



Human Resources for Health Country Profiles

PAPUA NEW GUINEA



Human Resources for Health
Country Profiles

Papua New Guinea

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Contents

| | |
|---|-------------|
| List of tables | v |
| Acknowledgements | vi |
| Abbreviations | vii |
| Executive summary | viii |
| 1. Introduction | 1 |
| 1.1 Demographic, social and political background | 1 |
| 1.2 Current economic situation | 2 |
| 1.3 Summary of health indicators | 2 |
| 1.3.1 Mortality and life expectancy | 2 |
| 1.3.2 Main causes of mortality and morbidity | 2 |
| 1.4 Health system | 3 |
| 1.4.1 Governance structure | 3 |
| 1.4.2 Health services organization | 3 |
| 1.4.3 Sources of funding | 4 |
| 1.4.4 Health expenditure | 4 |
| 2. Health workforce supply | 5 |
| 2.1 Health workforce supply | 5 |
| 2.2 Health workforce distribution | 6 |
| 2.2.1 Distribution of health workers by gender | 6 |
| 2.2.2 Distribution of health workers by age | 6 |
| 2.2.3 Distribution of health workers by provinces | 7 |
| 2.2.4 Distribution of health workers by urban/rural areas | 7 |
| 2.2.5 Distribution of health workers by sector | 8 |
| 2.2.6 Migrant health workforce | 8 |
| 2.2.7 Skills distribution | 9 |
| 3. Health professions education | 10 |
| 3.1 Health professions education governance | 11 |
| 3.1.1 Medical education | 13 |
| 3.1.2 Nursing education | 13 |
| 3.1.3 Community health workers | 16 |
| 3.1.4 Health extension officer education | 17 |
| 3.1.5 Dental education | 18 |
| 3.1.6 Pharmacy education | 18 |
| 3.1.7 Allied and other health professions education | 18 |
| 3.2 Capacities of health professions education institutions | 20 |
| 3.2.1 Physical infrastructure | 20 |
| 3.2.2 Technical infrastructure | 20 |
| 3.3 Admission and selection of students | 20 |
| 3.4 Regulation and accreditation of health professions education institutions | 20 |
| 3.4.1 Medical education | 21 |
| 3.4.2 Nursing education | 21 |
| 3.5 In-service and continuing professional education | 21 |

| | |
|---|-----------|
| 4. Human resources for health utilization | 22 |
| 4.1 Recruitment | 22 |
| 4.2 Deployment and distribution policies and mechanisms | 22 |
| 4.2.1 Staff turnover, attrition, absenteeism and motivation | 22 |
| 4.2.2 Management structure | 22 |
| 4.2.3 Supervision mechanisms | 23 |
| 4.2.4 Physical environment and access to essential equipment and supplies/resources | 23 |
| 4.3 Unemployment | 24 |
| 4.4 Employment of health workers in the private sector | 24 |
| 4.5 Health workforce performance | 24 |

| | |
|--|-----------|
| 5. Financing human resources for health | 25 |
| 5.1 HRH expenditure | 25 |
| 5.2 Remuneration to health workers | 25 |
| 5.3 Financing health professions education | 27 |

| | |
|---|-----------|
| 6. Governance for human resources for health | 28 |
| 6.1 HRH policies and plans | 28 |
| 6.2 Policy development, planning and managing for HRH | 28 |
| 6.3 Professional regulation | 28 |
| 6.3.1 Medical Board | 28 |
| 6.3.2 Nursing personnel | 29 |
| 6.3.3 Pharmacy Board | 30 |
| 6.4 HRH information | 30 |
| 6.5 Health workforce requirements | 31 |

| | |
|----------------------|-----------|
| 7. Conclusion | 32 |
|----------------------|-----------|

| | |
|-------------------|-----------|
| References | 33 |
|-------------------|-----------|

| | |
|-----------------|-----------|
| Appendix | 35 |
|-----------------|-----------|

List of tables

| | | |
|-----------|---|----|
| Table 1. | Select demographic characteristics | 1 |
| Table 2. | Select economic and socioeconomic characteristics, 2019..... | 2 |
| Table 3. | Select main health indicators | 2 |
| Table 4. | Select health indicators, 2019 | 4 |
| Table 5. | Health workforce trends by cadre, 1988–2018 | 5 |
| Table 6. | Health workers by cadre and gender, 2018..... | 6 |
| Table 7. | Health workers by cadre and age (years), 2018 | 6 |
| Table 8. | Health workers per population by cadre and province, 2018 | 7 |
| Table 9. | Health workers by cadre and urban/rural distribution, 2018 | 8 |
| Table 10. | Health workers by sector, 2018 | 8 |
| Table 11. | Suggested pre-service enrolment and graduate targets to meet Scenario 5 in 2030 | 10 |
| Table 12. | Training institutions and cadres trained in 2015 | 12 |
| Table 13. | Medical graduates from UPNG, 2009–2018 | 14 |
| Table 14. | Medical specialties training at UPNG | 14 |
| Table 15. | Pre-service nursing enrolments and graduates, 2009–2018 | 15 |
| Table 16. | Post-basic nursing enrolments and graduates at UPNG, 2009–2016..... | 16 |
| Table 17. | Midwifery enrolments and graduates, 2012–2018 | 17 |
| Table 18. | CHW enrolments and graduates, 2010–2018 | 17 |
| Table 19. | Various programme enrolment and graduation at DWU, 2011–2018 | 18 |
| Table 20. | Number of graduates by allied health cadre, 2011–2016..... | 20 |
| Table 21. | Average annual income levels of public servants by cadre in 2013 (kina) | 27 |
| Table 22. | Tuition fees at UPNG, 2019 | 28 |
| Table 23. | Projections of health workforce requirements, based on Scenario 5 of the World Bank review..... | 32 |

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Abbreviations

| | |
|--------|--|
| CHS | Christian Health Services |
| CHW | community health worker |
| CPE | continuing professional education |
| DHERST | Department of Higher Education, Research, Science and Technology |
| DWU | Divine Word University |
| GDP | gross domestic product |
| GPA | grade point average |
| HCPRS | Health Care Practitioners Registration System |
| HCS | head count survey |
| HEO | health extension officer |
| HR | human resources |
| HRH | human resources for health |
| HW | health worker |
| HWEP | Health Workforce Enhancement Plan 2013–2016 |
| ICT | information and communications technology |
| MBBS | Bachelor of Medicine, Bachelor of Surgery |
| NCD | noncommunicable disease |
| NGO | nongovernmental organization |
| NDoH | National Department of Health |
| NHP | National Health Plan 2011–2020 |
| OECD | Organisation for Economic Co-operation and Development |
| PAU | Pacific Adventist University |
| PHA | provincial health authority |
| PMGH | Port Moresby General Hospital |
| RHFMT | Rural Health Facility Management Training |
| UoG | University of Goroka |
| UPNG | University of Papua New Guinea |
| UTS | University of Technology, Sydney |
| WHO | World Health Organization |
| WHO CC | World Health Organization Collaborating Centre |

Executive summary

This report was developed to review the *Health Workforce Enhancement Plan 2013–2016* (HWEP), which had been extended until 2019, and to function as a human resources for health (HRH) situational analysis in preparation for the development of a national HRH strategic plan. The HWEP was developed as a response to *Papua New Guinea Health Workforce Crisis: A Call to Action*, a 2011 World Bank report that recommended the country adopt a strategy to increase pre-service and in-service training, staff for support services, and quality-enhancing non-salary budget expenditures, known in the report as Scenario 5. A recommended training schedule up to 2030 has also been developed to guide the implementation of such a strategy.

Main HRH issues

Unavailability of reliable and comprehensive HRH data is the most significant problem. The most recent data available are from 2018, which reported there were 15 237 health workers in Papua New Guinea. For the first time, the country's 2018 human resources database constitutes information from public service, faith-based organizations and private health-care providers. Since the health workforce is the most important aspect of any health-care system, and good planning and management of the health workforce require accurate data, the development of a well-organized human resources information system is critical. Historically, data collection was not nationalized due to a decentralized health system, and data were collected on an ad hoc basis, which makes workforce planning and management challenging. There is reluctance by the provinces and districts to supply accurate and timely data to the central Government for various reasons: lack of understanding of the importance of such data; fear of exploitation of the data; privacy concerns; and lack of adequate communication infrastructure to send the data. Several institutions and departments hold HRH data that could be utilized in the absence of a reliable central database, including registry bodies, training schools, payroll, the Department of Higher Education, Research, Science and Technology, and Christian Health Services. However, there is no systemized coordination among these institutions. There is also a reluctance to share data, even within the central Government branches, for the same reasons the provinces and districts are hesitant to share data. This has led to duplication of work and reduced efficiency.

Production of health workers

The production of health workers in the immediate future is not enough to cover the attrition rate due to ageing. However, current progress in increasing the production of health workers is promising. The National Department of Health has a vision to eventually open at least one self-sustaining nursing school in each province. So far, this objective appears to be heading in the right direction, with several closed training schools reopened and new schools built. Additionally, schools and curricula are slowly being audited and reviewed to improve standards. However, funding is needed in order to maintain this progress and scale up training in future. Schools have taken the initiative and sought their own funding to improve the quality and capacity of training, which is encouraging.

