJECTORY



Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 898,766

2016 / 2017 BASELINE



Total fertility rate: 2.61 Live births (est.): 19,180







NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives/ nurse-midwives; Nurses includes Matrons-DNS, Sister, Enrolled nurses; Non-Physician Clinicians (NPCs) includes Nurse Practitioner, Senior Sisters; Medical Officers includes Medical Officers & Senior Medical Officers; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	208
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	3
Duration of pre-service education program (years)		Number of BEmONC only facilities	18
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
		Nurse-midwives	100%

Obstetricians/gynaecologists

100%



CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?



NV

75

41



Estimated 2016 population: 114,388

Children aged 0-9: 28,743 (25%) Children aged 10-19: 22,776 (20%) Women of reproductive age: 29,655 (26%)

Total fertility rate: 3.79 Live births (est.): 3,356

workforce time needed

107

1

25

3

95% 95%

2016 / 2017 BASELINE



	Headcount <i>(A)</i>	% time on RMNCAH <i>(B)</i>	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	46	75	35	YES	-
Nurses	307	50	154	YES	-
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	44	60	26	YES	-
Medical officers	29	30	9	YES	-
Obstetricians and gynaecologists	2	100	2	YES	-
Paediatricians	1	100	1	YES	-



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



POTENTIAL MET NEED =

NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives/ nurse-midwives; Nurses includes Nurses; Non-Physician Clinicians (NPCs) includes Medical Assistants; Medical Officers includes General Medical Officers; Obstetricians & Gynaecologists includes Consultant; Paediatricians includes Consultant

QUALITY

National RMNCAH plan?	YES	Number of health facilities
National Human Resources for Health Plan?	YES	of which:
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities
Duration of pre-service education program (years)		Number of BEmONC only facilities
Nursing	3.0	Number with integrated youth friendly services
Post nursing midwifery	1.5	Per cent of skilled birth attendant responsibilities
Auxiliary cadres	na	included in job description:
		Nurse-midwives

Obstetricians/gynaecologists

TAL SY OD



Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY

CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)

CONTINUUM OF CARE COVERAGE



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



tions **PRE-PREGNANCY**



t	Expressed	as a	%	of	current headcount	

4

100

Δ

AFFORDABILITY

Paediatricians



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Specialized Nurse (Nurse Midwife); Nurses includes Staff Nurse; Non-Physician Clinicians (NPCs) includes Medex, Health Assistants (HA) I-III (ISCO 3256); Medical Officers includes General Physicians; Obstetricians & Gynaecologists includes Staff Physicians / Obstetrics & Gynaecology; Paediatricians includes Staff Physicians / Paediatrician

ACCESSIBILITY

75%

NO



POTENTIAL MET NEED =

QUALITY

National RMNCAH plan?	YES	Number of health facilities	60
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	2
Duration of pre-service education program (years)		Number of BEmONC only facilities	54
Nursing	2.0	Number with integrated youth friendly services	1
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
		Nurse-midwives	100%

Nurse-midwives	100%
Obstetricians/gynaecologists	95 %

(*)

workforce time available

workforce time needed

(*)



CHANGING NEED





WORKERS OVER 50

Percentage of RMNCAH workers aged over 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: **10,760**

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH <i>(B)</i>	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	8	100	8	NO	113%
Nurses	33	70	23	NO	27%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	6	40	2	NO	283%
Obstetricians and gynaecologists	1	100	1	NO	300%
Paediatricians	1	100	1	NO	100%

† Expressed as a % of current headcount

AFFORDABILITY



NOTES:

- na not applicable
- missing data

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives; Nurses includes Registered Nurse; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Ob/gyn; Paediatricians includes Paediatricians

ACCESSIBILITY

Children aged 0-9: 3,120 (29%)

Children aged 10-19: 2,140 (20%)

Women of reproductive age: 2,600 (24%)



QUALITY

NO	Number of health facilities	5
NO	of which:	
YES	Number of CEmONC facilities	1
	Number of BEmONC only facilities	0
3.0	Number with integrated youth friendly services	2
1.0	Per cent of skilled birth attendant responsibilities	
na	included in job description: Nurse-midwives	100%
	N0 N0 YES 3.0 1.0 na	N0 Number of health facilities N0 of which: YES Number of CEmONC facilities 3.0 Number of BEmONC only facilities 1.0 Per cent of skilled birth attendant responsibilities included in job description: Nurse-midwives Nurse-midwives

Obstetricians/gynaecologists

POTENTIAL MET NEED (PMN)



POTENTIAL MET NEED =

workforce time needed

95%

62%

38%

LEVEL OF CARE REQUIRED

Total fertility rate: **3.92** Live births (est.): **320**

Primary level care

Secondary level care



CHANGING NEED





WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 1,551

2016 / 2017 BASELINE



Total fertility rate: 2.80 Live births (est.): 18

Primary level care

Secondary level care



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	2	5	0	NO	0%
Nurses	8	17	1	NO	63%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	4	8	0.3	NO	25%
Obstetricians and gynaecologists	na	na	na	na	na
Paediatricians	na	na	na	na	na

† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives/ nurse-midwives; Nurses includes Registered Nurses, Public Health Nurses, Child Family Health Nurses; Medical Officers includes GPs

QUALITY

National RMNCAH plan?	NO	Number of health facilities	1
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	0
Nursing	3.0	Number with integrated youth friendly services	1
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
,		Nurse-midwives	100%
		Obstetricians/gynaecologists	na

POTENTIAL MET NEED (PMN)



64%

POTENTIAL MET NEED =

workforce time available workforce time needed



CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

0

20

 Percentage of RMNCAH workers aged over 50

 Nurse-midwives
 50%

 Nurses
 12,5%

 Auxiliary cadres
 NA

 NPCs
 25%

 Ob/gyns
 NA

 Paediatricians
 NA

40

60

80

100

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?



NZ

26



Estimated 2016 population: 17.803

2016 / 2017 BASELINE



Total fertility rate: 2.10 Live births (est.): 248

workforce time needed

86%



Nurses	68	75	51	NO	13%
Auxiliary cadres	37	75	28	NO	0%
Non-physician clinicians (NPCs)	2	75	2	NO	0%
Medical officers	28	50	14	NO	0%
Obstetricians and gynaecologists	5	100	5	NO	0%
Paediatricians	2	100	2	NO	0%



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives; Nurses includes Registered Nurse; Auxiliary cadres includes Licensed Practical Nurses (LPNs); Non-Physician Clinicians (NPCs) includes Nursing Practitioners; Medical Officers includes Physician; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	16
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	9
Nursing	2.0	Number with integrated youth friendly services	2
Post nursing midwifery	2.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	1.5	included in job description:	
		Nurse-midwives	100%

Obstetricians/gynaecologists





Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 8,084,993

Children aged 0-9: 2,014,682 (25%) Children aged 10-19: 1,760,048 (22%) Women of reproductive age: 2,015,463 (25%)

Total fertility rate: 3.84 Live births (est.): 274,651

Primary level care

workforce time needed

100%

Secondary level care

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	800	100	800	YES	-
Nurses	4,000	40	1,600	YES	-
	2,531	40	1,012	YES	-
Non-physician clinicians (NPCs)	411	40	164	YES	-
Medical officers	379	30	114	YES	-
Obstetricians and gynaecologists	40	100	40	YES	13%
Paediatricians	32	100	32	YES	0%

POTENTIAL MET NEED (PMN)

45%

LEVEL OF CARE REQUIRED



55%

† Expressed as a % of current headcount

AFFORDABILITY



NOTES:

na not applicable

missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives; Nurses includes Nurses; Auxiliary cadres includes Community Health Workers; Non-Physician Clinicians (NPCs) includes Health Extension Officers/ Medical Assistants; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

ACCESSIBILITY



QUALITY

National RMNCAH plan?	VES	Number of boalth facilities	4717
National filvingArt plan:	TLO		4/1/
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	-	Number of CEmONC facilities	22
Duration of pre-service education program (years)		Number of BEmONC only facilities	823
Nursing	3.0	Number with integrated youth friendly services	-
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	2.0	included in job description:	
,		Nurse-midwives	100%

Obstetricians/gynaecologists

Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY

CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



PRE-PREGNANCY



Estimated 2016 population: 195,137

Children aged 0-9: 48,913 (25%) Children aged 10-19: 43,679 (22%) Women of reproductive age: 43,436 (22%)

Total fertility rate: 4.16 Live births (est.): 5,315

62%

Primary level care

workforce time needed

Secondary level care

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	71	100	71	YES	5%
Nurses	355	30	107	YES	12%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	102	40	41	YES	5%
Obstetricians and gynaecologists	6	100	6	YES	180%
Paediatricians	5	100	5	YES	0%

POTENTIAL MET NEED (PMN)

LEVEL OF CARE REQUIRED



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives & Nurse-midwives; Nurses includes Registered Nurse, Enrolled Nurse; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Physicians (Ob / Gyn); Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	40
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	2
Duration of pre-service education program (years)		Number of BEmONC only facilities	11
Nursing	4.0	Number with integrated youth friendly services	-
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
,		Nurse-midwives	100%
		Obstetricians/gynaecologists	100%





CONTINUUM OF CARE COVERAGE





WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



÷

PRE-PREGNANCY

Percentage of those in need receiving coverage of key interventions





Estimated 2016 population: 599.426

Children aged 0-9: 162,505 (27%) Children aged 10-19: 136,954 (23%) Women of reproductive age: 148,247 (25%)

Total fertility rate: 4.06 Live births (est.): 19,631

59%

Primary level care

Secondary level care

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

† Expressed as a % of current headcount

AFFORDABILITY

Percentage of 124

recommended

interventions

RMNCAH

included in

guaranteed

benefits package

minimum

Included

Not included

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	156	80	125	YES	3%
Nurses	1,066	80	853	YES	7%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	198	60	119	YES	5%
Obstetricians and gynaecologists	3	90	3	YES	0%
Paediatricians	6	90	5	YES	0%

85%

41%

LEVEL OF CARE REQUIRED



POTENTIAL MET NEED =

workforce time available workforce time needed

100%



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Nurse-midwives, Clinical Nurses, Nurse Practitioners; Nurses includes Nurses, Child Health Officers; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

15%

QUALITY

workers

midwives

and NPCs

Auxiliarv

Doctors

YES	Number of health facilities	344
YES	of which:	
YES	Number of CEmONC facilities	-
	Number of BEmONC only facilities	-
4.0	Number with integrated youth friendly services	-
1.5	Per cent of skilled birth attendant responsibilities	
na	included in job description:	
	Nurse-midwives	100%
	YES YES YES 4.0 1.5 na	YES Number of health facilities YES of which: YES Number of CEmONC facilities 4.0 Number of BEmONC only facilities 1.5 Per cent of skilled birth attendant responsibilities included in job description: Nurse-midwives

Obstetricians/gynaecologists

POTENTIAL MET NEED (PMN)

ACCESSIBILITY

CONTINUUM OF CARE COVERAGE

Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY



Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?





PRE-PREGNANCY



Estimated 2016 population: 1,401

Children aged 0-9: **262 (19%)** Children aged 10-19: **274 (20%)** Women of reproductive age: **356 (25%)**

Total fertility rate: **2.10** Live births (est.): **29**

2016 / 2017 BASELINE



40 20 0

National

estimate

Highest

(Fakaofo)

Lowest

area (Nukunonu)

POTENTIAL MET NEED =

National

PMN for

primary care

National

PMN for

secondary care Highest

area for Primary

PMN

(Fakaofo)

workforce time available

workforce time needed

Lowest

area for Primary

PMN

(Nukunonu)

na

Nurses	14	40	6	NO	<i>50%</i>
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	5	30	2	NO	40%
Obstetricians and gynaecologists	na	na	na	na	na
Paediatricians	na	na	na	na	na

† Expressed as a % of current headcount

AFFORDABILITY



NOTES:

- na not applicable
- missing data

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Nurse-midwife; Nurses includes Nurses; Medical Officers includes Medical Officers

ACCESSIBILITY



QUALITY

National RMNCAH plan?	NO	Number of health facilities	3
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	0
Duration of pre-service education program (years)		Number of BEmONC only facilities	0
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
		Nurse-midwives	100%

Obstetricians/gynaecologists



CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

Percentage of RMNCAH workers aged over 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



KINGDOM OF TONGA

Estimated 2016 population: 100,651

Children aged 0-9: **25,338 (25%)** Children aged 10-19: **23,439 (23%)** Women of reproductive age: **23,384 (23%)**

Total fertility rate: **3.79** Live births (est.): **2,569**

Primary level care

Secondary level care

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH <i>(B)</i>	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	30	100	30	NO	0%
Nurses	412	30	124	NO	6%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	16	30	5	NO	6%
Medical officers	59	30	18	NO	8%
Obstetricians and gynaecologists	1	100	1	NO	0%
Paediatricians	1	100	1	NO	0%

† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



Obstetricians/gynaecologists

NOTES:

- na not applicable
- missing data

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives; Nurses includes Nurses, Nurse Practitioners; Non-Physician Clinicians (NPCs) includes Health Officers; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Obstetricians; Paediatricians includes Paediatricians

National RMNCAH plan?	YES	Number of health facilities
National Human Resources for Health Plan?	YES	of which:
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities
Duration of pre-service education program (years)		Number of BEmONC only facilities
Nursing	3.0	Number with integrated youth friendly services
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities
Auxiliary cadres	na	included in job description:
		Nurse-midwives



39%

LEVEL OF CARE REQUIRED



61%

POTENTIAL MET NEED =

workforce time needed

36

Δ

0

0

100% 100%



CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

Percentage of RMNCAH workers aged over 50 Nurse-midwives 57% Nurses 13% Auxiliary cadres NA NPCs 19% Medical officers 9% Ob/gyns NA Paediatricians 100% 40 100 0 20 60 80

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?





Estimated 2016 population: 10,170

Children aged 0-9: 2,200 (22%) Children aged 10-19: 1,910 (19%) Women of reproductive age: 2,320 (23%)

Total fertility rate: 3.60 Live births (est.): 253

workforce time needed

2016 / 2017 BASELINE



	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	19	100	19	NO	16%
Nurses	19	60	11	NO	21%
	na	na	na	na	na
Non-physician clinicians (NPCs)	na	na	na	na	na
Medical officers	14	20	3	NO	21%
Obstetricians and gynaecologists	1	100	1	NO	100%
Paediatricians	0	100	0	NO	0%

POTENTIAL MET NEED (PMN)



† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- na not applicable
- missing data _

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives/ nurse-midwives; Nurses includes Nurses, Nurse Practitioners; Medical Officers includes Medical Officers and GPs; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities	11
National Human Resources for Health Plan?	YES	of which:	
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities	1
Duration of pre-service education program (years)		Number of BEmONC only facilities	0
Nursing	3.0	Number with integrated youth friendly services	0
Post nursing midwifery	1.0	Per cent of skilled birth attendant responsibilities	
Auxiliary cadres	na	included in job description:	
,		Nurse-midwives	100%
		Obstetricians/gynaecologists	100%

Obstetricians/gynaecologists



CHANGING NEED

2016

2020

2025

2030

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50

Percentage of RMNCAH workers aged over 50 Nurse-midwives 68% Nurses 11% Auxiliary cadres NA NPCs NA Medical officers 0 Ob/gyns 0 Paediatricians 0 100 0 20 40 60 80

DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016–2030



PROJECTIONS TO 2030 - WHAT IF...?



2020

2025

2030

2016

NZ

76

2025

2030

2020

2016



Estimated 2016 population: 270,405

Children aged 0-9: **68,626 (25%)** Children aged 10-19: **55,542 (21%)** Women of reproductive age: **68,006 (25%)**

Total fertility rate: **3.41** Live births (est.): **8,587**

2016 / 2017 BASELINE



RMNCAH WORKER AVAILABILITY

	Headcount <i>(A)</i>	% time on RMNCAH (B)	Dedicated RMNCAH Equivalent (DRE) (A*B)	Educated in country?	Leavers in last 5 years†
Nurse-midwives	81	100	81	YES	2%
Nurses	178	75	134	YES	0%
Auxiliary cadres	na	na	na	na	na
Non-physician clinicians (NPCs)	56	85	48	YES	2%
Medical officers	32	50	16	YES	3%
Obstetricians and gynaecologists	4	100	4	YES	0%
Paediatricians	1	100	1	YES	0%

† Expressed as a % of current headcount

AFFORDABILITY



ACCESSIBILITY



NOTES:

- **na** not applicable
- missing data

11 Access to Youth and Adolescent Friendly Health Services (AYFHS) Nurse-midwives includes Midwives; Nurses includes Community Health Workers; Non-Physician Clinicians (NPCs) includes Nurse Practitioners; Medical Officers includes Medical Officers; Obstetricians & Gynaecologists includes Obstetrician / Gynaecologist; Paediatricians includes Paediatricians

QUALITY

National RMNCAH plan?	YES	Number of health facilities
National Human Resources for Health Plan?	NO	of which:
Policy to address continuous quality improvement?	YES	Number of CEmONC facilities
Duration of pre-service education program (years)		Number of BEmONC only facilities
Nursing	3.0	Number with integrated youth friendly services
Post nursing midwifery	1.5	Per cent of skilled birth attendant responsibilities
Auxiliary cadres	na	included in job description:
		Nurse-midwives

Obstetricians/gynaecologists

90	ANALYSIS	OF THE	RMNCAH	WORKFORCE	IN THE PACIFIC

POTENTIAL MET NEED (PMN)



POTENTIAL MET NEED =

workforce time needed

357

2

32

0

100% 100%

VANUATU – a brief for policy discussion

CONTINUUM OF CARE COVERAGE

Percentage of those in need receiving coverage of key interventions



PROJECTIONS TO 2030 - CURRENT TRAJECTORY

CHANGING NEED

Changing need (hours p.a.) for elements of care (2016 - 2030)



WORKERS OVER 50



DEDICATED RMNCAH EQUIVALENT (DRE) WORKFORCE REQUIRED AND FORECAST 2016-2030



PROJECTIONS TO 2030 - WHAT IF...?



PREGNANCY BIRTH POSTNATAL

PRE-PREGNANCY





Source: Pacific Community (SPC)



PREGNANCY HEAT MAPS AND TRAVEL TIME MAPS

This section presents a set of maps to illustrate the geographic distribution of pregnancies in each country, and the time it takes to travel from different parts of each country to the nearest health facility that can provide emergency obstetric and newborn care (EmONC) services. Combining both sets of maps it is possible to identify geographic areas that are underserved by health facilities (and by extension, RMNCAH workers) and estimate the number of pregnancies that potentially do not have access to a health facility which provides emergency care services if needed. These maps provide evidence to support policy design for the deployment of available health workers where they are most needed, and to create solutions to the specific challenges such as community outreach work and effective referral. Further information on the methodology used to create the maps can be found in Annex 1.

Pregnancy heatmaps

It is crucial to understand the spatial distribution of births and pregnancies, which is essential to inform overall planning decisions related to population and public health. The maps below show the distribution of estimated pregnancies for each country for 2018, where dark shades of red indicate relatively large numbers of pregnancies, and dark shades of blue relatively small numbers. The pattern of pregnancies largely mirrors the main population centres.

Travel time maps

Specialised health services provided at higher level care facilities require clients to travel long distances from remote locations in order to access them. Understanding travel time and its implications for care-seeking behaviour and workforce planning is critically important in the Pacific.

Based on the methodology described in Annex 1, it was possible to estimate the proportion of pregnant women in each country who are able to access a comprehensive EmONC health facility within two hours, firstly using motorised transport and secondly on foot.

Detailed maps of the travel times to a CEmONC facility were produced. The following maps have been produced per country except for Tokelau which does not have CEmONC facility: (1) travel time to the nearest CEmONC facility using motorised transport, (2) travel time to the nearest CEmONC facility using non-motorised transport.

The green sections of these maps represent relatively short travel times (under 30 minutes), and the blue sections relatively lengthy travel times (over 2 hours). Additionally, during the regional validation workshop in September 2018, the countries were asked to provide information on the geographical challenges to accessibility of RMNCAH services and workers and a summary is provided below the maps for countries that shared this information.

COOK ISLANDS PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot	
total	total	%	total	%
334	248	74	172	52

The ministry of health and/ or the specific island's council organises transport to and from the airport and health centre/ hospital. Police patrol boats are used for emergency cases. Air travel to Rarotonga, where the CEmONC facility is, from the outer islands is as follows: Aitutaki- 4 daily flights; Mitiaro- 2 flights a week; Atiu- 3 flights a week; Mauke - 2 flights a week; Manihiki- 1 flight a fortnight; Mangaia- 3 flights a week. From Rarotonga there are up to 3 daily flights to Auckland. In Penrhyn, scheduled flights and ships occur once a month. In Rakahanga, people travel by ferry or fishing boat to Manihiki (for flights) and it takes 45 mins to 2 hours. In Pukapuka there are only charter flight, and a monthly shipping route visit. In Nassau there is no airport; people travel to Pukapuka to catch a charter flight or local shipping service. In Palmerston there is no airport and boat services are irregular (approximately every second month).

COOK ISLANDS TRAVEL TIME MAPS





FIJI ISLANDS PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot	
total	total	%	total	%
25,108	16,685	66	9,576	38

FIJI ISLANDS TRAVEL TIME MAPS





FEDERATED STATES OF MICRONESIA: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot	
total	total	%	total	%
3,297	2,536	77	2,313	70

FEDERATED STATES OF MICRONESIA: TRAVEL TIME MAPS





KIRIBATI PREGNANCY HEAT MAP

KIRIBATI TRAVEL TIME MAPS



Pregnancies	Accessib 2 hou motorised	le within rs by transport	Accessible within 2 hours on foot	
total	total	%	total	%
4,484	2,535	57	2,528	56





REPUBLIC OF MARSHALL ISLANDS: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within rs by transport	Accessible within 2 hours on foot	
total	total	%	total	%
1,847	1,226	66	1,056	57

REPUBLIC OF MARSHALL ISLANDS: TRAVEL TIME MAPS




NIUE: PREGNANCY HEAT MAP



NIUE: TRAVEL TIME MAPS





	Accessible within 2 hours by motorised transport		Accessible with	n 2 hours on foot
Pregnancies total	total	%	total	%
24	24	100	18	74

NAURU: PREGNANCY HEAT MAP



NAURU: TRAVEL TIME MAPS



	Accessible within 2 hours by motorised transport		Accessible within 2 hours on foot	
Pregnancies total	total	%	total	%
417	417	100	417	100

PALAU PREGNANCY HEAT MAP



Pregnancies	Accessit 2 hou motorised	le within Irs by I transport	Accessible within 2 hours on foot		
total	total	%	total	%	
324	290	90	242	75	

In Palau there are ambulances at the main island and substations where they can transport emergency cases. In the northern-most isolated island of Kayangel there is a new ambulance bill and a boat has been made available as an emergency ambulance (the government is working on a multiagency policy to address staffing and logistics). The islands of Peleliu and Angaur have airstrips, and there is an agreement with a small aviation company and a policy on how to activate emergency evacuation of patients from these islands. For the farthest islands that would take more than 24 hours to reach: Hatohobei recently had a community health centre inaugurated but it is difficult to find a health worker to staff the site; and Sonsorol has no health centre. These islands have scheduled outreach visits every quarter, including a nurse or other health care provider.

PALAU TRAVEL TIME MAPS





PAPUA NEW GUINEA: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot		
total	total	%	total	%	
367,528	142,944	39	46,907	13	

It is challenging to provide access to PNG's EmONC facilities due to the terrain, which consists of high mountains, valleys and big fast flowing rivers, with long distance between health facilities in the outer islands. Therefore, helicopters, planes, boat planes and boats are needed to transfer those mothers that need EmONC. There are also facilities that provide waiting houses for pregnant women to come and stay near the nearest BEmONC and CEmONC facilities to deliver. Road conditions are poor, which adds to the duration of journeys over land

PAPUA NEW GUINEA: TRAVEL TIME MAPS





SOLOMON ISLANDS: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot		
total	total	%	total	%	
27,138	13,430	49	19,766	73	

Travel is difficult due to scattered islands and difficult terrain, especially in Guadalcanal and Malaita. Transportation is mainly by boat, but there are no regular routes for public or private transport and, it can also be very costly. Road conditions are often poor, leading people to choose longer land routes or shipping routes that are more accessible; e.g. to access services in Honiara instead of the nearest facility. Others simply walk to reach the facility, choosing a route that is direct

SOLOMON ISLANDS: TRAVEL TIME MAPS





KINGDOM OF TONGA: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot		
total	total	%	total	%	
3,338	3,338	100	3,062	92	

Most patients use the domestic airline service "Real Airlines of Tonga" for medical referrals. Scheduled flights to Tongatapu from the islands are as follows: Vava'u- 2 daily (1 hour); Ha'apai-2 daily (50 minutes); 'Eua- 1 daily (15 minutes); Niuafo'ou and Niuatoptapu -every 2 weeks (3.5 hours). There are no domestic flights on Sundays in Tonga. For more serious health conditions, there are daily flights from Nuku'alofa to Fiji (1.5 hours), Australia (4 hours) and New Zealand (3 hours). Ha'apai island group is midway between Tongatapu and Vava'u, and the weekly boat stops at several islands en route to Vava'u (12 hours). People from nearby islands travel by boat directly to Tongatapu (2-6 hours). The Niuas are the most difficult islands to access, and are closer to Samoa than to Tongatapu. There is a monthly scheduled sailing from the Nuias to Tongatapu, taking 20-60 hours depending on the weather conditions. The crossing can be very rough, and it is particularly unreliable during the cyclone season (December to April).

KINGDOM OF TONGA: TRAVEL TIME MAPS



TUVALU: PREGNANCY HEAT MAP



TUVALU: TRAVEL TIME MAPS



Pregnancies	Accessib 2 hou motorised	le within Irs by I transport	Accessible within 2 hours on foot		
total	total	%	total	%	
336	199	59	199	59	

There is a referral system in place for all high-risk and first time pregnancies to women residing in the outer islands to deliver on the main island. Pregnant women from the outer islands are advised by 36 weeks to take a ferry from their island to Funafuti to give birth. All medical transfers are covered by the Tuvalu Medical Treatment Scheme. The longest travel time from the furthest island takes about 28 hours by sea, and the shortest takes about 4 hours by sea. There are two large government ferry boats operated by Tuvalu Maritime Board that travel from Funafuti to each of the outer islands once every 2-3 weeks. These trips to the outer islands take from 1-4 days, longer if the seas are rough. There is limited access for these large ferries to dock on the outer islands and small work boats are dispatched from the wharf to unload passengers and cargo. In the case of medical reasons, the closest ferry is directed to detour their route to pick up patients and transport them to Funafuti Hospital. In the case of an emergency a Fast Patrol Boat is dispatched from the wharf at Funafuti to expedite the evacuation. This can take up to 15 hours round trip to Funafuti depending which island is indicated in the evacuation.



VANUATU: PREGNANCY HEAT MAP



Pregnancies	Accessib 2 hou motorised	le within Irs by transport	Accessible within 2 hours on foot		
total	total	%	total	%	
11,562	8,453	73	6,767	59	

In SHEFA Province, to go to CEmONC on Efate from Mataso, requires 4 hours by boat, then travel by road for 120 minutes to Vila Central Hospital (including time to communicate for a truck etc.). In TORBA Province, to reach a CEmONC there is 1-hour flight to Santo. In TAFEA Province, Travel from Port Narvin by truck to Dillons Bay airport takes 10 hours (or by boat 5 hours then truck to airport). Dillons Bay to Tanna airport is a 15-minute flight then truck to Lenakel Provincial Hospital (20 minutes). If needed– then plane Tanna airport to Vila – 1 hour to reach Vila Central hospital. In PENAMA Province, to get to Vila from Pangi Health Centre – by truck 30 mins to Lonore airport – then plane 1 hour from Lonore airport to Vila. In MALAMPA Province, to get to Vila – 1 hr by truck to Ulei airport – by plane – 1hr flight to Vila. In SANMA Province it can take up to 3 hours by truck to reach a CEmONC.

VANUATU: TRAVEL TIME MAPS



SAMOA: PREGNANCY HEAT MAP

SAMOA: TRAVEL TIME MAPS







	Accessible within 2 hours by motorised transport		Accessible with	in 2 hours on foot
Pregnancies total	total	%	total	%
7,025	6,331	90	4,975	71

TOKELAU: PREGNANCY HEAT MAP



There are no CEmONC facilities in Tokelau. Transport from Tokelau to Samoa for urgent medical treatment takes time: there is no air access. The only scheduled form of transportation is by ship, with sailings every fortnight. Additionally, a boat is made available for emergency transfer of patients. Sailing time from Samoa is about 24 hours to Fakaofo, 26 hours to Nukunonu and 30 hours to Atafu. With the absence of a port, passengers and supplies are offloaded from the ship in the open sea on to barges for further transportation ashore. Travel between the 3 atolls takes approximately 4-6 hours. The referral hospital on Nukunonu offers more services such as ultrasounds and x-rays, but does not have any operating theatres so it is not suitable for a complicated birth that requires surgery.

	Accessible within 2 hours by motorised transport		Accessible with	in 2 hours on foot
Pregnancies total	total	%	total	%
38	0	0	0	0

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Data collection

A self-completion questionnaire was used to collect quantitative and qualitative data on selected indicators. The questionnaire was based on the one used for the 2014 State of the World's Midwifery (SoWMy) report, but adjusted for the Pacific context (e.g. reflecting the RMNCAH cadres that exist in the region and the fact that not all countries have education institutions for health professionals), and to ensure that child and adolescent health interventions were included as well as reproductive, maternal and newborn interventions. The original SoWMy questionnaire was developed in 2013 through an iterative feedback process involving the core SoWMy team and representatives of WHO, UNFPA, ICM, the International Council of Nurses (ICN), the International Federation of Gynaecology and Obstetrics (FIGO) and Jhpiego. Reference was made to international policy documents and agreed research and analysis frameworks.

In addition to the questionnaire, each country was asked to provide a list of the names, locations and types of all its health facilities, and to indicate the numbers and cadres of RMNCAH workers deployed in each facility.

UNFPA commissioned consultants to support the process of data collection. They visited 13 of the 15 countries (the exceptions were Tokelau and Samoa) between October 2017 and September 2018, and also provided remote support to all countries. The lead consultant provided remote support to the data collection consultants by email and telephone. National stakeholders (including representatives of ministries of health, ministries of education, professional associations and education institutions) were invited to contribute, and once the questionnaire was complete a national validation workshop took place in each country to approve the responses given to the questionnaire. A full list of contributors can be found in Annex 2. By September 2018, 14 countries had returned at least a partially-completed questionnaire, and the final country (Samoa) did so during the regional validation workshop at the end of September 2018 (see below), with support from one of the data collection consultants.