Deployment and management of health workers

Much of the good work accomplished so far is in the area of health worker production, which remains the main priority at the moment. As one public servant said, "We just need to get more bodies out there." While there does need to be an increase in the number of health workers trained, more thought needs to be given to what happens after the training. The main areas for improvement are in the deployment and management of staff. It is very difficult to determine the rate of attrition, absenteeism and productivity levels in the absence of adequate data. However, it is understood that attrition from the health workforce, particularly from ageing, is a significant problem. In addition, levels of absenteeism and tardiness are high, and morale is low. Part of the reason is due to the lack of adequate skills and insufficient training of local managers in the importance of adhering to National Health Service Standards and performing annual reviews. The incredibly diverse range of cultures in Papua New Guinea also hampers the management of staff. A key recommendation of Scenario 5 is

to increase in-service training, which requires more effort. There is currently no in-service training or a career pathway plan in place, which is contributing to attrition and low morale.

Conclusion

The progress in increasing the production of health workers should continue, but greater efforts are needed in deployment and management once the health workers are produced. The development of an up-to-date and sustainable human resources information system is central and paramount to the improvement and productivity of the health workforce and will help guide future planning. Addressing the current “silo” culture of departments and entities will lead to some improvement in the efficiency of data collection. Some of the objectives of the *HWEP* have already been met, which will help support the development of a national HRH strategic plan.

1. Introduction

1.1 Demographic, social and political background

Papua New Guinea is the largest developing country in the South Pacific, with approximately 8.6 million people (2018, Table 1), 87% of which live in rural areas (The World Bank, 2019). The three urban centres are Port Moresby (the capital), Lae and Mount Hagen.

The country is divided into four regions that include 20 provinces, one autonomous region and the national capital:

- Highlands Region (39% of total population): Eastern Highlands, Enga, Hela, Jiwaka, Simbu, Southern Highlands and Western Highlands.
- Momase Region (26%): East Sepik, Madang, Morobe and West Sepik.
- Southern Region (20%): Central, Gulf, Milne Bay, National Capital District, Northern Province and Western Province.
- Islands Region (15%): Autonomous Region of Bougainville, East New Britain, Manus, New Ireland and West New Britain.

Papua New Guinea has one of the most diverse cultural and linguistic populations in the world, with hundreds of ethnic groups and over 800 languages, although most have fewer than 1000 speakers. English is an official language, but the lingua franca is Tok Pisin (New Guinea Pidgin), except in the Southern Region where Hiri Motu is spoken and recognized as the third official language. A complicated cultural and hierarchical system known as *wontok* (one talk) is built on the premise that loyalties to kin are above loyalties to others. This strong loyalty to one clan has resulted in conflicts between tribes.

The population is young due to high fertility rates (Table 1). Approximately 36% are under 15 years of age (The World Bank, 2019). There is minimal external migration, although internal migration to urban centres is increasing, which has resulted in a growing class of squatter and informal settlements where living conditions are poor.

Papua New Guinea is one of the most underdeveloped countries in the world, ranked 153 of 189 countries in the 2017 Human Development Index (UNDP, 2018). Nearly half of the country is mountainous, making

accessibility to health and other services difficult, slow and expensive. For many provinces, supplies are delivered by air or sea as paved roads are rare, including any to the capital, which is isolated from the rest of the country by road.

Table 1. Select demographic characteristics

| Indicator | | Year |
|--|-----------|------|
| Total population | 8 606 316 | 2018 |
| Urban population (%) | 13.12 | 2018 |
| Population density (per square kilometre) | 19 | 2018 |
| Population growth (annual %) | 3.1 | 2011 |
| Net migration rate (per 1000 population) | 0.0 | 2012 |
| Sex ratio (M:F) | 51:49 | 2018 |
| Age distribution (% of total): | | |
| 0–14 years | 35.829 | 2018 |
| 15–64 years | 60.74 | 2018 |
| 65+ years | 3.45 | 2018 |
| Total fertility rate per woman | 3.56 | 2018 |
| Crude birth rate per 1000 people | 27.07 | 2018 |
| Crude death rate per 1000 people | 7.43 | 2018 |
| Adult literacy rate (% of people aged 15+) | 61.6 | 2010 |

Sources: National Statistical Office, 2018; The World Bank, 2019.

Papua New Guinea became an independent country in 1975 after a peaceful handover from Australian colonial rule. The country is governed by a parliamentary democracy based on the Westminster model. The National Parliament is unicameral and multiparty, consisting of 109 members, made up of a representative for each of the provinces and open constituencies, who serve five-year terms. The Prime Minister is elected by the National Parliament and is head of government. They then select other members of the Parliament to be cabinet members and act as heads of ministries. Historically, governments have been unstable as no party has ever won enough seats to govern outright, relying instead on coalitions to form governments.

Governance of services was decentralized in 1995 under the auspices of the Organic Law on Provincial Governments and Local-level Governments. The National Health Administration Act 1997 allowed

for the development of a National Health Plan, National Health Board, Provincial Health Boards and the approval of National Health Service Standards. Provincial and district governments play a key role in health-care services. While this has allowed communities to have greater control in managing their health-care needs, it has also led to significant challenges (see section 1.4.1).

1.2 Current economic situation

Demand for natural resources has fuelled economic growth in Papua New Guinea with mining, petroleum and cash crops forming the bulk of revenue. Gross domestic product (GDP) has increased from US\$ 3.52 billion in 2000 to US\$ 24.97 billion in 2019 (Table 2) (The World Bank, 2019), but this change is largely seen as due to mining product exports rather than significant improvements in internal performance. Recent economic stabilization comes after a period of low and negative growth in the 1990s due to poor trade conditions, falling commodity prices, poor economic policies, natural disasters and a long civil war in Bougainville, which has since gained autonomy status (WHO Regional Office for the Western Pacific, 2011).

Subsistence farming is vital, supporting approximately 80% of the population. Unlike other Pacific island countries, low international migration rates (Table 1) result in small remittances to the country, estimated to be 1.5% of GDP in 2004 (Stahl & Appleyard, 2007).

Table 2. Select economic and socioeconomic characteristics, 2019

| Indicator | | Year |
|--|---------------|------|
| GDP, current (US\$) | 24.97 billion | 2019 |
| GDP per capita (Atlas method, current US\$) | 2780 | 2019 |
| GDP annual growth (%) | 5.62 | 2019 |
| Unemployment (% of total labour force) | 2.62 | 2011 |
| Labour participation rate (% of total, ages 15–64) | 48.31 | 2010 |

Source: The World Bank, 2019.

1.3 Summary of health indicators

1.3.1 Mortality and life expectancy

Life expectancy is low, approximately 60 years in men and 65 years in women in 2013 (Table 3), although this has improved over the past 20 years

as life expectancy was 54 in men and 60 in women in 1993 (The World Bank, 2019). Neonatal, infant and under-5 mortality has improved over the past two decades, but they are still the highest in the Pacific. Between 1994 and 2016–2018, infant mortality has decreased from 61.9 per 1000 live births to 33, neonatal mortality declined from 31.1 to 20, and under-5 mortality fell from 84.1 to 49 (Table 3). However, improvements in childhood death rates have not been replicated in mothers. The maternal mortality ratio remains high at 171 per 100 000 live births but has improved from previous measurements (330 in 1996, 733 in 2006). These figures can partly be explained by unchanged rates of skilled health staff attending births (53.2% in 1996, 53.0% in 2006, 56.4% in 2016–2018) and pregnant women receiving antenatal care (76.7% in 1996, 76% in 2016–2018).

Table 3. Select main health indicators

| Indicator | | Year |
|---|------|-----------|
| Life expectancy (years) | | |
| Total | 62.4 | 2013 |
| Female | 64.6 | |
| Male | 60.4 | |
| Under-5 mortality rate (per 1000 live births) | 49 | 2016–2018 |
| Infant mortality rate (per 1000 live births) | 33 | 2016–2018 |
| Neonatal mortality rate (per 1000 live births) | 20 | 2016–2018 |
| Maternal mortality ratio (per 100 000 live births) | 171 | 2016–2018 |
| Births attended by skilled health staff (% of total births) | 56.4 | 2016–2018 |

Sources: National Statistical Office, 2018; The World Bank, 2019.

1.3.2 Main causes of mortality and morbidity

Communicable diseases remain the main cause of morbidity and mortality in Papua New Guinea. Pneumonia, malaria, tuberculosis, diarrhoeal disease and HIV/AIDS account for approximately half of all deaths (National Department of Health, 2010). Noncommunicable diseases (NCDs) account for a smaller number of deaths but is increasing. Mortality from NCDs is estimated to account for 42% of all deaths in 2014: cardiovascular disease 8%, cancer 9%, diabetes 6%, chronic respiratory disease 6% and other NCDs 13% (WHO, 2018).