Once the completed questionnaire was submitted, the research team reviewed the responses and sent a list of queries and clarifications to the data collection consultants, who in turn discussed them with the national stakeholders. Once these were resolved, the data were inputted into an Excel spreadsheet for analysis.

Secondary data on demographics and epidemiology were obtained from published sources to inform the analysis and modelling (see below and Annex 4 for details).

Regional validation workshop

Once the data had been collated and analysed, representatives from all 15 countries were invited to a regional validation workshop in Suva, Fiji, held between 25 and 27 September, 2018. Representatives attended from 14 countries (the exception was Niue). At the workshop, the purpose, methodology and preliminary results of the analysis were presented. Country representatives then had the opportunity to review, discuss, check, add to and amend the inputs and assumptions used in the modelling. Following this validation workshop, requested changes were made to the model and the analysis was re-run for each country. This report shows this final analysis.

Most of the changes requested by workshop participants were made, but some were not. In most cases this was due to countries not agreeing on standard assumptions such as working hours and cadre competencies (see 'Limitations' below).

Data analysis and modelling

Most of the information in Chapter 2 of this report is the result of descriptive analysis of the data provided by the countries in the questionnaire. The 'potential met need' (PMN) estimates and the information on the right-hand page of each country profile under the heading 'Projections to 2030' is the result of a modelling exercise which aimed to estimate the RMNCAH workforce numbers and composition required to meet the need for RMNCAH services until 2030, and compare this against the forecast size and composition of the RMNCAH workforce.

The PMN, headcount required and headcount forecast were estimated using a mathematical model. Before commencing the modelling, we defined the key interventions representing need for RMNCAH care. For this we used the list of essential RMNCAH interventions from Annex 2 of the Global Strategy for Women's, Children's and Adolescents' Health⁹.

The model itself was run separately for each country according to the following method. First, the **potential met need (PMN)** was estimated as follows:

- 1. Estimate how much health worker time would be needed to deliver each of the 124 essential RMNCAH interventions to everyone who needed it in the baseline year (2016), by:
 - a. estimating the number of women, children, adolescents and newborns requiring each intervention using demographic and epidemiological data from secondary sources (see Annex 4 for details).
 - b. estimating the average contact time required to deliver each intervention to one individual, using time estimates from the OneHealth tool where available, otherwise expert estimates (see Annex 4 for details),
 - c. based on the previous two quantities, estimating the total annual contact time required to deliver each intervention to all the individuals who need it,
 - d. disaggregating the total annual contact time required for each intervention into need that can only be delivered at a secondary level and need that could be delivered at either primary or secondary level (see Annex 5 for details).

2. Estimate the amount of health worker time that is available to meet the need. This step starts with the headcount numbers for each RMNCAH cadre as collected in the questionnaires. Each

^{9.} A number of interventions that are considered to be essential in the Global Strategy for Women's, Children's and Adolescents' Health were not included in the met need modelling because they are not RMNCAH interventions and therefore require interventions to be performed by members of the health workforce that were not included in this assessment. These excluded interventions are: detection and treatment of non-communicable diseases (NCDs) such as tuberculosis and cancer; pre-pregnancy detection and management of risk factors such as obesity, alcohol abuse, mental health, genetic conditions; management of hepatitis B and genetic conditions; assessment and management of nucleid as this is not generally practised in the region. It should, however, be noted that every RMNCAH worker has a responsibility to understand and take appropriate action in relation to NCD risk factors.

cadre headcount is converted into available hours, by:

- a. defining the cadre(s) that should be responsible for providing at least one essential RMNCAH intervention (even if they do not currently do so) and assigning them to one of seven categories of health worker based on their job titles, duration of post-secondary education and responsibilities as recorded in the questionnaire. The seven categories were ordered from lowest paid to highest paid (based on analysis of salaries provided in the survey) as follows: auxiliary cadres, nurses, midwives and nurse-midwives, NPCs, medical officers, and medical specialists (obstetricians/ gynaecologists and paediatricians)
- b. for each cadre, converting headcounts into 'Dedicated RMNCAH Equivalents' (DREs) by multiplying the headcount number by country estimates of the percentage of its clinical time that this cadre spends working on RMNCAH (on average)
- c. converting these DREs into annual hours availability by assuming that all RMNCAH workers work 40 hours per week, take an average of 5 days of sickness leave and 30 days of holiday per year, and spend 70% of their available working hours providing clinical interventions (as opposed to administrative tasks and other duties)
- d. disaggregating the available hours into hours available at primary health facilities and hours available at secondary health facilities, based on the location of health workers
- e. determining which of the RMNCAH interventions each cadre should be competent to perform or contribute to (even if they do not currently do so) based on expert opinion from the region (see Annex 3 for details).
- 3. Allocating the available health worker time to the need for each essential intervention, based on competencies, as follows:
 - a. using a logical algorithm, the number of hours required to provide universal coverage for each intervention were allocated sequentially to each cadre that is competent to deliver the intervention, starting with the least expensive cadre
 - b. starting with the secondary need and then moving on to primary need, for each cadre in turn, hours needed were allocated to competent available cadres one by one. This allocation continued, one hour at a time, until either the need or the availability was exhausted. Any unallocated capacity at secondary level was transferred to the primary level if any need was unmet at that level
 - c. if there were insufficient hours available from the least expensive competent cadre to meet all of the need for an intervention, the unallocated time was allocated to the next competent category until either all of the need had been (theoretically) met or all of the available DRE time had been allocated. Crucially, each cadre's available working time was allocated in increasing order of their roles and competencies. In practice, this means that although a medical officer could deliver family planning advice (for example), the medical officer cadre's time would only be allocated to this intervention if the available working time

from less expensive cadres was insufficient to meet all of the need for that intervention.

- 4. Calculating potential met need by comparing the allocated need to the total need, and expressing this as a percentage.
- 5. This PMN estimate was made separately for each sub-national area within a country. The resulting values were converted into a national PMN estimate by taking an average of the sub-national estimates, weighted by population size.

The **Dedicated RMNCAH Equivalent (DRE) workforce required** was estimated as follows:

- 1. the calculation started with the need hours for each of the 124 essential RMNCAH interventions, as estimated in step 1 above
- a 'preferred cadre' was selected for each of the interventions, based on expert opinion from the region and validated at the regional validation workshop (see Annex 3 for details)
- the need for each cadre is the sum of the need hours for each intervention where that cadre has been identified as the preferred cadre
- 4. this need was converted into a DRE for each cadre, assuming that the cadre works according to the same assumptions used in the PMN estimate [i.e. 40 hours per week, with an average of 5 days of sickness leave and 30 days of holiday per year, and spend 70% of their available working hours providing clinical interventions (as opposed to administrative tasks and other duties) and a percentage of this clinical time on RMNCAH, as declared in the data collection questionnaire]
- the overall need for RMNCAH services was projected forward from a baseline in 2016 until 2030, based on forecast changes in population and epidemiological factors (see Annex 4 for details)
- 6. the DRE required for each cadre in future years was estimated from the RMNCAH need hours for each year, as in steps 3-4 above.

The projected changes in the actual RMNCAH workforce were estimated by examining the forecast inflows and outflows, as follows:

- 1. the estimate started with the current headcount for each cadre from the country questionnaire
- 2. these headcount numbers were disaggregated by age, making it possible to estimate how many are likely to leave the workforce due to retirement (based on the country's statutory retirement age) or death in service (based on the country's age specific mortality rates). The questionnaire also provided details of the number of workers leaving the workforce in the preceding 5 years, from which an annual voluntary attrition rate (AVAR) was estimated
- 3. the questionnaire also included details of the number of new graduates joining the workforce from in-country education establishments, and from overseas. These numbers were extrapolated to 2030 and validated at the regional workshop, and applied to the projection for the future workforce
- 4. finally, the projected workforce headcount was converted to DREs, as detailed above, for comparison purposes.

The model also allowed an exploration of alternative policy scenarios, assessing the impact on met need between 2016 and 2030 when certain parameters of the model are altered. In this report, we present three possible "what if ...?" scenarios for comparison with the current trajectory:

Scenario 1) in which the annual voluntary attrition rate (AVAR) is reduced by 50% in the next five years and then remains at this reduced rate until 2030.

Scenario 2) in which recruitment is increased, so that the baseline projections for the inflow of graduates and overseas recruits are increased linearly until the 2025 level is 50% higher than the baseline. Recruitment then continues at this elevated level until 2030.

Scenario 3) in which efficiency is improved by 2% per year until 2030, starting in 2017. This was operationalised by increasing the % of health worker time spent on clinical (as opposed to administrative and other duties) from its baseline value of 70%, by 2% each year until 2030.

Although the methodology for this regional study was based on that used in SoWMy 2014, some aspects are quite different, which affects the extent to which the results shown in this report can be compared with those shown in the SoWMy report. The main change is the expansion of the list of essential interventions to include a wider range of RMNCAH interventions. To reflect the inclusion of child and adolescent health interventions, a new cadre (paediatricians) was added to the model. Additionally, in this regional report, auxiliary cadres and NPCs were assumed to have a wider range of competencies than was the case in the SoWMy report, so can meet more of the need than was assumed in SoWMy. Comparability is also affected by: (1) the updating of time estimates for delivery of essential interventions in line with updates in the OneHealth tool since 2014, (2) the updating of incidence data for many of the essential interventions due to the publication of more recent estimates (see Annex 4), (3) a different set of 'what if' scenarios, (4) a change to the assumed holiday entitlement for health workers (in SoWMy 2014 this was 20 days per year; for this report it was 30 days to include public holidays as well as personal annual leave), and (5) a change to the order of allocation, because salary data from this survey informed the decision about which cadres were least expensive. All of the above changes can be considered as improvements or refinements to the methodology, but they do mean that it is not appropriate to make a direct comparison between the modelling results from SoWMy 2014 and those shown in this report for the two countries included in both reports (PNG and Solomon Islands).

Pregnancy heatmaps and travel time maps

The Pacific Island countries present a unique set of geographical circumstances which makes timely access to health care especially challenging. Even when overall health worker availability is high at a national level, it is not easy to ensure that the right skills are readily accessible when required by small populations which are widely spread. Specialised health services are provided in higher-level health facilities, requiring the service user to travel in order to access them. Understanding travel time and its implications for care-seeking behaviour and workforce planning is important.

The maps identify the location of health facilities (HF) and analysed in terms of the time it would take for pregnant women to reach a Comprehensive Emergency Obstetric and Newborn Care (CEmONC) and Basic Emergency Obstetric and Newborn Care (BEmONC) facility from every atoll / island. We present the methodology included in this analysis, to identify the number of women that are potentially missing essential access to health facilities with different transportation scenarios.

Methodology

Estimates of the number of pregnancies expected for 2018 in each country were produced and mapped following the methodology described in James et al 2018 [82], at a 500m resolution for all countries, apart from Fiji and Kiribati for which a 1km resolution was used. In summary, this was achieved by identifying the women of reproductive age (WRA) from a gridded population map for each country and using age and sex census or UN data, grouped into seven 5-year groupings from 15 to 49 years of age. Birth counts were then estimated using age specific fertility rates provided by the countries during the data collection exercise. These were then multiplied with the WRA gridded data, for each age group, before summing, to estimate the total number of births. Finally, for each country, the distribution was scaled to match the national estimated births for 2018. Pregnancy estimates were further derived using data from the Guttmacher institute [83] on stillbirths, miscarriages, and abortions, to calculate a pregnancies to births ratio (1.3267), before applying to the birth estimates to generate numbers of pregnancies.

The travel time maps were prepared at a 100m resolution, using the following base maps: elevation model (WorldPop), land cover types (WorldPop), river (Open Street Map, OSM), lakes (OSM), roads (OSM), and health facilities (BEmONC and CEmONC) provided by each country (apart from Samoa where the health facility locations were taken from OSM and assumed to be CEmONC). Travel time maps were produced using the WHO mapping tool AccessMod 5.0, which has been specifically designed for modelling physical accessibility to health care and is free to access.

The areas where travel times were within 2 hours of a BEmONC or a CEmONC facility were identified. Two scenarios of modes of transport were used to investigate the variation in times to reach a health facility. The first was the motorised scenario, where speed of travel considered the potential travel by car on roads at an average speed of 40km/h, walking speed through different land cover types from 2 to 5km/h and the speed of traveling by boat at 19km/h. The second was the walking scenario as above but instead the travel by road was at the walking speed at 5 km/h. Once we identified the areas within 2 hours of travel to a health facility, we estimated the number of pregnant women that are within these zones.

As the complexities of travel times within the countries cannot be fully encompassed by these scenarios (because of the limitations of not including air travel, and frequency and availability of sea transport), countries were requested to provide additional notes about accessibility and plans that they have in place, to access remote areas in emergency situations and when mothers are planning to give birth. Where provided, these notes are shown alongside the maps.

Limitations

It is acknowledged that the RMNCAH workforce is part of the wider health workforce in any country, and the results presented in this report should be interpreted accordingly. Most cadres of RMNCAH worker also have responsibility for other aspects of health, and this assessment tries to reflect this fact by basing the modelling on DREs rather than headcounts. These results should be considered alongside similar assessments for other aspects of health care, for which other tools and methodologies exist [84].

In a regional assessment such as this, it is important to use the same methodology for each country, to enable crosscountry comparisons and regional aggregation of results where appropriate. This means that some of the standard assumptions applied are not applicable to every country, e.g. countries have different scopes of practices for individual cadres, different annual leave entitlements etc. The individual country results should be interpreted with this in mind. At the regional validation workshop, some countries requested changes to these standard assumptions, and where there was a broad consensus across countries, these changes were made. If, however, there was no consensus, these changes were not made.

The methodology used in this assessment applies less well to very small countries than to more populous countries. The projections for the number of health workers required assume that each country needs a minimum of one nurse-midwife, one nurse, one MO, one obstetrician/gynaecologist and one paediatrician. However, a very small country may need less than one. This can be managed by activities such as task-sharing or coming to arrangements with neighbouring countries, but the model does not factor in such solutions. This means the number of health workers needed (as estimated by the model) is much higher than the actual number, even if the actual number is sufficient to meet all or most of the need. This was the case for Niue, which is why Niue's country profile does not show the 'projected need' graphs.

Countries were asked to provide data from 2016, as the most recent complete calendar year before data collection began. However, as many countries populated their questionnaire in the year 2018, some of the baseline data may relate to the year 2017 rather than 2016.

Ideally, the assessment would have included anaesthetists, as a crucial RMNCAH cadre. However, as explained in the main body of the report, the decision was taken to exclude them because this is an assessment based on a set of key interventions and the health worker time required to deliver them. Although anaesthetists are essential to a few interventions (most notably caesarean section), the overall amount of their time required for the RMNCAH interventions on which this assessment was based was judged to be too small to justify the expense of including them in the model. They are, however, an essential element of the RMNCAH workforce, and should be considered as such during workforce planning activities.

Attempts were made to count private sector workers and those employed by NGOs such as IPPF, and representatives of these sectors were invited to contribute to the data collection in countries where the data collection consultants were advised that they were significant contributors to the RMNCAH system. In these cases, their health workers will have been counted in this assessment. However, for some countries it is possible that some RMNCAH workers from outside of the public health system were not counted. The following list includes the names of the contributors who indicated that they wished to be acknowledged. We would like to thank them all, and also the few contributors who requested not to be acknowledged by name in the report. Every effort has been made to make this list as accurate as possible. Sincere apologies are extended if any contributors have been unintentionally omitted or names misspelled.

Cook Islands: Temarama Anguna, Maine Benjamina, Elizabeth Iro, Mary Macmanus, Ngakiri Teaea, Yin Yin May

Federated States of Micronesia

Federal: Kapilly Capelle, Paul Ordenante Dacanay, Stanley Mickey

Chuuk State: Bosco Buliche, Markita Buliche, Benita Martin, Rita Mori, Awreen Paul, Enrida Pillias, Kayleen Ruben, Eleanor Setik, Siana Shapucy, Pipiana Wichep

Kosrae State: Meryulyn Livaie, Salome Martin, Kun Mongkeya, Patricia Tilfas, Paz Velasco, Rissey Waguk

Pohnpei State: Monalisa Benjamin, Bernolina Hedson, Nohra Liwy, Marcy Lorrin

Yap State: Wincener David, James Edilyong, Resel Elias, Naty Malgarsoh, Denitha Palemar

Fiji: Chandra Dayal, Misau Fasala, Vamarasi Fasala, James Fong, Joe Fuata, Aliote Galuvakadua, Muniamma Gounder, Rajat Gyaneshwar, Abdul Hussain, Eleni Kata, Susan Kiran, Margaret Leong, Vamarasi Mausio, William May, Shivnay Naidu, Eric Narayan, Prashil Parmar, Ami Prasad, Avelina Rokoduru, Jonathan Rowe, Torika Tamani, Sera Vulavou, Selina Waga-Ledua

Kiribati: Tereba Abese, Tareti Iowane-Ruaia, Luisa Kabang, Brian Kironde, Remwan Mantaia, Helen Murdoch, Teanibuaka Tabunga, Terotia Tabwaka, Baaua Tawita, Aren Teannaki, Baaua Teibiraa, Tiroia Teikake, Ereti Timeon

Marshall Islands: Kinisimere Alifereti, Kennar Briand, Maureen Emil, Darlene Korok, Hillia Langrine, Melvin Mellan, Joni Nashion, Arata Nathan, Florence Peter, Russell Uwaine, Francyne Wase-Jacklick, Teresa White

Nauru: Patrina Akua, James Auto, Isabel Deageago, Vae Keppa, Sasikumar Paravonnor, Beryl Scotty, Vania Scotty **Niue:** Edgar Akau'ola, Jenny Eveni, Colleen Kulatea, Grizelda Mokoia, Clivenn Naepi, Monica Tasmania-Lafi, Puasina Tatui

Palau: Louise Benaya, Gregory Dever, Antonette Merur, Marciana Ngirailemesang, Terry Ngirmang, Asena Ravu, Rufina Takashi, Jocelyn Tonyokue, Arnice Yuji

Papua New Guinea: Manah Dindi, Duncan Dobunaba, Pou Haro, Gilbert Hiawalyer, Nina Joseph, Enamul Karim, Mary Kililo, Emos Kubaloma, Lucy Langer, Saidi Lani, Joseph Lipu, Lucy Mahabi, Glen Mola, Susan Nalu, Kairu Opa, Esther Pelly, Charlotte Polly, Paula Puawe, Jennifer Pyakalyia, Karen Sanga, Martina Suve-Hohora, Lina Wam, Fonga Wema

Samoa: Liulaulu Faaleolea Ah Fook, Tamali'l Faapi'o Nielsen-Hoeflich, Grace Gabriel-Qereqeretabua, La-Toya Peka Lee, Lealaiauloto Lia'i, Perive Lelevaga, Faalagilagi Polataivao, Sala Soi Ma'atasesa Samuelu-Matthes, Liai losefa Siitia, Kalala Tupa'l, Momoti Ulisese

Solomon Islands: Joseph Gari, Ivan Ghemu, Pauline McNeil, Ernest Mai, John Muaki, Jenny Narasia, Divinal Ogaoga, George Pego, Nancy Pego, Sandra Rollands, Leila Ross, Jacqueline Tangirongo

Tokelau: Ivoga Iosefa, Tusi Iosefi, Maliana Luka, Asena Senimakosoi, Silivia Tavite

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Tuvalu: Pelesala Kaleia, Filoiala Sakaio, Virisila Sema, Miliana Simeona, Elina Soloseni, Penina Taniela, Alaita Taulima, Tilesa Tepaula, Clare Whelan

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ANNEX 3: RMNCAH WORKER COMPETENCIES

The following table sets out the assumptions made about which cadres are competent and authorised to deliver each of the RMNCAH interventions included in this assessment. This does not necessarily reflect what RMNCAH workers actually do in a given country; it shows what they are theoretically capable of doing if they are educated and regulated according to regional standards¹⁰, and operate within an enabling environment. For this reason, the table includes interventions regardless of whether or not they are routinely practised in all Pacific Island countries. **A dot indicates that the cadre** should be competent to deliver all aspects of the intervention with no supervision. A dot in parentheses indicates that the cadre should be competent to perform some aspects of the intervention (e.g. manage straightforward cases and/or be a member of a larger team in more complex cases). Shading indicates the preferred cadre for each intervention, which was used to estimate the number of each cadre required in each country (see Annex 1). More than one cadre is shaded if the intervention requires more than one health worker, or if severe cases require care from a different cadre than mild cases.

Intervention	Auxiliary cadres ¹¹	Nurse	Midwife/ nurse-midwife	Non-physician clinician	Medical officer	Obstetrician/ gynaecologist	Paediatrician
WOMEN'S SEXUAL AND REPRODUCTIVE I	IEALTH						
Information and counselling for sexual and reproductive health including contraception	•	•	•	•	•	•	
Delivery of condoms	•	•	•	•	•	•	
Delivery of contraceptive pills and injectables	(•)	•	•	•	•	•	
Delivery of contraceptive implants		•	•	•	•	•	
IUD insertion			•	•	•	•	
Female sterilisation					•	•	
Prevention of communicable and non- communicable disease and sexually transmitted and reproductive tract infections including HIV and syphilis	(•)	•	•	•	•	•	
Detection of HIV		•	•	•	•	•	
Detection of other STIs		•	•	•	•	•	
Treatment of HIV					•	•	
Treatment of syphilis		•	•	•	•	•	
Treatment of gonorrhoea		•	•	•	•	•	
Treatment of chlamydia		•	•	•	•	•	
Treatment of trichomoniasis		•	•	•	•	•	
Pre-conception iron and folic acid supplementation	•	•	•	•	•	•	
Screening for cervical cancer		•	•	•	•	•	
Screening for breast cancer		•	•	•	•	•	
Safe abortion (wherever legal)		(•)	(•)	(•)	•	•	
Post-abortion care	(•)	(•)	(•)	(•)	•	•	
Prevention of sexual and other forms of gender-based violence	(•)	•	•	•	•	•	
Response to sexual and other forms of gender-based violence	(•)	•	•	•	•	•	

10 As advised by the Technical Advisory Committee for this study

11 Usually nurse-aides, Community Health Workers or similar, if they have a minimum of 1 year of post-secondary schooling in order to qualify. If there is less than 1 year of professional education, auxiliary cadres are not considered to be a professional RMNCAH cadre and excluded from the modelling.

Intervention	Auxiliary cadres ¹¹	Nurse	Midwife/ nurse-midwife	Non-physician clinician	Medical officer	Obstetrician/ gynaecologist	Paediatrician		
MEN'S SEXUAL AND REPRODUCTIVE HEALTH									
Male sterilisation				٠	•	•			
PREGNANCY (ANTENATAL CARE)									
Early and appropriate antenatal care	(•)	•	•	•	•	•			
Screening for maternal illness, e.g. heart disease		•	•	•	•	•			
Iron and folic acid supplementation	•	•	•	•	•	•			
Tetanus immunisation		•	•	•	•	•			
Prevention of mother-to-child transmission of HIV (PMTCT)		•	•	•	•	•			
Prevention of malaria including insecticide-treated nets and intermittent preventive treatment	•	•	•	•	•	•			
Treatment of malaria in pregnancy		•	•	•	•	•			
Smoking cessation	•	•	•	•	•	•			
Management of syphilis		•	•	•	•	•			
Dietary counselling for healthy weight gain and adequate nutrition	•	•	•	•	•	•			
Prevention of and screening for gestational diabetes		•	•	•	•	•			
Treatment of gestational diabetes			•	•	•	•			
Treatment of eclampsia			(•)	(•)	(•)	•			
Treatment of pre-eclampsia			(•)	(•)	(•)	•			
Management of obstetric complications (preterm premature rupture of membranes, macrosomia, etc)			(•)	(•)	•	•			
Antenatal corticosteroids for women at risk of birth from 24-34 weeks of gestation when appropriate conditions are met		(•)	(•)	(•)	•	•			
Management of malpresentation at term			(•)	(•)	(•)	•			
CHILDBIRTH									
Facility-based childbirth with a skilled birth attendant		(•)	(•)	(•)	(•)	•			
Active management of third stage of labour		•	•	•	•	•			
Management of prolonged or obstructed labour			(•)	(•)	(•)	•			
Instrumental delivery for maternal/foetal indications			(•)	(•)	(•)	•			
Caesarean section for maternal/foetal indications			(•)	(•)	(•)	•			
Induction of labour with appropriate medical indications			(•)	(•)	•	•			
Management of intrapartum haemorrhage		(•)	(•)	(•)	•	•			

Intervention	Auxiliary cadres ¹¹	Nurse	Midwife/ nurse-midwife	Non-physician clinician	Medical officer	Obstetrician/ gynaecologist	Paediatrician
Prevention and management of eclampsia (including with magnesium sulphate)		(•)	(•)	(•)	(•)	•	
Management of women with or at risk of infections (including prophylactic use of antibiotics for caesarean section)		•	•	•	•	•	
POSTNATAL (MOTHER)							
Care in the facility for mother and baby for at least 24 hours after an uncomplicated vaginal birth	(•)	•	•	•	•	•	
Promotion, protection and support of exclusive breastfeeding for 6 months	(•)	•	•	•	(•)	(•)	(•)
Management of postpartum haemorrhage (PPH)	(•)	(•)	(•)	(•)	•	•	
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		(•)	(•)	(•)	٠	•	
Postnatal contact with an appropriately skilled healthcare provider, at home or in the health facility, around day 3, day 7 and at 6 weeks after birth		•	•	·	•	•	
POSTNATAL (NEWBORN)							
Neonatal resuscitation with bag and mask		•	•	•	•	•	•
Hygienic cord and skin care	•	•	•	•	•	•	•
Initiation of prophylactic antiretroviral therapy for babies exposed to HIV		•	•	•	•		•
Kangaroo mother care for small babies	•	•	•	•	•	•	•
Extra support for feeding small and preterm babies with breast milk		•	•	•	•		•
Continuous positive airway pressure to manage babies with respiratory distress syndrome		(•)	(•)	(•)	•		•
Case management of possible severe bacterial infection		(•)	(•)	(•)	•		•
Management of newborns with jaundice		•	•	•	•	•	•
Management of genetic conditions					•		•
Postnatal contact with a skilled healthcare provider, at home or in the health facility, around day 3, day 7 and at 6 weeks after birth		•	•	•	٠		•

RMNCAH WORKER COMPETENCIES (continued)

Intervention	Auxiliary cadres ¹¹	Nurse	Midwife/ nurse-midwife	Non-physician clinician	Medical officer	Obstetrician/ gynaecologist	Paediatrician
CHILD HEALTH AND DEVELOPMENT							
Exclusive breastfeeding for 6 months; continued breastfeeding and complementary feeding from 6 months	•	•	•	•	•		•
Dietary counselling for prevention of undernutrition, overweight and obesity	•	•	(•)	•	•		•
Routine immunisation		•	•	•	•		•
Periodic vitamin A supplementation where appropriate		•	•	•	٠		•
Iron supplementation where appropriate		•	•	•	•		•
Prevention of childhood illnesses	•	•	(•)	•	•		•
Management of malaria (mild)		•		•	•		•
Management of malaria (severe)		(•)		(•)	(•)		•
Management of pneumonia (mild)		•		•	•		•
Management of pneumonia (severe)		(•)		(•)	(•)		•
Management of diarrhoea (mild)		•		•	•		•
Management of diarrhoea (severe)		(•)		(•)	(•)		•
Case management of severe acute malnutrition and treatment for wasting	(•)	(•)		(•)	(•)		•
Management of moderate acute malnutrition	(•)	•		•	•		•
Comprehensive care of children infected with, or exposed to, HIV		(•)		(•)	(•)		•
Case management of meningitis		(•)		(•)	(•)		•
Prevention of child maltreatment	•	•		•	•		•
Response to child maltreatment		(•)		(•)	(•)		•
Care for children with developmental delays, congenital abnormalities and disabilities		•		•	٠		•
ADOLESCENT HEALTH AND DEVELOPMENT							
Routine vaccination (DPT, hepatitis B, BCG, HPV)		•		•	•		•
Promotion of healthy behaviour (e.g. nutrition, physical activity, no tobacco, alcohol, drugs)	•	•		•	•		•
Prevention and detection of anaemia		٠		•	•		•
Management of anaemia		٠		•	•		•
Comprehensive sexuality education, information and counselling for sexual and reproductive health, including contraception		•		•	•		•
Services for comprehensive sexual and reproductive health including contraception	(•)	•	•	•	•		•
Psychosocial support and related services for adolescent mental health and wellbeing		•			•		•

RMNCAH WORKER COMPETENCIES (continued)

Intervention	Auxiliary cadres ¹¹	Nurse	Midwife/ nurse-midwife	Non-physician clinician	Medical officer	Obstetrician/ gynaecologist	Paediatrician
Prevention of sexual and other forms of GBV		•		•	•		•
Response to sexual and other forms of GBV	(•)	•		٠	٠		•
Prevention and detection of communicable and non-communicable diseases and STIs, including HIV		•	•	•	•		•
Treatment of HIV				•	•		•
Treatment of syphilis		•	•	•	•		•
Treatment of gonorrhoea		•	•	•	٠		•
Treatment of chlamydia		•	•	•	٠		•
Treatment of trichomoniasis		•	•	•	•		•
Detection of hazardous and harmful substance use	•	•		٠	٠		•
Management of hazardous and harmful substance use		•		•	•		٠
Prevention of suicide		(•)		(•)	(•)		•
Management of self-harm/suicide risks		(•)		(•)	(•)		•