1.4 Health system

1.4.1 Governance structure

Health-care governance is decentralized in Papua New Guinea. The National Department of Health (NDoH) is responsible for national policy development, setting health service standards and providing supplies, specialist services and technical advice, as well as managing hospitals (National Department of Health, 2010). The Provincial Health Authorities Act 2007 enabled provincial health authorities (PHAs) to be set up (one for each of 22 provinces, including the autonomous region and the national capital) to oversee the implementation of health policies and are responsible for providing primary care services through health centres and aid posts (Government of Papua New Guinea, 2007). PHAs have increased flexibility to manage their own staff and finances in accordance with the needs of the local population. However, this has not necessarily improved health services or outcomes. The maternal mortality ratio, which is a key impact indicator designated in the *National Health Plan 2011–2020* (NHP), does not indicate significant improvement over the past 25 years, despite several efforts: 330 per 100 000 live births in 1996, 733 in 2006 and 171 in 2016–2018 (National Statistical Office, 2018). As of 2018, 94% of the health centres/subcentres are open and functional as per the National Health Information System database. However, 58% of aid posts, which are the nearest point of care for the communities, remain closed. During the implementation of the current NHP, outreach clinics per 1000 children aged under 5 years decreased from 35 in 2013 to 29 in 2017. Outreach clinics from health centres to rural remote villages provide immunization, antenatal care, family planning, health awareness programmes and nutrition monitoring (National Department of Health, 2018a). Between 2013 and 2017, the average annual number of outpatient visits per person (a reflection of free primary health care usage) has declined from 1.25 to 1.07 visits (National Department of Health, 2018a). The decentralization process has meant many more administrators and managers are needed at the district level. Skilled health extension officers (HEOs) have been removed from front-line services to be administrators. Approximately 30% of all clinically skilled health workers are in administrative or management roles instead of seeing patients (National Department of Health, 2010). Other contributing factors in the decline in health outcomes include an economic structural adjustment exercise in 1999 that closed some nursing and community health worker (CHW) training schools and a 10%

reduction in public servants, and the devaluation of the currency (the kina) in 2004, which led to the closure of some public services.

1.4.2 Health services organization

There are seven tiers of health facilities (from lowest to highest): 1) aid posts, 2) community health posts, 3) health centres, 4) district hospitals, 5) provincial hospitals, 6) regional hospitals, and 7) national referral hospitals (Port Moresby General Hospital and Laloki Psychiatric Hospital). Patients should follow the referral pathway, but it is often bypassed by patients who are able to pay to enter higher-level private facilities or because there are no staff in the middle facilities. It has been reported that some aid posts see no more than 15 patients annually.

Due to the decentralization process, there is a separation of hospital management from other health facilities. Nineteen hospitals are funded by NDoH, although the day-to-day running of the provincial hospitals are managed by hospital boards. Aid posts, health posts and health centres collectively come under the rural health services branches, which are managed by provincial and district governments. These governments are responsible for providing staff and allocating funding, which are provided by the Departments of Finance and Treasury through provincial grants. Separation of the management of primary and secondary health services has reportedly led to difficulties in managing patient care when they are moved between the community and the hospital.

There are three providers of health-care services in Papua New Guinea: the Government, Christian Health Services (CHS) and a small private sector. The public system consists of two national referral hospitals, 19 provincial hospitals (in Alotau, Angau, Boram, Buka/Sohano, Daru, Goroka, Kavieng, Kerema, Kimbe, Kundiawa, Lalok, Lorengau, Mendi, Modilon, Mount Hagen, Nonga, Popondetta, Vanimo and Wabag), 45 urban clinics, approximately 500 health centres and over 3000 aid posts (National Department of Health, 2018b), although it is estimated that approximately 42% of aid posts are not in operation (National Department of Health, 2018b).

The various church agencies that provide health services in Papua New Guinea operate under CHS management, except Catholic Church Health Services, which operates independently. They provide approximately half of rural health services (National Department of Health, 2010) and are responsible for training most of the nurses (see section 3.1.2) and all

CHWs (see section 3.1.3). Funding for church-operated health services mostly comes from the Government with a small (1–5%) contribution from user fees.

The private sector is small and made up of private consultants, employer-funded health workers and traditional medicine practitioners. The mining and natural resources sector attracts a large expatriate population, which has allowed private health insurance to be introduced and employer subsidies to support the establishment of private health care.

1.4.3 Sources of funding

Health expenditure is funded mostly by the Government, with approximately 25% from donor agencies (WHO Regional Office for the Western Pacific, 2011). Historically, Australia has provided the majority of donor funds, but in recent years other donors have increased their share of aid.

Primary health care services are meant to be free for patients, but most provinces have charged user fees for outpatient visits, despite PHAs having no authority to do so under the Organic Law. Part of the reason for user fees is to cover gaps in funding for front-line services in facilities due to the slow distribution of funds to the facilities via PHAs. An analysis by the National Economic and Fiscal Commission in 2007 found that provinces spent only 21% of funds on front-line services (National Department of Health, 2010). To circumvent this, NDoH has begun to directly fund facilities. The Free Primary Health Care and Subsidized Specialist Services Policy in 2013 was developed to improve universal health care access (National Department of Health, 2013a). All primary care services provided by aid posts and health centres run by the Government or churches should be free, and user fees are allowed only for certain specialized hospital services, enabled under the Public Hospitals Act 1994. However, little data are available on the impact of this policy.

Future alternate sources of funding could include the wider utilization of private health insurance. The use of private insurance is currently small, but demand is increasing. The Government could consider requiring those employed in the formal sector and/or those able to afford it to take out private health insurance in order to reduce the burden on public services and increase available funds for health to those who are least able to afford it.

1.4.4 Health expenditure

Total health expenditure (including Government, through NDoH, PHAs and CHS, and donor sources) was estimated to be 2.47% of GDP in 2017, and health expenditure per capita was US\$ 61.46 (Table 4). There was an increase from US\$ 49.89 per capita in 2015 but a significant decrease compared to 2014, i.e. US\$ 97.90 (The World Bank, 2019). The boost in funding during 2014 was due to increased government revenue from the mining and resources sector. However, this is well below the 2014 Sector Performance Annual Review target of approximately US\$ 210 (i.e. PGK 500) per person. Service funding is also inequitable with funding largely flowing into urban areas. While 87% of the population live in rural areas, they receive only 36% of the resource allocation (AusAID, 2009). Rural health services and infrastructure need significant improvement. In a country with limited access to services (see section 1.1), functioning radios and telephones in health facilities are essential. However, the proportion of health facilities with such working equipment decreased from 69% to 35% between 2013 and 2017 (National Department of Health, 2018a).

Table 4. Select health indicators, 2019

| Indicator | |
|---|-------|
| Health expenditure, total (% of GDP) | 2.47 |
| Health expenditure per capita (annual, current US\$) | 61.46 |
| Out-of-pocket health expenditure (% of total expenditure on health) | 9.0 |

Source: The World Bank, 2019.

2. Health workforce supply

2.1 Health workforce supply

There has been a persistent lack of reliable and accurate human resources for health (HRH) data over many years. It is the primary problem in health workforce development in Papua New Guinea and crucial for any effective policy planning and development. Health workforce data are not collected centrally, but some information is collected intermittently in a one-off survey. The Human Resources (HR) Branch within NDoH does not receive regular updated data from the provinces and districts regarding health worker (HW) numbers and pre-service training. The most recent reliable data come from the 2018 HR database compiled to establish a centralized HR information system, linked with the provinces and CHS, with support from the World Health Organization (WHO). The HR database has begun compiling demographic data on the health workforce including age, sex, province and cadre. NDoH no longer has a copy of the 2009 head count survey (HCS) as the data were stored on one computer and, due to a lack of handover procedures, were lost once the responsible employee

ceased working at NDoH. Irregular censuses of HWs have occurred previously, but these are simply counts of cadres with no demographic information attached. These censuses were reliant on CHS, provincial hospitals, and provincial and district health authorities to supply data (National Department of Health, 2018c).

The 2018 HR database reported there were a total of 15 237 HWs in the health sector (including public service, churches and private health-care providers), which represents an increase of 16.6% since 2009 (National Department of Health, 2018d). This included a 58.8% increase in doctors to 602, and an over 600% increase in midwives to 677. More concerning is a drop in nurses, HEOs and dentists. Based on the estimated national population in 2018, however, the ratio of doctors, HEOs, nurses, midwives and CHWs per 1000 population was 1.03, an encouraging increase from 2009 when it was 0.55/1000 but still well below the WHO threshold of 4.45/1000 to meet the Sustainable Development Goals and universal health coverage (Table 5).