ANNEX 4: ESTIMATING NEED FOR ESSENTIAL RMNCAH INTERVENTIONS

For each of the essential RMNCAH interventions, the following table explains how the amount of health worker time needed to deliver the intervention was estimated, and the data sources. Note that epidemiological data were not generally available for the individual states of FSM, so for most indicators it was assumed that national incidence estimates applied equally in each state.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
WOMEN'S SEXUAL AND REPROP	DUCTIVE HEALTH	
Information and counselling for sexual and reproductive health including contraception	One 20-minute contact per woman of reproductive age (WRA) per year	Indicator: Number of WRA (2016-2030) Source: United Nations Population Division World Population Prospects database, medium variant, 2017 revision (https://esa.un.org/unpd/wpp/Download/ Standard/Population/), accessed 1 Nov 2017 for Fiji, Kiribati, PNG, Samoa, Solomon Islands and Vanuatu. SPC estimates for Nauru, Niue, Tokelau and Tuvalu. Country's own estimate for Cook Islands, FSM Palau, RMI and Tonga.
Delivery of condoms Delivery of contraceptive pills and injectables	Three contacts per year totalling 35 minutes per WRA using condoms, estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use male or female condoms 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 nijectables	Indicator: Number of WRA (2016-2030). Source: As above. Indicator: Contraceptive prevalence rate (any method). Source: WHO WPRO CHiPS report 2011 (http://www.wpro.who.int/health_ information_evidence/documents/CHIPS/en/) except Kiribati and Tokelau, for which the median from the other 13 countries (30.5%) was used. Indicator: Unmet need for contraception (%).
Delivery of contraceptive implants	One 60-minute contact every 3 years per WRA using implants, estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use implants	Source: Pacific Regional Information System NMUI database version 2.0 (http:// www.spc.int/nmdi/maternal_health), accessed 3 Nov 2017, except Cook Islands, Niue, Palau and Tokelau, for which the regional median (24.2%) was used. Indicator: % of female contraceptive users (aged 15-49) who use each type. Source: Most recent national population survey as at November 2017:
IUD insertion	One 55-minute contact every 5 years per WRA using IUD, estimated as follows: WRA x (CPR + unmet need) x % of female contraceptive users who use IUDs	Kiribati: DHS 2009 Nauru: DHS 2007 RMI: DHS 2007
Female sterilisation	One 100-minute contact per unsterilised WRA requesting sterilisation, estimated as follows: (New members of the WRA cohort in 2016) x (CPR + unmet need) x % of female contraceptive users who use female sterilisation * for 2016 – same approach for later years	Samoa: DHS 2009 Solomon Islands: DHS 2006-7 Tuvalu: DHS 2007 The median for these 6 countries was applied to all other countries.
Prevention of communicable and non-communicable disease and sexually transmitted and reproductive tract infections including HIV and syphilis	One 10-minute contact per woman aged 15+ per year	Indicator: Number of women aged 15+ (2016-2030). Source: United Nations Population Division World Population Prospects database, SPC estimates or country's own estimates as above.
Detection of HIV	One 10-minute contact per WRA reporting risky behaviours such as intravenous drug use or higher-risk sexual intercourse, estimated as follows: WRA x (prevalence of intravenous drug use among women + % of WRA reporting higher-risk sex in last year)	 Indicator: Number of WRA (2016-2030). Source: As above. Indicator: Prevalence of intravenous drug use among women. Source: 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 (http://www.sciencedirect.com/science/article/pii/S2214109X17303753). Regional estimate of 0.15% for Pacific Island states applied to all countries. Indicator: % of WRA reporting higher-risk sex in last year. Source: Most recent DHS (as above) for Kiribati, Nauru, RMI, Solomon Islands and Tuvalu. The median for these five countries (10.8%) was applied to all other countries.
Detection of other STIs	One 10-minute contact per WRA reporting STI symptoms, estimated as follows: WRA x % of WRA reporting STI symptoms in last year	Indicator: Number of WRA (2016-2030). Source: As above. Indicator: % of WRA reporting STI symptoms in last year. Source: Most recent DHS (as above) for Kiribati, Nauru, RMI, Solomon Islands and Tuvalu. The median for these five countries (7.5%) was applied to all other countries.
Treatment of HIV	Four contacts per year totalling 240 minutes per WRA with HIV per year, estimated as follows: WRA x HIV prevalence in adult women	Indicator: Number of WRA (2016-2030). Source: As above. Indicator: HIV prevalence in adult women (%). Source: CHiPS report 2011 (as above) for RMI, Solomon Islands and Vanuatu. UNAIDS (http://aidsinfo.unaids.org/) for Fiji and PNG. The median for these five countries (0.05%) was applied to all other countries.

Intervention	Number and average duration of contacts needed	Data requirements and sources
Treatment of synhilis	One 15 minute contact per W/RA with synhilis, estimated as	Indicator Number of WRA (2016 2020)
neathert of syphins	follows:	Source: As above
	WRA x incidence of syphilis in WRA	Indicator: Incidence of syphilis in WRA.
		Source: Newman et al (2015) Global estimates of the prevalence and incidence
		of four curable sexually transmitted infections in 2012 based on systematic review and global reporting (http://journals.plos.org/plosone/article?id=10.1371/ journal.pone.0143304). Regional estimate of 0.05% for Western Pacific applied to all countries.
Treatment of gonorrhoea	One 15- minute contact per WRA with gonorrhoea, estimated	Indicator: Number of WRA (2016-2030).
	as follows:	Source: As above.
	WRA X Incidence of gonormoea in WRA	Indicator: Incidence of gonorrhoea in WRA.
		Source: Newman et al (2015) as above. Regional estimate of 3.49%% for Western Pacific applied to all countries.
Treatment of chlamydia	One 15- minute contact per WRA with chlamydia, estimated	Indicator: Number of WRA (2016-2030).
	WRA x incidence of chlamydia in WRA	Source: As above.
		Indicator: Incidence of chlamydia in WKA
		source: Newman et al as above. Regional estimate of 3.84% for Western Pacific applied to all countries.
Treatment of trichomoniasis	One 15- minute contact per WRA with trichomoniasis, estimated as follows:	Indicator: Number of WRA (2016-2030).
	WRA x incidence of trichomoniasis in WRA	Source: As above.
		Source: Newman et al as above. Regional estimate of 4 56% for Western Pacific
		applied to all countries.
Pre-conception iron and folic acid supplementation	One 10-minute contact per woman trying to conceive, estimated as follows:	Indicator: Pregnancies (2016-2030).
uola supplementation	Pregnancies x 0.6 (assuming that 60% of pregnancies are intended – see Sedob et al 2014 (https://www.ncbi.nlm.nih.	Source: SPC estimates of live births*, with a multiplier derived from the Guttmacher 'Adding it Up' report to reflect the estimated number of miscarriages, stillbirths and abortions.
	gov/pmc/articles/PMC4727534/))	* Fiji and Tonga adjusted these estimates at the regional validation workshop using national data sources.
Screening for cervical	One 10-minute contact every three years per WRA	Indicator: WRA (2016-2030).
cancer		Source: As above.
Screening for breast cancer	One 50-minute contact every year per woman aged 40-69	Indicator: Women aged 40-69 (2016-2030).
	(assuming clinical breast exam rather than mammogram)	Source: United Nations Population Division World Population Prospects database, SPC estimates or country's own estimates as above.
Safe abortion (wherever	One 27-minute contact* per legal abortion (assuming surgical	Indicator: WRA.
legal)	rather than medical procedure used), estimated as follows:	Source: As above.
	* 15 minutes for a midwife/nurse + 12 minutes for a dector	Indicator: Legal abortions per 1,000 WRA.
	(on average)	Source: Derived from CHiPS report 2011 (as above) for Cook Islands, FSM, Kiribati, Nauru, Palau, PNG, Samoa, Tonga and Vanuatu. This showed an average of 2.3 abortions per 1,000 WRA, so this rate was applied to the WRA of the remaining countries to estimate the number of legal abortions.
Post-abortion care	Contact totalling 165-minutes* per spontaneous or induced	Indicator: Births (2016-2030).
	abortion (legal or illegal), estimated as follows:	Source: SPC estimates of live births. Fiji and Tonga adjusted these estimates at
	(Births x 0.2) + (WRA/1,000 x abortions per 1,000 WRA in countries with restrictive abortion laws)	the regional validation workshop using national data sources.
	* 66 minutes for a nurse aide + 66 minutes for a midwife/	Indicator: VKA.
	nurse + 33 minutes for an obstetrician/gynacologist (on	Indicator: As upove.
	average)	Source: Guttmacher Institute 2017 (https://www.guttmacher.org/fact-sheet/
		induced-abortion-worldwide) accessed 8 Nov 2017. Uniform rate of 37 per 1,000 WRA.
Prevention of sexual and other forms of gender-based	One 10-minute contact per adult woman per year	Indicator: Women aged 15+ (2016-2030). Source: As above.
violence		
Response to sexual and other forms of gender-based	Contact totalling 35 minutes per woman experiencing sexual or GBV. estimated as follows:	Indicator: Women aged 15+ (2016-2030).
violence	Women aged 15+ * prevalence of recent IPV among WRA	Source: As above.
		Source: UNAIDS (as above) for RMI Nauru Solomon Islands Tonga and Tuvalu
		The median for these five countries (33.3%) was applied to all other countries.

(continued)

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
MEN'S SEXUAL AND REPRO	DUCTIVE HEALTH	
Male sterilisation	One 100-minute contact per unsterilised man requesting sterilisation, estimated as follows: (New members of the adult male cohort in 2016*) x % of adult men who have been sterilised * for 2016 – same approach for later years	 Indicator: Number of men aged 15+ (2016-2030). Source: United Nations Population Division World Population Prospects database, SPC estimates or country's own estimates as above. Indicator: % of adult men who have been sterilised. Source: Most recent national population survey as at November 2017: Kiribati: DHS 2009, Nauru: DHS 2007, RMI: DHS 2007, Samoa: DHS 2009, Solomon Islands: DHS 2006-7, Tuvalu: DHS 2007. The median for these 6 countries (1.2%) was applied to all other countries.
PREGNANCY (ANTENATAL (CARE)	
Early and appropriate antenatal care (four visits), including: identification of GBV; accurate determination of gestational age; screening for hypertensive disorders; counselling on family planning, birth and emergency preparedness, screening for and prevention of STIs, detection of risk factors for genetic conditions	Eight 10-minute contacts per pregnancy of >12 weeks gestation, estimated as follows: Births + (stillbirth rate/1,000 * live births)	Indicator: Births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: Healthy Newborn Network 2017 (https://www.healthynewbornnetwork. org/numbers/), accessed 4 Nov 2017 for all countries except Cook Islands, Nauru, Niue, Palau, Tokelau and Tuvalu. The regional median of 15.6 was applied to these 6 countries.
Screening for maternal illness, e.g. heart disease	One 5-minute contact per pregnancy	Indicator: Pregnancies (2016-2030). Source: As above.
Iron and folic acid supplementation	One 8-minute contact per pregnancy	Indicator: Pregnancies (2016-2030). Source: As above.
Tetanus immunisation	Contacts totalling 5 minutes per pregnancy	Indicator: Pregnancies (2016-2030). Source: As above.
Prevention of mother-to-child transmission of HIV (PMTCT)	Contacts totalling 360 minutes per pregnant woman with HIV, estimated as follows: Pregnancies x HIV prevalence in WRA	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: HIV prevalence in WRA. Source: CHiPS report 2011 (as above) for RMI, Solomon Islands and Vanuatu. UNAIDS (as above) for Fiji and PNG. The median for these five countries (0.05%) was applied to all other countries.
Prevention of malaria including insecticide- treated nets and intermittent preventive treatment	One 6-minute contact per pregnant woman living in areas of high malaria transmission, estimated as follows: Pregnancies x % of population living in areas of high malaria transmission	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: % of population living in areas of high malaria transmission. Source: World Malaria Report 2016 (http://www.who.int/malaria/publications/ world-malaria-report-2016/report/en/), Annex 4G for PNG, Solomon Islands and Vanuatu. For the remaining countries, the UK National Health Service website (http://www.fitfortravel.nhs.uk/home.aspx) indicated no malaria risk, so an estimate of zero was applied.
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	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Incidence of presumed and confirmed malaria cases (%). Source: World Malaria Report 2016 as above, Annex 4H for PNG, Solomon Islands and Vanuatu. Assumption of zero for other countries.
Smoking cessation	One 16-minute contact per pregnant woman who smokes, estimated as follows: Pregnancies x % of women aged >=15 who smoke any tobacco product	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: % of women aged >=15 who smoke any tobacco product (2015). Source: Kessaram et al 2015 (https://www.cdc.gov/pcd/issues/2015/15_0155. htm#table2_down), accessed 21 Feb 2018, for all countries except FSM, Palau, PNG and Tuvalu. For these four countries, the regional median of 21.7% was assumed.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
Management of syphilis	Contacts totalling 17 minutes per pregnant woman with syphilis, estimated as follows:	Indicator: Pregnancies (2016-2030). Source: As above.
	Pregnancies x incidence of syphilis in WRA	Indicator: Incidence of syphilis in WRA. Source: Newman et al (2015) as above.
Dietary counselling for healthy weight gain and adequate nutrition	Contacts totalling 10 minutes per pregnant woman	Indicator: Pregnancies (2016-2030). Source: As above.
Prevention of and screening for gestational diabetes	Contacts totalling 10 minutes per pregnant woman	Indicator: Pregnancies (2016-2030). Source: As above.
Treatment of gestational diabetes	Contacts totalling 70 minutes per pregnant woman with gestational diabetes, estimated as follows: Pregnancies x prevalence of gestational diabetes	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Prevalence of gestational diabetes. Source: IDF Diabetes Atlas 2015 (http://www.diabetesatlas.org/). Regional estimate for Western Pacific (10.3%) applied to all countries (total hyperglycaemia in pregnancy prevalence of 12.1%, of which 85% is assumed to be due to gestational diabetes).
Treatment of eclampsia	Contacts totalling 360 minutes* per pregnant woman with eclampsia, estimated as follows: Pregnancies x incidence of eclampsia x % of eclampsia cases occurring antenatally * 240 minutes for midwife + 120 minutes for obstetrician/ gynaecologist (on average)	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Incidence of eclampsia (% of births). Source: Dolea et al (2003) Global burden of hypertensive disorders of pregnancy in the year 2000 (http://www.who.int/healthinfo/statistics/bod_ hypertensivedisordersofpregnancy.pdf), accessed 5 Nov 2017. Estimate of 0.06% for WPRO B3 applied to all countries. Indicator: % of eclampsia cases occurring antenatally. Source: Thornton et al (2013) The incidence of preeclampsia and eclampsia and associated maternal mortality in Australia from population-linked datasets (http://www.ajog.org/article/S0002-9378(13)00237-8/abstract). Estimate of 26% applied to all countries.
Treatment of pre-eclampsia	Contacts totalling 1,500 minutes* per pregnant woman with pre-eclampsia, estimated as follows: Pregnancies x incidence of pre-eclampsia * 1,440 minutes for midwife + 60 minutes for obstetrician/ gynaecologist (on average)	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Incidence of pre-eclampsia (% of births). Source: Dolea et al (2003) Global burden of hypertensive disorders of pregnancy in the year 2000 (http://www.who.int/healthinfo/statistics/bod_ hypertensivedisordersofpregnancy.pdf), accessed 5 Nov 2017. Estimate of 2.8% for WPRO B3 applied to all countries.
Management of obstetric complications (preterm premature rupture of membranes, macrosomia, etc)	One 30-minute contact per pregnant woman with obstetric complications, estimated as follows: (Live births + stillbirths) x incidence of pPROM	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirths (2016-2030). Source: As above. Indicator: Incidence of pPROM (%). Source: WHO global survey on maternal and perinatal health 2005, Table 4.1 (http://www.who.int/reproductivehealth/topics/best_practices/GS_Tabulation. pdf?ua=1). Regional estimate of 11.7% for Asia applied to all countries.
Antenatal corticosteroids for women at risk of birth from 24-34 weeks of gestation when appropriate conditions are met	One 70-minute* contact per preterm birth, estimated as follows: (Live births + still births) x preterm birth rate (<38 weeks) * 40 minutes for midwife + 30 minutes for doctor (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Still births (2016-2030). Source: As above. Indicator: Preterm birth rate (<38 weeks). Source: Healthy Newborn Network 2017 (as above) for all countries except Cook Islands, Nauru, Niue, Palau, Tokelau and Tuvalu. Regional average of 9.6 applied to these 6 countries.
Management of malpresentation at term	One 107-minute contact per case of malpresentation at term, estimated as follows: (Live births + still births) x incidence of breech presentation	Indicator: Live births (2016-2030). Source: As above. Indicator: Still births (2016-2030). Source: As above. Indicator: Incidence of breech presentation (%). Source: Vogel et al (2015) (available at http://www.thelancet.com/pdfs/journals/ langlo/PIIS2214-109X(15)70094-X.pdf), accessed 4 Nov 2017. Global rate of 4% applied to all countries.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
CHILDBIRTH		
Facility-based childbirth with a skilled birth attendant, including: routine monitoring with partograph, detection of infections, and hygienic management of the cord at birth	One 390-minute* contact per birth, estimated as follows: Live births + (stillbirth rate/1,000 * live births) * 360 minutes for midwife + 30 minutes for obstetrician/ gynaecologist (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above.
Active management of third stage of labour	One 10-minute contact per birth, estimated as follows: Live births + (stillbirth rate/1,000 * live births)	Source: As above. Indicator: Stillbirth rate. Source: As above.
Management of prolonged or obstructed labour	Contacts totalling 480 minutes* per case of prolonged or obstructed labour, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x incidence of prolonged or obstructed labour * 360 minutes for midwife + 120 minutes for obstetrician/ gynaecologist (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Incidence of prolonged or obstructed labour (% of live births). Source: Dolea & AbouZahr 2003: Global burden of obstructed labour in the year 2000 (http://www.who.int/healthinfo/statistics/bod_obstructedlabour.pdf), accessed 9 Nov 2017. Estimate of 3% for WPRO B3 applied to all countries.
Instrumental delivery for maternal/foetal indications	One 90-minute* contact per birth requiring instrumental delivery, estimated as follows: Live births + (stillbirth rate/1,000 * live births)) x % of maternal deaths that are secondary to prolonged or obstructed labour * 60 minutes for midwife + 30 minutes for obstetrician/ gynaecologist (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: % of maternal deaths that are secondary to prolonged or obstructed labour. Source: WHO (https://stratog.rcog.org.uk/tutorial/easi-resource/importance- of-instrumental-delivery-4862), accessed 24 Feb 2018. Estimated at 8% for all countries.
Caesarean section for maternal/foetal indications	One 390-minute* contact per birth requiring caesarean section, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x recommended c-section rate * 210 minutes for nurse aide + 90 minutes for midwife + 90 minutes for obstetrician/gynaecologist (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Recommended c-section rate. Source: WHO 2015 statement on c-section rates (available at http://www.who. int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/), accessed 4 Nov 2017. Estimated at 10% for all countries.
Induction of labour with appropriate medical indications	One 60-minute* contact per birth occurring after 41 completed weeks of gestation**, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x % of pregnancies which go beyond 41 completed weeks * 40 minutes for midwife/nurse + 20 minutes for doctor (on average) ** Other common indications for induction include pre- eclampsia, gestational diabetes and pPROM, but the time estimates for these conditions are included elsewhere so are not counted again here	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: % of pregnancies which go beyond 41 completed weeks. Source: OneHealth tool version 4.61 (Aug 2017) – estimated at 5% for all countries.
Management of intrapartum haemorrhage	One 195-minute* contact per case of intrapartum haemorrhage, estimated as follows: Live births + (stillbirth rate/1,000 * live births)) x incidence of intrapartum haemorrhage * 80 minutes for midwife or nurse + 115 minutes for doctor (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Incidence of intrapartum haemorrhage (%). Source: OneHealth tool version 4.61 (Aug 2017) – estimated at 5% for all countries.
Prevention and management of eclampsia (including with magnesium sulphate)	Contacts totalling 360 minutes* per case of intrapartum eclampsia, estimated as follows: Pregnancies x incidence of eclampsia x % of eclampsia cases occurring during childbirth * 240 minutes for midwife + 120 minutes for obstetrician/ gynaecologist (on average)	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Incidence of eclampsia (% of births). Source: Dolea et al (2003) as above. Indicator: % of eclampsia cases occurring during childbirth. Source: Thornton et al (2013) as above. Estimate of 46% applied to all countries.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
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 + (stillbirth rate/1,000 * live births)) x recommended c-section rate	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Recommended c-section rate. Source: WHO 2015 as above.
POSTNATAL (MOTHER)		
Care in the facility for mother and baby for at least 24 hours after an uncomplicated vaginal birth, including (for the mother): eclampsia prevention, anaemia prevention, detection of postpartum sepsis, family planning advice, contraceptives, identification of IPV, 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	Contacts totalling 240 minutes* per birth, estimated as follows: Live births + (stillbirth rate/1,000 * live births) * 120 minutes for nurse-aide + 120 minutes for midwife (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above.
Promotion, protection and support of exclusive breastfeeding for 6 months	Contacts totalling 70 minutes* per live birth * 20 minutes for nurse aide and 50 minutes for midwife (on average)	Indicator: Live births (2016-2030). Source: As above.
Management of postpartum haemorrhage (PPH)	One 345-minute* contact per birth resulting in PPH, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x incidence of severe PPH per 100 live births * 80 minutes for nurse aide + 150 minutes for midwife/nurse + 115 minutes for doctor (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Incidence of severe PPH per 100 live births. Source: Dolea et al (2003) Global burden of maternal haemorrhage in the year 2000 (http://www.who.int/healthinfo/statistics/bod_maternalhaemorrhage.pdf), accessed 5 Nov 2017. Estimate of 8.6% for WPRO B3 applied to all countries.
Management of eclampsia	Contacts totalling 360 minutes* per case of postpartum eclampsia, estimated as follows: Pregnancies x incidence of eclampsia x % of eclampsia cases occurring postpartum * 240 minutes for midwife + 120 minutes for obstetrician/ gynaecologist (on average)	Indicator: Pregnancies (2016-2030). Source: As above. Indicator: Incidence of eclampsia (% of births). Source: As above. Indicator: % of eclampsia cases occurring postpartum. Source: Thornton et al (2013) as above. Estimate of 28% applied to all countries.
Treatment of maternal anaemia	One 30-minute* contact per case of maternal anaemia, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x prevalence of anaemia in pregnant women * 20 minutes for midwife + 10 minutes for doctor (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Prevalence of anaemia in pregnant women (%). Source: World Bank 2017 (https://data.worldbank.org/indicator/SH.PRG.ANEM), accessed 24 Feb 2018 for Fiji, Kiribati, RMI, FSM, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. For the remaining countries the regional median of 36% was applied.
Management of postpartum sepsis	Contacts totalling 240-minutes* per birth resulting in postpartum sepsis, estimated as follows: WRA x (incidence of postpartum sepsis per 1,000 WRA/10) * 70 minutes for nurse aide + 140 minutes for midwife/nurse + 30 minutes for doctor (on average)	Indicator: WRA (2016-2030). Source: As above. Indicator: Incidence of postpartum sepsis per 1,000 live births. Source: Dolea & Stein (2003) Global burden of maternal sepsis in the year 2000 (http://www.who.int/healthinfo/statistics/bod_maternalsepsis.pdf), accessed 5 Nov 2017. Estimate of 4.86 for WPRO B3 applied to all countries.

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ESTIMATING NEED FOR ESSENTIAL RMNCAH INTERVENTIONS (continued)

	Number and average duration of contacts needed	
Intervention	with a RMNCAH worker	Data requirements and sources
POSTNATAL (MOTHER)		
Routine postpartum examination	One 10-minute contact per birth, estimated as follows: Live births + (stillbirth rate/1,000 * live births)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above.
Initiation or continuation of antiretroviral therapy	Contacts totalling 240 minutes per postpartum woman with HIV, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x HIV prevalence in adult women	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: HIV prevalence in adult women (%) Source: CHiPS report 2011 (as above) for RMI, Solomon Islands and Vanuatu. UNAIDS (http://aidsinfo.unaids.org/) for Fiji and PNG. Regional median applied to remaining countries.
Response to intimate partner violence	Contacts totalling 35 minutes per new mother experiencing IPV, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x incidence of IPV in WRA	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Incidence of IPV in WRA. Source: As above.
Screening for postpartum depression	One 10-minute contact per birth, estimated as follows: Live births + (stillbirth rate/1,000 * live births)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above.
Management of postpartum depression	One 30-minute contact per birth, estimated as follows: (Live births + (stillbirth rate/1,000 * live births)) x prevalence of perinatal mental disorders after childbirth NB this is the time required for the RMNCAH worker to make a referral to specialist cadres, not the time taken to treat the condition	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above. Indicator: Prevalence of perinatal mental disorders after childbirth (%). Source: Fisher et al 2012: Prevalence and determinants of common perinatal mental disorders in women in low- and middle-income countries: A systematic review (http://www.who.int/bulletin/volumes/90/2/11-091850/en/). Universal estimate of 19.5% applied to all countries.
Postnatal contact with an appropriately skilled healthcare provider, at home or in the 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 + (stillbirth rate/1,000 * live births)	Indicator: Live births (2016-2030). Source: As above. Indicator: Stillbirth rate. Source: As above.
POSTNATAL (NEWBORN)		
Neonatal resuscitation with bag and mask	One 23-minute contact per newborn requiring resuscitation, estimated as follows: Live births x % of newborns requiring resuscitation	Indicator: Live births (2016-2030). Source: As above. Indicator: % of newborns requiring resuscitation. Source: OneHealth tool version 4.61 (Aug 2017) – estimated at 1% for all countries.
Hygienic cord and skin care	One 20-minute contact per live birth	Indicator: Live births (2016-2030). Source: As above.
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	Indicator: Live births (2016-2030). Source: As above. Indicator: Prevalence of HIV in WRA. Source: As above.
Kangaroo mother care for small babies	One 30-minute contact per newborn with low birth weight, estimated as follows: Live births x % of newborns with birth weight <2500g	Indicator: Live births (2016-2030). Source: As above. Indicator: % of newborns with birth weight <2500g. Source: Healthy Newborn Network (as above) for all countries except Cook Islands, Niue, Tokelau and Tonga. Regional median of 10% applied to these 4 countries.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
Extra support for feeding small and preterm babies with breast milk	One 90-minute contact per small or preterm newborn, estimated as follows: Live births x preterm birth rate (<38 weeks)	Indicator: Live births (2016-2030). Source: As above. Indicator: Preterm birth rate (<38 weeks). Source: As above.
Continuous positive airway pressure to manage babies with respiratory distress syndrome	One 120-minute contact per newborn with respiratory distress syndrome, estimated as follows: Live births x % of births delivered at <32 weeks' gestation* * (WHO estimates that most babies born at <32 weeks develop RDS – see http://www.who.int/pmnch/media/ news/2012/201204_borntoosoon-report.pdf)	Indicator: Live births (2016-2030). Source: As above. Indicator: % of births delivered at <32 weeks' gestation. Source: Blencowe et al (2012) National, regional, and worldwide estimates of preterm birth rates (http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(12)60820-4.pdf) – estimated that 16% of preterm births occurred at <32 weeks, so this global percentage was applied to the country preterm birth estimates (see above).
Case management of possible severe bacterial infection	Contacts totalling 570 minutes* per newborn with possible severe bacterial infection (pSBI), estimated as follows: Live births x incidence of pSBI in newborns (%) * 480 minutes midwife or nurse + 90 minutes doctor (on average)	Indicator: Live births (2016-2030). Source: As above. Indicator: Incidence of pSBI in newborns (%). Source: Seale et al (2014) Estimates of pSBI in neonates in sub-Saharan Africa, south Asia and Latin America for 2012 (http://www.thelancet.com/pdfs/journals/ laninf/PIIS1473-3099(14)70804-7.pdf). Estimate of 7.6% applied to all countries.
Management of newborns with jaundice	One 150-minute contact per newborn with severe jaundice, estimated as follows: Live births x % of newborns with jaundice requiring phototherapy	Indicator: Live births (2016-2030). Source: As above. Indicator: % of newborns with severe jaundice. Source: Teune et al (2011) A systematic review of severe morbidity in infants born late preterm (http://www.ajog.org/article/S0002-9378(11)00916-1/pdf). Estimated at 1.9% for all countries (sum of incidence in late preterm infants and full-term infants).
Management of genetic conditions	Contacts totalling 360 minutes per newborn with genetic conditions, estimated as follows: Live births x prevalence of monogenic diseases at birth	Indicator: Live births (2016-2030). Source: As above. Indicator: Prevalence of monogenic diseases at birth (%). Source: WHO 2017: Monogenic diseases (http://www.who.int/genomics/public/ geneticdiseases/en/index2.html), accessed 9 Nov 2017. Global estimate of 1% applied to all countries.
Postnatal contact with a skilled healthcare provider, at home or in the health facility, around day 3, day 7 and at 6 weeks after birth	Contacts totalling 60 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)	Indicator: Live births (2016-2030). Source: As above.
CHILD HEALTH AND DEVELO	PMENT	
Exclusive breastfeeding for 6 months; continued breastfeeding and complementary feeding from 6 months	Contacts totalling 100 minutes per live birth surviving for >1 month, estimated as follows: Live births x (100 – (neonatal mortality rate/1,000))	Indicator: Live births (2016-2030). Source: As above. Indicator: Neonatal mortality rate (2015). Source: Healthy Newborn Network as above, except for Tokelau, for which the regional median of 12.4 was applied.
Dietary counselling for prevention of undernutrition, overweight and obesity	Six 30-minute contacts per live birth surviving for >1 month, estimated as follows: Live births x (100 – (neonatal mortality rate/1,000))	Indicator: Live births (2016-2030). Source: As above. Indicator: Neonatal mortality rate (2015). Source: As above.
Routine immunisation (rotavirus, measles, DPT, Hib, pneumococcal)	Contacts totalling 24 minutes per year per child aged <5	Indicator: Children aged <5 (2016-2030). Source: United Nations Population Division World Population Prospects database, SPC estimates or country's own estimates as above.
Periodic vitamin A supplementation where appropriate	One 20-minute contact per child <5 needing vitamin A supplementation, estimated as follows: Under 5s x prevalence of vitamin A deficiency in children	Indicator: Children aged <5 (2016-2030). Source: As above. Indicator: Prevalence of vitamin A deficiency in children. Source: WHO VMNIS (http://www.who.int/vmnis/database/vitamina/countries/ en/), accessed 13 Nov 2017 for Cook Islands, Fiji, Kiribati, RMI, Solomon Islands, Tuvalu and Vanuatu. The median for these countries (0.5%) was applied to all other countries.