Table 5. Health workforce trends by cadre, 1988–2018

| Cadre | 1988 | 1998 | 2004 | 2009 | 2018 |
|---|-------------|---------------|---------------|---------------|---------------|
| Medical doctors | 384* | 316* | 524* | 379 | 602 |
| Dental professionals | | | | 191 | 142 |
| Health extension officers | 357 | 233 | 575 | 486 | 313 |
| Nurses | 2917** | 2920** | 3980** | 3526 | 3264 |
| Midwives | | | | 92 | 677 |
| Community health workers | 4982 | 3926 | 5358 | 4419 | 4469 |
| Pharmacy professionals | | | | | 115 |
| Medical laboratory staff | 159 | 150 | 254 | 258 | 288 |
| Allied health professionals | 283 | 372 | 440 | 318 | 395 |
| Other/management, health administrative and support staff | – | 2874 | 1224 | 3394 | 4972 |
| Total | 9082 | 10 791 | 12 355 | 13 063 | 15 237 |

* Doctors and dentists are combined; ** nurses and midwives are combined.

Sources: Morris & Somanathan, 2012; National Department of Health, 2018d.

2.2 Health workforce distribution

Data presented in section 2.2 are from the HR information database 2018.

2.2.1 Distribution of health workers by gender

Among the health workers whose gender is specified, the majority are female (Table 6), including almost a

third of all doctors and almost half of all HEOs. There is a greater proportion of men in nursing careers compared to many other countries, with 25% of all nurses and midwives male. By comparison, only 8–10% of nurses in Australia are male (Rumsey, et al., 2012). Note that 23.29% of the workforce did not report gender.

Table 6. Health workers by cadre and gender, 2018

| Cadre | Male | | Female | | Gender not specified | | Total |
|---|-------------|--------------|-------------|--------------|----------------------|--------------|---------------|
| | No. | % | No. | % | No. | % | |
| Medical doctors | 298 | 49.50 | 134 | 22.26 | 170 | 28.24 | 602 |
| Dental professionals | 55 | 38.73 | 45 | 31.69 | 42 | 29.58 | 142 |
| Health extension officers | 125 | 39.94 | 116 | 37.06 | 72 | 23.00 | 313 |
| Nurses | 730 | 18.52 | 2191 | 55.60 | 1020 | 25.88 | 3941 |
| Community health workers | 1443 | 32.29 | 2061 | 46.12 | 965 | 21.59 | 4469 |
| Pharmacy professionals | 36 | 31.30 | 55 | 47.83 | 24 | 20.87 | 115 |
| Medical laboratory staff | 143 | 49.65 | 62 | 21.53 | 83 | 28.82 | 288 |
| Allied health professionals | 170 | 43.04 | 107 | 27.09 | 118 | 29.87 | 395 |
| Health administrative and support staff | 1656 | 42.60 | 1227 | 31.57 | 1004 | 25.83 | 3887 |
| Management | 87 | 55.06 | 49 | 31.01 | 22 | 13.92 | 158 |
| Unattached staff | 516 | 55.66 | 383 | 41.32 | 28 | 3.02 | 927 |
| Total | 5259 | 34.51 | 6430 | 42.20 | 3548 | 23.29 | 15 237 |

Source: National Department of Health, 2018d.

2.2.2 Distribution of health workers by age

A large proportion of HWs will reach retirement within the next decade (Table 7). Those who have retired have been encouraged to come back, often in supervisory

roles overseeing younger, inexperienced staff. There is some anecdotal evidence that some retirees have taken up new roles, but the reintegration of retired workers into public service is not widespread.

Table 7. Health workers by cadre and age (years), 2018

| Cadre | Age | | | | | | | Total |
|---|-----------|-------------|-------------|-------------|-------------|------------|-------------|---------------|
| | < 25 | 25–34 | 35–44 | 45–54 | 55–64 | 65+ | Unknown | |
| Medical doctors | 0 | 101 | 109 | 31 | 27 | 13 | 321 | 602 |
| Dental professionals | 0 | 21 | 23 | 22 | 19 | 6 | 51 | 142 |
| Health extension officers | 0 | 63 | 82 | 26 | 15 | 11 | 116 | 313 |
| Nurses | 27 | 901 | 808 | 485 | 326 | 117 | 1277 | 3941 |
| Community health workers | 18 | 733 | 964 | 759 | 556 | 198 | 1241 | 4469 |
| Pharmacy professionals | 0 | 24 | 36 | 15 | 6 | 1 | 33 | 115 |
| Medical laboratory staff | 0 | 39 | 25 | 62 | 28 | 7 | 127 | 288 |
| Allied health professionals | 0 | 60 | 69 | 62 | 27 | 10 | 167 | 395 |
| Health administrative and support staff | 14 | 355 | 660 | 742 | 358 | 80 | 1678 | 3887 |
| Management | 0 | 1 | 11 | 38 | 57 | 12 | 39 | 158 |
| Unattached staff | 1 | 63 | 162 | 174 | 225 | 224 | 78 | 927 |
| Total | 60 | 2361 | 2949 | 2416 | 1644 | 679 | 5128 | 15 237 |

Source: National Department of Health, 2018d.

2.2.3 Distribution of health workers by provinces

There is an inequitable distribution of HWs across the provinces with wide variations in the number

of people served by each HW. The National Capital District has the highest proportion of HWs, and the lowest proportion is in Western Province (Table 8).

Table 8. Health workers per population by cadre and province, 2018

| Provinces | Total no. of health workers | Medical doctors/1000 people | Dental professionals/1000 people | HEOs/1000 people | Nurses/1000 people | CHWs/1000 people | Pharmacy professionals/1000 people | Medical laboratory staff/1000 people | Allied health professionals/1000 people |
|--------------------|-----------------------------|-----------------------------|----------------------------------|------------------|--------------------|------------------|------------------------------------|--------------------------------------|---|
| AROB | 188 | 0.03 | 0.003 | 0.01 | 0.30 | 0.23 | 0.01 | 0.01 | 0.01 |
| Central | 255 | 0.003 | – | 0.04 | 0.10 | 0.57 | – | 0.02 | – |
| East Sepik | 486 | 0.03 | 0.01 | 0.04 | 0.29 | 0.45 | 0.01 | 0.02 | 0.04 |
| Eastern Highlands | 685 | 0.04 | 0.02 | 0.02 | 0.32 | 0.53 | 0.01 | 0.02 | 0.02 |
| East New Britain | 627 | 0.04 | 0.03 | 0.05 | 0.60 | 0.61 | 0.02 | 0.05 | 0.08 |
| Enga | 458 | 0.04 | 0.01 | 0.03 | 0.30 | 0.41 | 0.004 | 0.02 | 0.02 |
| Gulf | 165 | 0.03 | 0.01 | 0.04 | 0.24 | 0.43 | 0.01 | 0.02 | 0.03 |
| Hela | 126 | 0.02 | 0.003 | 0.03 | 0.17 | 0.13 | 0.01 | 0.02 | 0.04 |
| Jiwaka | 272 | 0.002 | 0.004 | 0.02 | 0.29 | 0.20 | – | 0.01 | 0.01 |
| Simbu | 357 | 0.06 | 0.01 | 0.02 | 0.29 | 0.30 | 0.01 | 0.02 | 0.03 |
| Madang | 707 | 0.04 | 0.01 | 0.05 | 0.37 | 0.65 | 0.01 | 0.02 | 0.03 |
| Manus | 218 | 0.23 | 0.01 | 0.17 | 1.19 | 0.99 | 0.04 | 0.08 | 0.20 |
| Milne Bay | 858 | 0.06 | 0.03 | 0.09 | 0.80 | 1.50 | 0.02 | 0.04 | 0.07 |
| Morobe | 724 | 0.06 | 0.01 | 0.01 | 0.57 | 0.18 | 0.02 | 0.03 | 0.04 |
| NCD | 1261 | 0.28 | 0.05 | 0.004 | 1.48 | 0.64 | 0.05 | 0.12 | 0.13 |
| New Ireland | 376 | 0.06 | 0.03 | 0.11 | 0.60 | 0.47 | 0.02 | 0.07 | 0.06 |
| Oro | 228 | 0.04 | 0.03 | 0.04 | 0.35 | 0.46 | 0.01 | 0.02 | 0.03 |
| Southern Highlands | 405 | 0.03 | 0.01 | 0.02 | 0.24 | 0.31 | 0.005 | 0.01 | 0.02 |
| West New Britain | 505 | 0.04 | 0.03 | 0.07 | 0.51 | 0.74 | 0.01 | 0.04 | 0.08 |
| Western Highlands | 593 | 0.05 | 0.02 | 0.03 | 0.48 | 0.65 | 0.01 | 0.03 | 0.05 |
| West Sepik | 521 | 0.03 | 0.01 | 0.06 | 0.40 | 1.11 | 0.01 | 0.04 | 0.07 |
| Western | 73 | 0.04 | – | 0.01 | 0.08 | 0.17 | – | – | 0.01 |

AROB, Autonomous Region of Bougainville; CHW, community health worker; HEO, health extension officer; NCD, National Capital District.

Source: National Department of Health, 2018b; National Department of Health, 2018d.

2.2.4 Distribution of health workers by urban/rural areas

Although 87% of the population live in rural areas (The World Bank, 2019) only 34% of HWs are deployed in

these areas (Table 9). There are severe shortages of medical officers and pharmacy professionals in rural areas. This is offset by the higher proportion of HEOs and CHWs who are trained to work in rural areas in the absence of doctors.