(continued)

ESTIMATING NEED FOR ESSENTIAL RMNCAH INTERVENTIONS (continued)

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
Iron supplementation where appropriate	Contacts totalling 20 minutes per child needing iron supplementation, estimated as follows: Under-5s x prevalence of anaemia in children aged under 5	Indicator: Children aged <5 (2016-2030). Source: As above. Indicator: Prevalence of anaemia in children aged under 5 (%). Source: World Bank 2017 (https://data.worldbank.org/indicator/SH.ANM. CHLD.ZS), accessed 9 Nov 2017 for Fiji, Kiribati, RMI, FSM, PNG, Solomon Islands, Tonga and Vanuatu. WHO (http://apps.who.int/iris/ bitstream/10665/43894/1/9789241596657_eng.pdf) accessed 9 Nov 2017 for Cook Islands, Nauru, Niue, Palau, Samoa and Tuvalu. For Tokelau the median from the other countries (38.6%) was applied.
Prevention of childhood illnesses including malaria, pneumonia, meningitis and diarrhoea	Contacts totalling 10 minutes per year per child aged <10	Indicator: Children aged <10 (2016-2030). Source: As above.
Management of malaria (mild)	One 20-minute contact per mild case of malaria, estimated as follows: Children under 10 x incidence of malaria x % of childhood malaria cases that are mild	Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of malaria. Source: World Malaria Report 2016 as above. Indicator: % of childhood malaria cases that are mild. Source: World Malaria Report 2016 (page 58) – uniform assumption of 98% applied to all countries.
Management of malaria (severe)	Contacts totalling 110 minutes* per severe case of malaria, estimated as follows: Children under 10 x incidence of malaria x % of childhood malaria cases that are severe * 80 minutes for nurse + 30 minutes for paediatrician (on average)	Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of malaria. Source: As above. Indicator: % of childhood malaria cases that are severe. Source: World Malaria Report 2016 (page 58) – uniform assumption of 2% applied to all countries.
Management of pneumonia (mild)	One 20-minute contact per mild case of pneumonia, estimated as follows: Children under 10 x incidence of pneumonia per child-year x % of childhood pneumonia cases that are mild	Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of pneumonia per child-year. Source: Walker et al (2013) Global burden of childhood pneumonia and diarrhoea (http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(13)60222-6.pdf). Western Pacific regional estimate of 0.11 applied to all countries. Indicator: % of childhood pneumonia cases that are mild. Source: Walker et al (2013) as above – regional estimate of 88.3% applied to all countries.
Management of pneumonia (severe)	Contacts totalling 260 minutes* per severe case of pneumonia, estimated as follows: Children under 10 x incidence of pneumonia per child-year x % of childhood pneumonia cases that are severe * 200 minutes for nurse + 60 minutes for paediatrician (on average)	Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of pneumonia per child year. Source: Walker et al (2013) as above. Indicator: % of childhood pneumonia cases that are severe. Source: Walker et al (2013) as above – regional estimate of 11.7% applied to all countries.
Management of diarrhoea (mild)	One 10-minute contact per mild case of diarrhoea, estimated as follows: Children under 10 x incidence of diarrhoea per child-year x % of childhood diarrhoea cases that are mild	 Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of diarrhoea per child year. Source: Walker et al (2013) as above. Western Pacific regional estimate of 2.7 applied to all countries. Indicator: % of childhood diarrhoea cases that are mild. Source: Walker et al (2013) as above – regional estimate of 97.9% applied to all countries.
Management of diarrhoea (severe)	Contacts totalling 100 minutes* per severe case of diarrhoea, estimated as follows: Children under 10 x incidence of diarrhoea per child-year x % of childhood diarrhoea cases that are severe * 70 minutes for nurse + 30 minutes for paediatrician (on average)	Indicator: Children aged <10 (2016-2030). Source: As above. Indicator: Incidence of diarrhoea per child year. Source: Walker et al (2013) as above. Indicator: % of childhood diarrhoea cases that are severe. Source: Walker et al (2013) as above – regional estimate of 2.1% applied to all countries

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources		
Case management of severe	Contacts totalling 900 minutes* per case of severe acute	Indicator: Children aged <10 (2016-2030).		
acute malnutrition and treatment for wasting	malnutrition, estimated as follows:	Source: As above.		
	Children under 10 x % of children of under 5 who are below minus 3 standard deviations from median weight-for-height of the WHO child growth standards	Indicator: % of children of under 5 who are below minus 3 standard deviations from median weight-for-height of the WHO child growth standards.		
	* 500 minutes for nurse-aide + 300 minutes for nurse + 100 minutes for paediatrician (on average)	Source: UNICEF, WHO & World Bank joint malnutrition country dataset May 2017 (https://data.unicef.org/topic/nutrition/malnutrition/), accessed 13 Nov 2017 for Fiji, Nauru, PNG, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. The median of 1.4% for these 8 countries was applied to the remaining countries.		
Management of moderate	Contacts totalling 40 minutes* per case of moderate acute	Indicator: Children aged <10 (2016-2030).		
	Children under 10 x (% of children of under 5 who are below minus 2 standard deviations from median weight-for-height of the WHO child growth standards - % who are below minus 3 standard deviations from the median) * 15 minutes for nurse-aide + 25 minutes for nurse (on average)	Source: As above. Indicator: % of children of under 5 who are below minus 2 and minus 3 standard deviations from median weight-for-height of the WHO child growth standards. Source: UNICEF, WHO & World Bank (2017) as above for Fiji, Nauru, PNG, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. The median of 3% for these 8 countries was applied to the remaining countries.		
Comprehensive care of children infected with, or	Contact totalling 135 minutes* per year per child infected with or exposed to HIV, estimated as follows:	Indicator: Children aged <10 (2016-2030).		
exposed to, HIV	Children under 10 x prevalence of HIV in children	Indicator: Prevalence of HIV in children.		
	* 100 minutes for nurse + 35 minutes for paediatrician (on average)	Source: Global burden of disease study 2016 (http://ghdx.healthdata.org/gbd-2016), accessed 21 February 2018 for FSM, Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 9 countries (0.009%) was applied to the remaining countries.		
Case management of meningitis	Contacts totalling 260 minutes* per case of meningitis in children aged <10. estimated as follows:	Indicator: Children aged <10 (2016-2030).		
	Children under 10 x (incidence of meningitis in children under	Source: As above. Indicator: Incidence of meninaitis in children under 5 per 100.000 child-vears.		
	5 per 100,000 child-years / 10,000) * 200 minutes for nurse + 60 minutes for paediatrician (on average)	Source: Lukšić et al (2013) Estimating global and regional morbidity from acute bacterial meningitis in children: assessment of the evidence (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3893986/pdf/CroatMedJ_54_0510.pdf). Regional estimate for Western Pacific of 42.9 applied to all countries.		
Prevention of child maltreatment	One 20-minute contact per child per year	Indicator: Children aged <10 (2016-2030). Source: As above.		
Response to child maltreatment	Contacts totalling 120 minutes* per child experiencing maltreatment, estimated as follows:	Indicator: Children aged <10 (2016-2030).		
	Children under 10 x incidence of interpersonal violence	Indicator: incidence of interpersonal violence towards children <10.		
	towards children <10 * 90 minutes for nurse + 30 minutes for paediatrician (on average), to provide immediate care and refer case to specialist cadre	Source: Global burden of disease study 2016 (http://ghdx.healthdata.org/gbd-2016), accessed 24 February 2018 for FSM, Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 9 countries (0.0001%) was applied to the remaining countries.		
Care for children with	Contacts totalling 600 minutes per year per child with	Indicator: Children aged <10 (2016-2030).		
developmental delays, congenital abnormalities and	developmental delays, congenital abnormalities or disabilities, estimated as follows:	Source: As above.		
disabilities	Children <10 x % of children under 15 with moderate or	Indicator: % of children under 15 with moderate or severe disability.		
	severe disability	world_report/2011/chapter2.pdf). Regional estimate of 5.3% for Western Pacific applied to all countries.		
ADOLESCENT HEALTH AND DEVELOPMENT				
Routine vaccination (DPT,	Contacts totalling 32 minutes* per adolescent, estimated on	Indicator: Adolescents aged 10-19 (2016-2030).		
hepatitis B, BCG, HPV)	an annual basis as follows: Adolescents/10	Source: United Nations Population Division World Population Prospects		
	* 6 minutes x 2 for DPT + 6 minutes x 2 for Hep B, 2 minutes for BCG + 6 minutes for HPV			
Promotion of healthy	Contacts totalling 5 minutes per adolescent per year (on the	Indicator: Adolescents aged 10-19 (2016-2030).		
penaviour (e.g. nutrition, physical activity, no tobacco, alcohol, drugs)	assumption that this intervention will be delivered in groups of 30, each lasting 2.5 hours)	Source: As above.		
Prevention and detection of	One 5-minute contact per adolescent per year	Indicator: Adolescents aged 10-19 (2016-2030).		
andenna		Source: As above.		

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Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
Management of anaemia	Three 10-minute contacts per adolescent with anaemia, estimated as follows: Adolescents * prevalence of anaemia in school-age children	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above. Indicator: prevalence of anaemia in school-age children (%). Source: WHO (2008): Worldwide prevalence of anaemia 1993-2005 (http://apps. who.int/iris/bitstream/10665/43894/1/9789241596657_eng.pdf). Global estimate of 25.4% applied to all countries.
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)	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above.
Services for comprehensive sexual and reproductive health including contraception	Contacts totalling 10 minutes per adolescent per year, estimated as follows: (10-14 year-old females* + 10-19 year-old males) * 15-19 year-old females are included under WRA above	Indicator: 10-14 year-old females + 10-19 year-old males (2016-2030). Source: United Nations Population Division World Population Prospects database, SPC estimates or country's own estimates as above.
Psychosocial support and related services for adolescent mental health and wellbeing	Contacts totalling 30 minutes per adolescent with mild depression or anxiety, estimated as follows: Adolescents x Prevalence of anxiety disorders among adolescents	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above. Indicator: Prevalence of anxiety disorders among adolescents. Source: Global burden of disease study 2016 (http://ghdx.healthdata.org/gbd- 2016), accessed 13 Nov 2017 for RMI, Solomon Islands, Somoa, Vanuatu, PNG, FSM, Tonga and Fiji. For the other countries, the regional average of 3.84% was applied.
Prevention of sexual and other forms of GBV	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)	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above.
Response to sexual and other forms of GBV	Contacts totalling 35 minutes* per adolescent experiencing sexual or other form of GBV, estimated as follows: (10-14 year-old females** + 10-19 year-old males) x incidence of sexual violence in adolescents * 20 minutes for nurse aide + 15 minutes for nurse (on average) ** 15-19 year-old females are included under WRA above	Indicator: 10-14 year-old females + 10-19 year-old males (2016-2030). Source: As above. Indicator: Incidence of sexual violence in adolescents. Source: Global burden of disease study 2016 (http://ghdx.healthdata.org/gbd- 2016), accessed 24 February 2018 for FSM, Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 9 countries (0.03% for females aged 10-14 and 0.02% for males aged 10-19) was applied to the remaining countries.
Prevention and detection of communicable and non- communicable diseases and STIs, including HIV	One 5-minute contact per adolescent per year	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above.
Treatment of HIV	Four 60-minute contacts per year per adolescent with HIV, estimated as follows: (10-14 year-old females* + 10-19 year-old males) x HIV prevalence in adolescents * 15-19 year-old females are included under WRA above	 Indicator: 10-14 year-old females + 10-19 year-old males (2016-2030). Source: As above. Indicator: HIV prevalence in adolescents. Source: Global burden of disease study 2016 (as above), accessed 21 February 2018 for FSM, Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 9 countries (0.02%) was applied to the remaining countries.
Treatment of syphilis	One 15-minute contact per adolescent male with syphilis, estimated as follows: Males aged 15-19 x incidence of syphilis in adolescent males	Indicator: 15-19 year-old males (2016-2030). Source: As above. Indicator: Incidence of syphilis in males aged 15-19. Source: Global burden of disease study 2016 (as above) for FSM, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 8 countries (0.55%) was applied to the remaining countries.
Treatment of gonorrhoea	One 15-minute contact per adolescent male with gonorrhoea, estimated as follows: Males aged 15-19 x incidence of gonococcal infection in adolescent males	Indicator: 15-19 year-old males (2016-2030). Source: As above. Indicator: Incidence of gonococcal infection in males aged 15-19. Source: Global burden of disease study 2016 (as above) for FSM, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 8 countries (0.05%) was applied to the remaining countries.
Treatment of chlamydia	One 15-minute contact per adolescent male with chlamydia, estimated as follows: Males aged 15-19 x incidence of chlamydial infection in adolescent males	 Indicator: 15-19 year-old males (2016-2030). Source: As above. Indicator: Incidence of chlamydial infection in males aged 15-19. Source: Global burden of disease study 2016 (as above) for FSM, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 8 countries (0.27%) was applied to the remaining countries.

Intervention	Number and average duration of contacts needed with a RMNCAH worker	Data requirements and sources
Treatment of trichomoniasis	One 15-minute contact per adolescent male with trichomoniasis, estimated as follows: Males aged 15-19 x incidence of trichomoniasis in adolescent males	Indicator: 15-19 year-old males (2016-2030). Source: As above. Indicator: Incidence of trichomoniasis in males aged 15-19. Source: Global burden of disease study 2016 (as above) for FSM, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 8 countries (1.16%) was applied to the remaining countries.
Detection of hazardous and harmful substance use	One 5-minute contact per adolescent per year	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above.
Management of hazardous and harmful substance use	Contacts totalling 60 minutes* per adolescent using hazardous or harmful substance, estimated as follows: Adolescents x % of 15-19 year-olds who are heavy episodic drinkers * To cover brief interventions and referral to specialist cadres	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above. Indicator: % of 15-19 year-olds who are heavy episodic drinkers. Source: WHO Global Health Observatory (http://apps.who.int/gho/data/node. main.A1210?lang=en) accessed 13 Nov 2017, for all countries except RMI and Tokelau. Regional median of 10.5% applied to RMI and Tokelau.
Prevention of suicide	Contacts totalling 50 minutes* per adolescent at risk of suicide (to cover brief interventions and referral to specialist mental health cadres), estimated as follows: Adolescents x % of adolescents with major depressive disorder * 30 minutes for nurse + 20 minutes for paediatrician (on average)	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above. Indicator: % of adolescents with major depressive disorder. Source: Global burden of disease study 2016 (as above) for FSM, Fiji, Kiribati, PNG, Samoa, Solomon Islands, Tonga and Vanuatu. The median of these 10 countries (1.4%) was applied to the remaining countries.
Management of self-harm/ suicide risks	Contacts totalling 50 minutes* per adolescent performing self-harm (to cover brief interventions and referral to specialist mental health cadres), estimated as follows: Adolescents x prevalence of deliberate self-harm among adolescents * 30 minutes for nurse + 20 minutes for paediatrician (on average)	Indicator: Adolescents aged 10-19 (2016-2030). Source: As above. Indicator: Prevalence of deliberate self-harm among adolescents (%). Source: Muehlenkamp et al (2012) International prevalence of adolescent non- suicidal self-injury and deliberate self-harm (https://www.ncbi.nlm.nih.gov/pmc/ articles/PMC3348041/). Global estimate of 16% applied to all countries.