Table 9. Health workers by cadre and urban/rural distribution, 2018

| Cadre | Total number | % urban | % rural | HWs/1000 population, urban | HWs/1000 population, rural |
|---|---------------|------------|------------|----------------------------|----------------------------|
| Medical doctors | 602 | 97% | 3% | 0.065 | 0.002 |
| Dental professionals | 142 | 81% | 19% | 0.013 | 0.003 |
| Health extension officers | 313 | 55% | 45% | 0.019 | 0.016 |
| Nurses/midwives | 3941 | 65% | 35% | 0.282 | 0.153 |
| Community health workers | 4469 | 36% | 64% | 0.180 | 0.314 |
| Pharmacy professionals | 115 | 94% | 6% | 0.012 | 0.001 |
| Medical laboratory staff | 288 | 75% | 25% | 0.024 | 0.008 |
| Allied health professionals | 395 | 86% | 14% | 0.038 | 0.006 |
| Other/management, health administrative and support staff | 4972 | 88% | 12% | 0.482 | 0.067 |
| Total | 15 237 | 66% | 34% | 1.114 | 0.570 |

Source: National Department of Health, 2018d.

2.2.5 Distribution of health workers by sector

The HR information database from NDoH (2018) reveals that the majority of the health workers (11 823 workers or 77.59%) are under public service (Table 10). Nineteen faith-based organizations, representing

various denominations, employ 2878 (18.89%) health workers, with the Catholic Church Health Services employing around 73% of those workers. Forty-three nongovernmental organizations (NGOs) and private health-care providers employ 536 (3.52%) health workers.

Table 10. Health workers by sector, 2018

| Cadre | Government (public service) | Churches | NGOs/ private | Total |
|---|-----------------------------|-------------|---------------|---------------|
| Medical doctors | 526 | 14 | 62 | 602 |
| Dental professionals | 137 | 1 | 4 | 142 |
| Health extension officers | 238 | 40 | 35 | 313 |
| Nurses/midwives | 2762 | 982 | 197 | 3941 |
| Community health workers | 3101 | 1276 | 92 | 4469 |
| Pharmacy professionals | 79 | 6 | 30 | 115 |
| Medical laboratory staff | 216 | 37 | 35 | 288 |
| Allied health professionals | 343 | 19 | 33 | 395 |
| Health administrative and support staff | 3357 | 486 | 44 | 3887 |
| Management | 137 | 17 | 4 | 158 |
| Unattached staff | 927 | 0 | 0 | 927 |
| Total | 11 823 | 2878 | 536 | 15 237 |

Source: National Department of Health, 2018d.

2.2.6 Migrant health workforce

There are no comprehensive data on the number of migrant health workers in Papua New Guinea. However, the *Study on International Health Workforce Mobility and Its Implication in Papua New Guinea* (2015) revealed that 57 foreign-born doctors were reported to be employed in 2011, including 51 (88%) as professionals, and 12% in teaching or associate

professional roles (Hawthorne, 2015). In terms of birthplace, the top 10 medical source countries were the Philippines (20), India and Solomon Islands (six each), Germany (five) and the United States of America (three), with only very small numbers derived from other countries (for example, just one from all other Pacific sources).

In terms of nursing, 22 foreign-trained nurses were in the workforce and employed in 2011, with their residence principally derived from Indonesia (five), the Philippines, India and the United States of America (two each), and a scattering of other Organisation for Economic Co-operation and Development (OECD) and non-OECD countries. All reported holding professional, rather than education sector, employment.

Based on registration information from Nursing Council (PNG Nursing Council, 2017), the number of newly registered overseas nurses increased from 15 to 113 between 2009 and 2015, indicating there

was an increasing reliance on foreign workers to fill vacant posts. However, in 2016, the number of newly registered overseas nurses was only 51.

2.2.7 Skills distribution

There is a lack of data to inform the skills distribution of cadres in Papua New Guinea. Based on the 2018 HCS, there are 5.4 nurses for every doctor, which represents a significant drop from 2009 when the ratio was 9.3. This is due to an increase in physician numbers at the same time as a fall in nursing numbers (National Department of Health, 2018d). The private-to-public ratio is 1:22.

3. Health professions education

There has been a decline in the production of health workers, especially after the economic structural adjustment exercise in 1999, which closed a number of government-run schools of nursing and the last of the public CHW schools. This has resulted in a severe shortage of nurses, which is expected to worsen in coming years due to ageing (see section 2.2.2).

In 2009, the World Bank modelled and costed five different health workforce scenarios for 2030 based on various health worker-to-population scenarios.

The most sustainable and affordable model was the so-called Scenario 5 – increases in pre-service training and in-service training, staff for support services and quality-enhancing non-salary budget expenditures (Morris & Somanathan, 2012). The report recommended increasing the total health workforce to 18 406 in 2030, including an increase of doctors from 379 in 2009 to 1535 in 2030, nurses from 3252 to 8012 and CHWs from 4398 to 8256. In order to meet these targets, a suggested pre-service training scenario for each cadre was developed (Table 11).

Table 11. Suggested pre-service enrolment and graduate targets to meet Scenario 5 in 2030

| Year | Enrolment targets | | | | Graduate targets | | | |
|------|-------------------|------|--------|------|------------------|------|--------|------|
| | Doctors | HEOs | Nurses | CHWs | Doctors | HEOs | Nurses | CHWs |
| 2009 | 54 | 49 | 139 | 215 | 49 | 46 | 135 | 209 |
| 2010 | 54 | 49 | 139 | 215 | 49 | 46 | 135 | 209 |
| 2011 | 54 | 49 | 139 | 215 | 49 | 46 | 135 | 209 |
| 2012 | 54 | 49 | 170 | 215 | 49 | 46 | 165 | 209 |
| 2013 | 54 | 49 | 170 | 258 | 49 | 46 | 165 | 250 |
| 2014 | 54 | 49 | 170 | 309 | 49 | 46 | 165 | 300 |
| 2015 | 54 | 49 | 250 | 309 | 49 | 46 | 250 | 300 |
| 2016 | 54 | 49 | 361 | 515 | 49 | 46 | 350 | 500 |
| 2017 | 54 | 49 | 361 | 515 | 49 | 46 | 350 | 500 |
| 2018 | 54 | 49 | 515 | 515 | 49 | 46 | 500 | 500 |
| 2019 | 111 | 49 | 515 | 515 | 100 | 46 | 500 | 500 |
| 2020 | 111 | 49 | 526 | 619 | 100 | 46 | 500 | 600 |
| 2021 | 111 | 49 | 632 | 619 | 100 | 46 | 600 | 600 |
| 2022 | 111 | 49 | 632 | 619 | 100 | 46 | 600 | 600 |
| 2023 | 167 | 49 | 737 | 722 | 150 | 46 | 700 | 700 |
| 2024 | 167 | 49 | 737 | 722 | 150 | 46 | 700 | 700 |
| 2025 | 167 | 49 | 737 | 722 | 150 | 46 | 700 | 700 |
| 2026 | 167 | 49 | 842 | 825 | 150 | 46 | 800 | 800 |
| 2027 | 167 | 49 | 842 | 825 | 150 | 46 | 800 | 800 |
| 2028 | 222 | 49 | 842 | 825 | 200 | 46 | 800 | 800 |
| 2029 | 222 | 49 | 842 | 825 | 200 | 46 | 800 | 800 |
| 2030 | 222 | 49 | 842 | 825 | 200 | 46 | 800 | 800 |

Source: Morris & Somanathan, 2012.

Estimates are based on baseline HW numbers from the 2009 HCS and population projections. Enrolment targets include attrition rates of 9% for doctors, 6% for HEOs, 5% for nurses and 3% for CHWs.

The *Health Workforce Enhancement Plan 2013–2016* (HWEPlan) was developed based on Scenario 5 (National Department of Health, 2013b). It specifically outlined an objective to increase the number of scholarships

available for doctors, nurses, HEOs and CHWs, instructing all training institutions to increase the intake of students for each cadre by five each year to increase graduate output (National Department of Health, 2018c). Some nursing schools have increased their enrolment (Table 15), but this has not been replicated across all schools. NDoH is currently in a catch-up phase by reopening previously closed nursing schools to increase training, and the Department is

aiming to have one self-sustaining nurse training school in each province by 2030, each producing approximately 100 nurses per year. However, funding for this is not fixed, so it is difficult to plan beyond the immediate term. This emphasis on pre-service training from Scenario 5 has translated into the HWEP and is the main focus of NDoH. As one public servant said, “We just need to get more bodies out there working.” The School of Medicine and Health Sciences at the University of Papua New Guinea (UPNG) managed to increase enrolment for doctors from 48 in 2009 to 61 in 2016, which is in line with the World Bank report recommendations. However, the graduating class remained essentially unchanged in that time, with 39 graduating in 2009 and 42 in 2016, which is below target.