- CHiPS = country health information profiles
- CPR = contraceptive prevalence rate
- DPT = diphtheria, pertussis and tetanus
- FGM = female genital mutilation
- FSM = Federated States of Micronesia
- GBV = gender-based violence
- HIV = human immunodeficiency virus
- HPV = human papilloma virus
- IPV = intimate partner violence
- IUD = intrauterine device
- PMTCT = prevention of mother-to-child transmission of HIV
- PNG = Papua New Guinea
- PPH = postpartum haemorrhage
- pPROM = preterm premature rupture of membranes
- RMI = Republic of the Marshall Islands
- RTI = reproductive tract infection
- SPC = the Pacific Community
- $\label{eq:STI} {\sf STI} = {\sf sexually transmitted infection}$
- $WHO = World \ Health \ Organization$
- WPR0 = Western Pacific Regional Office
- WRA = women of reproductive age (15-49 years)

* Contact durations were taken from the OneHealth tool version 5.61 (November 2017), available from http://www.avenirhealth.org/software-onehealth) where available, otherwise expert opinion was used. Note that, for interventions that can be delivered at the community level, the time estimate in OneHealth is higher if the intervention is delivered via an outreach model of care. In such cases, the lower time estimate was used in cases where the duration depends on model of care. For countries which make use of outreach services for RMNCAH, therefore, the assumed time requirement will be an underestimate.

ANNEX 5. ORGANISATION OF CARE

Most Pacific island states have only primary health facilities in their remote areas/outer islands, which means that the need for interventions that can only be delivered at higher levels of care can be met only with extensive travel. Our estimates of potential met need take this into account: where possible we have made sub-national estimates of potential met need for RMNCAH services. To do this, we estimated how much of the need for essential RMNCAH interventions can be met at primary community/level, and how much can only be met at higher levels of the health system.

The table below sets out estimates of the proportion of health worker time needed for each intervention that could be provided (a) at community/primary care level and (b) at higher levels of care.

To draw up this table, we first consulted the OneHealth tool, which contains estimates of the proportion of time needed for each intervention that could be provided at primary/ community levels and at higher levels of care. Note that this appears to be an estimate of 'what is', i.e. if OneHealth says 50/50, it means that its model assumes that half of the need for that intervention will be met at primary level and half at higher levels. The OneHealth estimates are shown in the second and third columns of the table. Dashes (-) indicate interventions that are not included in OneHealth. We then reviewed these estimates in consultation with TAC members, who proposed some adjustments to the OneHealth estimates based on their experience of working in the region. The adjusted estimates are shown in the fourth and fifth columns of the table. If the cells in these columns are orange, it means the TAC disagreed with the OneHealth estimates, and a justification for the change is highlighted in square parentheses in the first column and/or a footnote.

Currently, our model is based on a philosophy of 'what could be' if all health workers were appropriately educated and working in an enabling environment, so the proportions aim to reflect that, rather than reflecting what is actually happening (which anyway will vary by country). Most of the proposed deviations from OneHealth are for this reason. However, in some cases, the TAC felt that we should reflect 'what is' to some extent, e.g. if drugs to treat a certain condition are available only in hospitals, then that intervention cannot be provided at primary level even if primary level health workers are theoretically competent to do it. This mainly relates to HIV treatment. HIV is not very prevalent in most of the Pacific states, so this will make very little difference to our estimates.

Intervention	OneHealth estimate		PSRO estimate	
Intervention	% community/primary	% secondary/tertiary	% community/primary	% secondary/tertiary
WOMEN'S SEXUAL AND REPRODUCTIVE HEALTH				
Information and counselling for sexual and reproductive health including contraception	_	_	100	0
Delivery of condoms	100	0	100	0
Delivery of contraceptive pills and injectables	100	0	100	0
Delivery of contraceptive implants [nurses don't, midwives do – most remote areas are staffed by nurses rather than midwives]	50	50	25	75
IUD insertion [ditto]	50	50	20	80
Female sterilisation	0	100	0	100
Prevention of communicable and non-communicable disease and sexually transmitted and reproductive tract infections including HIV and syphilis	-	_	90	10
Detection of HIV	-	_	50	50
Detection of other STIs	-	_	100	0
Treatment of HIV ¹² [although primary care workers should be able to provide some of this, protocols do not allow for ART drugs to be provided at primary level]	50	50	0	100
Treatment of syphilis [most cases can be treated with antibiotics which should be available at primary level]	50	50	75	25
Treatment of gonorrhoea [ditto]	50	50	75	25

12. Piercy et al 2016 (http://journals.sagepub.com/doi/full/10.1177/0956462416672128) say that nurses can provide care for stable HIV patients. WHO 2016 defines stable as "those who were receiving ART for at least 1 year with no adverse drug reactions, no current illness or pregnancy... and evidence of treatment success (rising CD4 counts)" (http://www.who.int/hiv/pub/journal_articles/stable-and-advanced-disease-consensus-definitions/en/). UNAIDS (http://aidsinfo.unaids.org/) has data on '12-month retention on ART'. The available data for the region are: Tonga 50%, , Vanuatu 57%, Fiji 59%, Solomon Islands 83%, PNG 87%, Kiribati 88%, RMI 88%, Palau >95%, median 87%. So ideally we would estimate c.80% at primary level to reflect that the initial stages of getting people stable will need to be done at a higher level, but they cannot generally access the drugs at primary level.

ORGANISATION OF CARE (continued)

Internetion	OneHealth estimate		PSRO estimate	
Intervention	% community/primary	% secondary/tertiary	% community/primary	% secondary/tertiary
Treatment of chlamydia [ditto]	50	50	75	25
Treatment of trichomoniasis [ditto]	50	50	75	25
Pre-conception iron and folic acid supplementation	90	10	90	10
Screening for cervical cancer [many primary care workers not trained, and no lab for analysis]	50	50	25	75
Screening for breast cancer (clinical exam not mammogram) [most clinical breast exams in the region are performed by doctors]	100	0	50	50
Safe abortion (wherever legal) [requires surgery]	50	50	0	100
Post-abortion care (including care after miscarriage and ectopic pregnancy)	50	50	50	50
Prevention of sexual and other forms of gender-based violence	_	_	100	0
Response to sexual and other forms of gender-based violence [most violence response services in the region are offered at hospital level]	70	30	50	50
MEN'S SEXUAL AND REPRODUCTIVE HEALTH				
Male sterilisation [in some countries in the region, nurses have been trained to provide non-scalpel vasectomy]	0	100	10	90
PREGNANCY (ANTENATAL CARE)				
Early and appropriate antenatal care [provided at hospital if this is the nearest facility]	100	0	90	10
Screening for maternal illness, e.g. heart disease	_	_	50	50
Iron and folic acid supplementation	75	25	75	25
Tetanus immunisation [provided at hospital if this is the nearest facility]	100	0	90	10
Prevention of mother-to-child transmission of HIV (PMTCT)	50	50	50	50
Prevention of malaria including insecticide-treated nets and intermittent preventive treatment [provided at hospital if this is the nearest facility]	100	0	90	10
Treatment of malaria in pregnancy	50	50	50	50
Smoking cessation [provided at hospital if this is the nearest facility]	100	0	90	10
Management of syphilis [provided at hospital if this is the nearest facility]	100	0	90	10
Dietary counselling for healthy weight gain and adequate nutrition	_	_	90	10
Prevention of and screening for gestational diabetes [unlikely to have all equipment needed to do this at primary level]	100	0	75	25
Treatment of gestational diabetes ¹³	_	_	50	50
Treatment of eclampsia [primary care workers will provide initial care then refer]	50	50	25	75
Treatment of pre-eclampsia [ditto]	50	50	25	75
Management of obstetric complications (preterm premature rupture of membranes, macrosomia, etc) [ditto]	50	50	25	75

13. It is estimated that 75% of GDM cases can be controlled with lifestyle modifications alone (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4509429/)

ORGANISATION OF CARE (continued)

	OneHealth estimate		PSRO estimate	
Intervention	% community/primary	% secondary/tertiary	% community/primary	% secondary/tertiary
PREGNANCY (ANTENATAL CARE)				
Antenatal corticosteroids for women at risk of birth from 24-34 weeks of gestation when appropriate conditions are met	0	100	0	100
Management of malpresentation at term	-	_	0	100
CHILDBIRTH				
Facility-based childbirth with a skilled birth attendant	25	75	25	75
Active management of third stage of labour [should be same as childbirth care]	50	50	25	75
Management of prolonged or obstructed labour	0	100	0	100
Instrumental delivery for maternal/foetal indications	_	_	10	90
Caesarean section for maternal/foetal indications	_	_	0	100
Induction of labour with appropriate medical indications	0	100	0	100
Management of intrapartum haemorrhage	25	75	25	75
Prevention and management of eclampsia (including with magnesium sulphate) [primary care workers will provide initial care then refer]	50	50	20	80
Management of women with or at risk of infections (including prophylactic use of antibiotics for caesarean section)	-	_	10	90
POSTNATAL (MOTHER)				
Care in the facility for mother and baby for at least 24 hours after an uncomplicated vaginal birth [assumed same as for facility-based childbirth]	_	_	25	75
Promotion, protection and support of exclusive breastfeeding for 6 months [baby-friendly hospital initiative means much of this will happen in hospital]	100	0	50	50
Management of postpartum haemorrhage (PPH)	25	75	25	75
Management of eclampsia [assumed same as for eclampsia in pregnancy]	-	_	25	75
Treatment of maternal anaemia ¹⁴	_	_	80	20
Management of postpartum sepsis	50	50	50	50
Routine postpartum examination [assumed same as for facility-based childbirth]	-	_	25	75
Initiation or continuation of antiretroviral therapy	-	_	0	100
Response to intimate partner violence [assumed same as for all women – see above]	30	70	50	50
Screening for postpartum depression	-	_	50	50
Management of postpartum depression [c.50% of cases may require medication not routinely prescribed at primary level]	75	25	50	50
Postnatal contact with an appropriately skilled healthcare provider, at home or in the health facility, around day 3, day 7 and at 6 weeks after birth	_	_	90	10

(continued)

14. Stevens et al 2013 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4547326/) estimated that in Oceania 3% of cases of anaemia in pregnant women were severe. But in postpartum women this % will be higher due to bleeding.
| Intervention | OneHealth estimate | | PSR0 estimate | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|---------------------|----------------------|
| | % community/primary | % secondary/tertiary | % community/primary | % secondary/tertiary |
| POSTNATAL (NEWBORN) | | | | |
| Neonatal resuscitation with bag and mask [should be same as childbirth care] | 50 | 50 | 25 | 75 |
| Hygienic cord and skin care [should be same as childbirth care] | 100 | 0 | 25 | 75 |
| Initiation of prophylactic antiretroviral therapy for babies exposed to $HIV^{\mbox{\tiny 15}}$ | - | - | 25 | 75 |
| Kangaroo mother care for small babies [should be same as childbirth care] | 50 | 50 | 25 | 75 |
| Extra support for feeding small and preterm babies with breast milk [should be same as childbirth care] | 50 | 50 | 25 | 75 |
| Continuous positive airway pressure to manage babies
with respiratory distress syndrome examination [requires
equipment not available at primary level, but care
would start at primary level if that's where the delivery
occurred] | - | - | 10 | 90 |
| Case management of possible severe bacterial infection
[care would start at primary level if baby born there, then
be referred] | 50 | 50 | 20 | 80 |
| Management of newborns with severe jaundice | _ | _ | 0 | 100 |
| Management of genetic conditions [the model will
allocate time only for those diagnosed with monogenic
diseases – so we assume these all require specialist
care] | _ | _ | 0 | 100 |
| Postnatal contact with a skilled healthcare provider,
at home or in the health facility, around day 3, day 7
and at 6 weeks after birth | _ | _ | 90 | 10 |
| CHILD HEALTH AND DEVELOPMENT | | | | |
| Exclusive breastfeeding for 6 months; continued
breastfeeding and complementary feeding from 6 months
[BFI means some of this will take place in hospital] | 100 | 0 | 90 | 10 |
| Dietary counselling for prevention of undernutrition,
overweight and obesity [may take place in hospital if
that is the nearest facility] | 100 | 0 | 90 | 10 |
| Routine immunisation [may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Periodic vitamin A supplementation where appropriate
[may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Iron supplementation where appropriate [may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Prevention of childhood illnesses [may take place in hospital if that is the nearest facility] | - | - | 90 | 10 |
| Management of malaria (mild) [may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Management of malaria (severe) | 0 | 100 | 0 | 100 |
| Management of pneumonia (mild) [may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Management of pneumonia (severe) | 0 | 100 | 0 | 100 |
| Management of diarrhoea (mild) [may take place in hospital if that is the nearest facility] | 100 | 0 | 90 | 10 |
| Management of diarrhoea (severe) | 0 | 100 | 0 | 100 |

15. Recommended treatment seems to involve specialist drugs (https://aidsinfo.nih.gov/guidelines/html/3/perinatal/187/antiretroviral-management-of-newborns-with-perinatal-hiv-exposure-or-perinatal-hiv) which implies a specialist doctor should prescribe.

Intervention	OneHealth estimate		PSRO estimate	
	% community/primary	% secondary/tertiary	% community/primary	% secondary/tertiary
Case management of severe acute malnutrition and treatment for wasting	0	100	0	100
Management of moderate acute malnutrition [may take place in hospital if that is the nearest facility]	100	0	90	10
Comprehensive care of children infected with, or exposed to, HIV [as with adults]	50	50	0	100
Case management of meningitis ¹⁶	_	_	0	100
Prevention of child maltreatment	_	_	90	10
Response to child maltreatment [assumed 25% in hospital because model assumes 25% of health worker time should be from a paediatrician]	_	_	75	25
Care for children with developmental delays, congenital abnormalities and disabilities	50	50	50	50
ADOLESCENT HEALTH AND DEVELOPMENT				
Routine vaccination (DPT, hepatitis B, BCG, HPV) [may take place in hospital if that is the nearest facility]	100	0	90	10
Promotion of healthy behaviour (e.g. nutrition, physical activity, no tobacco, alcohol, drugs) [may take place in hospital if that is the nearest facility]	100	0	90	10
Prevention and detection of anaemia	_	_	50	50
Management of anaemia	_	-	50	50
Comprehensive sexuality education, information and counselling for sexual and reproductive health, including contraception	100	0	100	0
Services for comprehensive sexual and reproductive health including contraception [may take place in hospital if that is the nearest facility]	100	0	90	10
Psychosocial support and related services for adolescent mental health and wellbeing	75	25	75	25
Prevention of sexual and other forms of GBV	_	-	100	0
Response to sexual and other forms of GBV [as for WRA] $% \left[\left({{{\rm{A}}{\rm{B}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}}{\rm{A}$	70	30	50	50
Prevention and detection of communicable and non-communicable diseases and STIs, including HIV	_	_	90	10
Treatment of HIV [as for WRA]	50	50	0	100
Treatment of syphilis [as for WRA]	50	50	75	25
Treatment of gonorrhoea [as for WRA]	50	50	75	25
Treatment of chlamydia [as for WRA]	50	50	75	25
Treatment of trichomoniasis [as for WRA]	50	50	75	25
Detection of hazardous and harmful substance use	50	50	90	10
Management of hazardous and harmful substance use	50	50	50	50
Prevention of suicide [depression treatment should involve higher levels]	50	50	90	10
Management of self-harm/suicide risks	50	50	50	50

16. According to WHO (http://www.who.int/mediacentre/factsheets/fs141/en/), hospital admission is always necessary for meningitis.

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UNFPA Pacific Sub-Regional Office

Level 6 Kadavu House 414 Victoria Parade Suva - City Center Fiji Telephone number: +679 330 8022 Email: pacificSRO@unfpa.org http://pacific.unfpa.org