3.1 Health professions education governance

The *Health Sector Human Resource Policy* was developed to guide the planning and management of HR within the health sector (National Department of Health, 2013c). It highlighted that the lack of accurate data has prevented a training needs analysis from being undertaken. Health professions education is

managed by multiple stakeholders including NDoH, the Department of Higher Education, Research, Science and Technology (DHERST) and churches. Post-secondary educational institutions in Papua New Guinea are managed by DHERST, which administers government scholarships, sets course numbers and approves courses according to the National Accreditation Framework and *National Qualifications Framework*. Churches operate some of the nursing schools and all CHW training schools.

There are currently 40 training institutions: four universities; 16 nursing schools (nine fully accredited, four provisionally accredited and three newly established) and 20 CHW schools (16 fully accredited, two provisionally accredited and two newly established), as shown in Table 12. These institutions are a mix of government-owned and church-run organizations. There are few private training schools, pending accreditation by the relevant regulatory bodies in the country. The four universities are UPNG, the University of Goroka (UoG), Pacific Adventist University (PAU) and Divine Word University (DWU). A small number, primarily for specialist postgraduate degrees, are trained overseas, mainly in Australia, New Zealand and Singapore.

Table 12. Training institutions and cadres trained in 2015

| Training institution | Public/ church | Location | Cadres trained | Status |
|---------------------------------------|----------------|-------------------|--|------------|
| Universities | | | | |
| Divine Word University | Church | Madang | Nurses (affiliated with St Mary’s and Lutheran schools of nursing) HEOs | Accredited |
| Pacific Adventist University | Church | Port Moresby | Nurses (amalgamated with Sopas School of Nursing) Midwives | Accredited |
| University of Goroka | Public | Goroka | Midwives (affiliated with Highlands School of Nursing) Physiotherapists Environmental health workers Health managers | Accredited |
| University of Papua New Guinea | Public | Port Moresby | Doctors – general and specialist Specialized nurses (midwives, emergency, critical care, perioperative, child health, mental health, community health and management & education) Dentists and dental technicians Pharmacists Pharmacy technicians and assistants Medical laboratory technicians Medical imaging technicians | Accredited |
| Nursing schools | | | | |
| Enga College of Nursing | Public | Enga | Nurses | Accredited |
| Highlands Regional College of Nursing | Public | Eastern Highlands | Nurses | Accredited |

Table 12. Training institutions and cadres trained in 2015 (Cont.)

| Training institution | Public/ church | Location | Cadres trained | Status |
|---|-------------------|-----------------------------------|--------------------|--------------------------|
| Lae School of Nursing | Public | Morobe | Nurses | Accredited |
| Lutheran School of Nursing | Church | Madang | Nurses Midwives | Accredited |
| Mendi School of Nursing | Public | Mendi | Nurses | Accredited |
| Nazarene College of Nursing | Church | Western Highlands | Nurses | Accredited |
| St Barnabas School of Nursing | Church | Milne Bay | | Accredited |
| St Mary's School of Nursing | Church | East New Britain | Nurses Midwives | Accredited |
| Arawa School of Nursing | Public | Autonomous Region of Bougainville | Nurses | Provisionally accredited |
| West New Britain School of Nursing | Public | West New Britain | Nurses | Provisionally accredited |
| Asia Pacific Institute of Applied Social Economic and Technical Studies | Private | National Capital District | Nurses | Provisionally accredited |
| Lemakot School of Nursing | Church | New Ireland | Nurses | Provisionally accredited |
| East Sepik College of Nursing | Public | East Sepik | Nurses | Newly established |
| Kaindi School of Nursing | Church | East Sepik | Nurses | Newly established |
| Kundiawa School of Nursing | Public | Simbu | Nurses | Newly established |
| Community health worker schools | | | | |
| Braun | Church | Morobe | CHWs | Accredited |
| Gaubin | Church | Madang | CHWs | Accredited |
| Kapuna | Church | Gulf | CHWs | Accredited |
| Kumin | Church | Southern Highlands | CHWs | Accredited |
| Kungumanga | Church | Enga | CHWs | Accredited |
| Lemakot | Church | New Ireland | CHWs | Accredited |
| Onamuga | Church | Eastern Highlands | CHWs | Accredited |
| Raihu | Church | Sandaun | CHWs | Accredited |
| Rumginae | Church | Western | CHWs | Accredited |
| Salamo | Church | Milne Bay | CHWs | Accredited |
| St Gerard's | Church | Central | CHWs | Accredited |
| St Margaret's | Church | Oro | CHWs | Accredited |
| Tinsley | Church | Western Highlands | CHWs | Accredited |
| Telefomin | Church | Western | CHWs | Accredited |
| Tombil | Church | Western Highlands | CHWs | Accredited |
| Kundiawa | Public | Simbu | CHWs | Accredited |
| Rabaul | Church | East New Britain | CHWs | Provisionally accredited |
| Asia Pacific Institute of Applied Social Economic and Technical Studies | Private | National Capital District | CHWs | Provisionally accredited |
| Arawa | Public | Autonomous Region of Bougainville | CHWs | Newly established |
| Kwikila | Church | Central | CHWs | Newly established |

3.1.1 Medical education

Pre-service education

UPNG is the only medical training institution, offering a five-year, full-time Bachelor of Medicine, Bachelor of Surgery (MBBS) (University of Papua New Guinea, 2015). Students with a minimum grade point average (GPA) of 3.5 and who are in the top 10% in science foundation year are eligible. In previous years, science was not compulsory in the senior years of secondary school, which had flow-on effects as many students struggled in the first foundation year that serves as an introductory programme to develop skills, knowledge and confidence. The secondary school curriculum has since been changed following lobbying, in part, from UPNG. Beginning in 2016, all secondary school students must study science in their final year. The anticipated effect is twofold: to improve the quality of candidates entering health professions training and to encourage students to take up a career in health sciences.

Approximately 64 students are enrolled each year, which includes six or seven students who are repeating subjects (Table 13). Only students with a minimum GPA of 3.0 at the end of the school year, progress to the following year. The reported attrition rate of the MBBS programme is approximately 10–15% per year, mostly due to social or family issues. This reported attrition rate is slightly higher (9%) than the contingency used by the World Bank in its suggested pre-service training schedule (Morris & Somanathan, 2012). The current number of graduates is less than the recommended training schedule. The average number of graduates each year between 2009 and 2012 was 42 (Table 13). The recommended training schedule for 2009–2018 was 49 per year (Table 11).

DWU is in the process of establishing the second medical school in the country.

Table 13. Medical graduates from UPNG, 2009–2018

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|------|------|------|------|------|------|------|------|------|------|
| Enrolment | | | | | | | | | | |
| MBBS doctors | | 53 | 60 | 62 | 54 | 50 | 61 | 61 | 61 | 61 |
| Graduates | | | | | | | | | | |
| MBBS doctors | 39 | 41 | 35 | 49 | 44 | 42 | 48 | 42 | 42 | 42 |

Sources: Morris & Somanathan, 2012; National Department of Health, 2018d.

Post-basic education

Medical specialty training available at UPNG includes anaesthesiology, paediatrics, obstetrics and gynaecology, ophthalmology, otorhinolaryngology, dermatology, emergency medicine, internal medicine, radiology, psychiatry, pathology and rural medicine (Table 14).

Table 14. Medical specialties training at UPNG

| Qualification | Duration (years) | Specialty |
|---|------------------|--|
| Postgraduate diploma | 1 | Anaesthesiology Child health Obstetrics and gynaecology Ophthalmology Otorhinolaryngology |
| Master of Medicine | 4 | Anaesthesiology Child health Dermatology Emergency medicine Internal medicine Medical imaging |
| Master | 2 | Obstetrics and gynaecology Ophthalmology Otorhinolaryngology Pathology Psychiatry Rural Medicine Surgery |
| Higher postgraduate diploma in laboratory and clinical subspecialties | 2 | Orthopaedic surgery Paediatric surgery Urology Head, neck and plastic surgery Neurosurgery Cardiothoracic surgery Cardiothoracic anaesthesia |

Source: University of Papua New Guinea, 2015.

3.1.2 Nursing education

There are 15 schools of nursing (eight government-owned, six church-owned and one private) and three universities (UPNG, UoG and PAU) that train nurses and midwives (Table 12). All nursing and midwifery programmes are reviewed and ratified by the Education Committee of the Nursing Council to ensure offered syllabi are in line with the Council's approved curriculum (PNG Nursing Council, 2017). However, the current approved pre-service nursing curriculum requires review to align it with the current National Health Plan priorities (see section 6.3.2).

Pre-service education

With the exception of the nursing programme offered by PAU, all nursing graduates complete a three-year Diploma of Nursing. Sopas School of Nursing was

amalgamated with PAU in 2001, and the Diploma of Nursing was upgraded to a four-year Bachelor of Nursing.

An audit and review of all nursing schools was conducted in 2012 by the WHO Collaborating Centre for Nursing, Midwifery and Health Development (WHO CC) at the University of Technology, Sydney (Rumsey, et al., 2012). It has been claimed that church-run schools of nursing and CHW schools have higher failure rates due to disciplinary issues compared with government schools, as higher moral standards are applied at church schools and student behaviours that would be tolerated by public schools would not be by the churches. However, the audit of schools of nursing reported the average attrition rate was 22%, with most schools in the 8–21% range and one school with an attrition rate of 51% (Rumsey, et al., 2012), mainly due to financial hardship, pregnancy and academic failure. The WHO CC reported that the staff-to-student ratio in seven of eight nursing schools is 1:7–10, below the maximum recommended ratio of 1:12. PAU had a ratio of 1:25.

There is significant competition for places due to the high number of applicants. Entry to the programmes is

based on a combination of school grades and character references, although recent graduates are favoured over school non-leavers. The annual intake of nursing students has increased from 202 in 2009 to 431 in 2014, and the number of graduates has increased from 167 in 2009 to 386 in 2018 (Table 15). Note there are considerable missing enrolment data from 2015 onwards, making it difficult to draw conclusions. The current number of graduate nurses exceeds the recommended training schedule. The average number of graduates each year in 2009–2014 was 213 and 378 in 2015–2016 (Table 15), compared to the recommended training schedule for the same period, which was 135–165 and 250–350 per year, respectively (Table 11). However, it should be noted that the recommended training schedule includes a 5% attrition rate for nurses, which is much lower than the 22% attrition rate found in the recent UTS WHO CC audit (Rumsey, et al., 2012). Table 15 incorporates data from different sources within NDoH (HR Branch, Nursing Council) and from the WHO CC audit. For some years, where data were available from multiple sources, there was a small variation between sources of approximately one to five students. In such cases, the higher value was used.

Table 15. Pre-service nursing enrolments and graduates, 2009–2018

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Enrolment | | | | | | | | | | |
| Enga | | | | | | | 132 | | | |
| Highlands | 29 | 29 | 40 | 20 | 40 | 50 | 22 | 49 | | |
| Lae | 23 | 29 | 25 | 28 | 40 | 48 | 54 | 36 | | |
| Lutheran | 34 | 46 | 35 | 25 | 40 | 46 | 45 | 33 | 49 | 43 |
| Mendi | 0 | 0 | 80 | 20 | 55 | 79 | 61 | 61 | 170 | 17 |
| Nazarene | 28 | 22 | 30 | 20 | 42 | 37 | 52 | 30 | 40 | 26 |
| Sopas/PAU | 34 | | | | 50 | 54 | | | | |
| St Barnabas | 22 | 0 | 80 | 20 | 65 | 77 | 51 | | 75 | 155 |
| St Mary's | 32 | 33 | 35 | 30 | 35 | 40 | 40 | | | |
| Arawa School of Nursing | | | | | | | | 36 | | |
| Total | 202 | 159 | 325 | 163 | 367 | 431 | 457 | 245 | 334 | 241 |
| Graduates | | | | | | | | | | |
| Enga | | | | | | | | | | |
| Highlands | 21 | 32 | 28 | 25 | 24 | 26 | 22 | 44 | 89 | 49 |
| Lae | 29 | 30 | 24 | 26 | 29 | 28 | 40 | 36 | 46 | 37 |
| Lutheran | 40 | 42 | 35 | 28 | 43 | 46 | 24 | 32 | 45 | 81 |
| Mendi | 0 | 0 | 46 | 36 | 69 | 70 | 39 | 70 | 81 | 85 |
| Nazarene | 24 | 23 | 20 | 18 | 18 | 26 | 21 | 100 | 76 | 34 |
| Sopas/PAU | 14 | 14 | 19 | 19 | 26 | 27 | 15 | 52 | 26 | 21 |
| St Barnabas | 13 | 16 | 15 | 14 | 19 | 18 | 27 | 89 | 32 | 20 |
| St Mary's | 26 | 28 | 26 | 25 | 25 | 27 | 32 | 43 | 44 | 37 |
| Arawa School of Nursing | – | – | – | – | – | – | – | – | – | 22 |
| West New Britain School of Nursing | – | – | – | – | – | – | – | – | – | – |
| Total | 167 | 186 | 213 | 191 | 253 | 268 | 220 | 466 | 439 | 386 |

Source: National Department of Health, 2018d.

A major issue highlighted during the nursing school audit was the lack of preceptorship training of students to meet the clinical component (Rumsey, et al., 2012). Currently, all diploma-level courses require 2000 hours of theory and 1600 hours of practicum; bachelor-level courses require 2666 hours of theory and 2133 hours of practicum. It has been reported that some schools have not had any preceptorship training in many years, and there is a lack of accredited assessors who are approved by the Nursing Council. Clinical tutors and supervisors are needed in all schools and need to be linked to clinical sites, but since there is a decentralized health system, the schools need to coordinate with multiple stakeholders including NDoH, PHAs and churches to organize clinical placements.

Post-basic education

Post-basic training of nurses includes: midwifery (Lutheran, PAU, St Mary's, UoG, UPNG); a Bachelor

of Clinical Nursing (specializing in child health, emergency nursing, intensive care nursing, perioperative or mental health); and a Bachelor of Nursing (management and education, or community health) for nurse administrators and nurse educators at UPNG (Table 16). Nurses may continue their education by completing a flexible two-year Advanced Diploma in Emergency Medicine or a one-year Advanced Diploma in Eye Care (qualifying them as ophthalmic nurse) at DWU.

The number of midwifery trainees has improved in recent years due to the Maternal and Child Health Initiative launched by the Australian Department of Foreign Affairs in 2011. The number of enrolments has doubled from 71 in 2012 to 142 in 2015, with a corresponding increase in graduates from 67 to 88 between 2012 and 2014 (Table 17). Data from 2015 onwards are incomplete.

Table 16. Post-basic nursing enrolments and graduates at UPNG, 2009–2016

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|
| Enrolment | | | | | | | | |
| Bachelor of Clinical Nursing (Emergency Nursing) | 9 | 8 | 8 | 10 | 12 | 20 | 9 | 11 |
| Bachelor of Clinical Nursing (Critical Care – Intensive Care Nursing) | 8 | 7 | 6 | 9 | 10 | 23 | 12 | 9 |
| Bachelor of Clinical Nursing (Perioperative) | 7 | 6 | 5 | 9 | 11 | 25 | 10 | 8 |
| Bachelor of Clinical Nursing (Child Health) | 10 | 11 | 11 | 8 | 12 | 8 | 7 | 12 |
| Bachelor of Nursing (Mental Health) | 7 | 8 | 7 | 14 | | 16 | 17 | 8 |
| Bachelor of Nursing (Midwifery) | 19 | 15 | 17 | 13 | 11 | 7 | 8 | 12 |
| Bachelor of Nursing (Management & Education) | 14 | 19 | 17 | 13 | 11 | 7 | 8 | 12 |
| Bachelor of Nursing (Community Health) | 10 | 11 | 5 | 6 | 14 | 6 | 18 | 9 |
| Total | 84 | 85 | 76 | 82 | 81 | 112 | 89 | 81 |
| Graduates | | | | | | | | |
| Bachelor of Clinical Nursing (Emergency Nursing) | | | 5 | 7 | 7 | 0 | 0 | 0 |
| Bachelor of Clinical Nursing (Critical Care – Intensive Care Nursing) | | | 6 | | 5 | 8 | | |
| Bachelor of Clinical Nursing (Perioperative) | | | 8 | | 11 | 11 | 10 | |
| Bachelor of Clinical Nursing (Child Health) | 14 | 8 | 8 | 11 | 11 | 10 | 14 | 17 |
| Bachelor of Nursing (Mental Health) | 7 | 8 | 6 | 5 | 8 | 0 | 10 | 7 |
| Bachelor of Nursing (Midwifery) | 16 | 15 | 11 | 16 | 20 | 22 | 17 | 34 |
| Bachelor of Nursing (Management & Education) | 14 | 14 | 18 | 18 | 8 | 7 | 13 | 20 |
| Bachelor of Nursing (Community Health) | 16 | 9 | 11 | 5 | 6 | 14 | 10 | 8 |
| Total | 70 | 57 | 73 | 62 | 76 | 72 | 74 | 86 |

Source: National Department of Health, 2018d.

Table 17. Midwifery enrolments and graduates, 2012–2018

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|-----------|------------|-----------|------------|------------|-----------|-----------|
| Enrolment | | | | | | | |
| Lutheran | 14 | 26 | 22 | 24 | 13 | 11 | 17 |
| PAU | 20 | 25 | 19 | 28 | | | |
| St Mary's | 0 | 0 | 0 | 24 | 17 | 14 | 11 |
| UoG | 17 | 28 | 29 | 31 | | | |
| UPNG | 20 | 24 | 18 | 35 | | 11 | |
| Total | 71 | 103 | 88 | 142 | 30 | 36 | 28 |
| Graduates | | | | | | | |
| Lutheran | 12 | 25 | 19 | 21 | 22 | 11 | 15 |
| PAU | 20 | 21 | 18 | 17 | | | |
| St Mary's | 0 | 0 | 0 | - | 20 | | 16 |
| UoG | 15 | 26 | 29 | 17 | 29 | | |
| UPNG | 16 | 20 | 22 | 17 | 35 | | |
| Total | 63 | 92 | 88 | 72 | 106 | 11 | 31 |

Source: National Department of Health, 2018d.

3.1.3 Community health workers

The 20 CHW schools produce graduates with a two-year Certificate in Community Health Work, with

skills to deliver outreach and public health services in rural areas. The Arawa and Boram schools have reopened and are operating. Discussions are currently in place to open church-run CHW schools in Voloka (West New Britain), Wewak (East Sepik) and Eastern Highlands provinces. All the CHW schools operate on a common curriculum, but the curriculum is due for review by NDoH as the last review occurred in 2004.

Competition for a place is high, with many applicants applying each year. However, unlike nursing, recent school-leavers are not given higher priority over school non-leavers. This lack of restriction on applicants is thought to have resulted in lower-quality applicants, as some have not finished their secondary education. The number of enrolments and graduates increased in 2010–2014, from 358 to 415 enrolments, corresponding with an increase in graduates from 239 to 373 (Table 18). Data for 2015–2016 are incomplete for enrolments, but 2017–2018 data seem to indicate continued levels of enrolment of about 450. Compared to the recommended training schedule for the same period, which was 209–230 per year (Table 11), training of CHWs is currently on track. The staff-to-student ratio in 2014 varied between 1:2 and 1:11.

Table 18. CHW enrolments and graduates, 2010–2018

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Enrolment | | | | | | | | | |
| Braun | 49 | 59 | 29 | 33 | 35 | | | 43 | 45 |
| Gaubim | 36 | 69 | 38 | 40 | 32 | | | 74 | 29 |
| Kapuna | | 21 | 17 | 26 | 25 | | | 25 | |
| Kumin | 21 | 22 | 0 | 35 | 45 | | | | |
| Kungumanga | | | | | | | | 36 | 30 |
| Lemakot | 23 | 37 | 31 | 33 | 56 | | | | |
| Onamuga | 25 | 25 | 25 | 26 | 30 | | | 28 | 24 |
| Raihu | 45 | 40 | 40 | 40 | 29 | 42 | 40 | 43 | 40 |
| Rumginae | 30 | 30 | 31 | 35 | 47 | 39 | 41 | 45 | 45 |
| Salamo | 47 | 50 | 40 | 43 | 0 | | | 28 | 27 |
| St Gerard's | 25 | 30 | 41 | 43 | 41 | | | | |
| St Margaret's | 26 | 20 | 22 | 27 | 45 | 37 | 43 | 32 | 38 |
| Tinsley | 31 | 26 | 23 | 21 | 30 | 38 | 51 | 49 | 40 |
| Telefomin | | | | | | 54 | 59 | 44 | 48 |
| Tombil | | | | | | 47 | 36 | - | 40 |
| Rabaul | | | | | | | | | |
| Kundiawa | | | | | | 19 | 19 | 24 | 27 |
| Total | 358 | 429 | 337 | 402 | 415 | 276 | 289 | 471 | 433 |

Table 18. CHW enrolments and graduates, 2010–2018 (Cont.)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Graduates | | | | | | | | | |
| Braun | 17 | 25 | 27 | 15 | 36 | 36 | 36 | 40 | |
| Gaubim | 0 | 20 | 29 | 11 | 39 | 48 | 40 | 66 | |
| Kapuna | 22 | 17 | 12 | 17 | 21 | 26 | 20 | 29 | |
| Kumin | 20 | 20 | 22 | 14 | 31 | 26 | 38 | | |
| Kungumanga | | | | 39 | 19 | 20 | 26 | 35 | |
| Lemakot | 22 | 22 | 0 | 27 | 22 | 22 | 57 | | |
| Onamuga | 23 | 25 | 25 | 24 | 26 | 26 | 22 | 26 | |
| Raihu | 30 | 37 | 36 | 19 | 37 | 33 | 34 | 47 | 32 |
| Rumginae | 29 | 27 | 29 | 26 | 26 | 26 | 39 | 39 | 37 |
| Salamo | 16 | 26 | 19 | 27 | 38 | 28 | 28 | 30 | |
| St Gerard's | 21 | 25 | 20 | 34 | 34 | 35 | 39 | | |
| St Margaret's | 21 | 20 | 16 | 15 | 16 | 16 | 33 | 32 | 35 |
| Tinsley | 18 | 28 | 21 | 23 | 28 | 29 | 25 | 33 | 49 |
| Telefomin | | | | | | – | – | 19 | |
| Tombil | | | | | | | 31 | 19 | – |
| Rabaul | | | | | | | | | |
| Kundiawa | | | | | | | 15 | 19 | 19 |
| Total | 239 | 292 | 256 | 291 | 373 | 371 | 483 | 434 | 172 |

Source: National Department of Health, 2018d.

3.1.4 Health extension officer education

Health extension officers (HEOs) function as intermediary HWs between doctors and nurses, with a combination of clinical, community health and administrative duties in a health centre. The cadre developed as a means to meet the demands of rural populations. Training of HEOs is through DWU, which offers a four-year Bachelor of Health Sciences in Rural Health (Divine Word University, 2020a). Entry requirements for school-leavers are four A or three A and one B grades in English, mathematics, and all science subjects, including biology, chemistry and/or physics at grade 12 level (Divine Word University, 2020a). Students are expected to complete two years of supervised training in rural areas, but due

to shortages of supervisors, some students need to extend their training period. However, students are only paid for the first two years and need to fund their own training if there are not enough supervisors, which is a major disincentive to finish their training. Government support cannot extend beyond this period as the next group of students need support. HEOs may continue their education by completing a flexible two-year Advanced Diploma in Emergency Medicine.

Enrolment and graduation from 2011 to 2016 have remained essentially stable with about 50 graduates per year from the Bachelor of Health Sciences in Rural Health programme (Table 19).

Table 19. Various programme enrolment and graduation at DWU, 2011–2018

| Programmes | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|------|------|------|------|------|------|------|------|
| Enrolment | | | | | | | | |
| Bachelor of Physiotherapy | | 18 | 19 | 26 | 18 | 20 | | |
| Bachelor of Environmental Health | 28 | 18 | 18 | 26 | 0 | 0 | | |
| Bachelor of Health Sciences – Rural Health | | 49 | 49 | 44 | 52 | 53 | | |
| Bachelor of Health Management | 27 | 21 | 21 | 21 | 26 | 19 | | |
| Advanced Diploma in Eye Care | 10 | 8 | 8 | 8 | 8 | 8 | | |
| Diploma in Applied Health Sciences – Health Extension | 63 | 0 | 0 | 0 | 0 | 0 | | |

Table 19. Various programme enrolment and graduation at DWU, 2011–2018 (Cont.)

| Programmes | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|------------|------------|------------|------------|------------|------------|-----------|------------|
| Advanced Diploma in Emergency Medicine | 4 | 22 | 22 | 0 | 0 | 11 | | |
| Total | 132 | 136 | 137 | 125 | 104 | 111 | 0 | 0 |
| Graduates | | | | | | | | |
| Bachelor of Physiotherapy | 0 | 12 | 17 | 19 | 18 | 20 | 20 | 25 |
| Bachelor of Environmental Health | 28 | 21 | 18 | 27 | 28 | | | 28 |
| Bachelor of Health Sciences – Rural Health | 63 | 51 | 49 | 25 | 49 | 52 | | 59 |
| Bachelor of Health Management | 27 | 21 | 20 | 15 | 26 | 19 | 27 | 22 |
| Advanced Diploma in Eye Care | 10 | 8 | 8 | 8 | 8 | 8 | 7 | |
| Diploma in Applied Health Sciences – Health Extension | 27 | 21 | 21 | 21 | 26 | | | |
| Advanced Diploma in Emergency Medicine | 4 | 22 | 22 | 0 | 0 | 11 | | |
| Total | 159 | 156 | 155 | 115 | 155 | 110 | 54 | 134 |

Source: National Department of Health, 2018d.

3.1.5 Dental education

The dentistry education programme at UPNG has multiple exit points. Students are initially enrolled for a three-year Diploma in Dental Technology (University of Papua New Guinea, 2015). Those who perform well can progress further and study an extra year to receive a Bachelor of Oral Health, or a further two years to receive a Bachelor of Dental Surgery, qualifying them that as dentists. Entry into the initial programme requires a minimum secondary school GPA of 3.0. Postgraduate courses are available at UPNG: Postgraduate Diploma in Dentistry, or a Master of Dental Surgery (see Table 20).

3.1.6 Pharmacy education

Pharmacy education is provided by UPNG. Students are initially enrolled for a three-year Diploma of Pharmacy that qualifies them as pharmacy technicians (University of Papua New Guinea, 2015). Students with a minimum GPA of 2.0 may elect to continue to study for a further two years for a Bachelor of Pharmacy, which qualifies them as pharmacists. As with the medical and dental programmes, the first year is a science foundation course. A Master of Pharmacy is also available at UPNG.

There is currently a shortage of pharmacy professionals to deliver drugs in rural areas. UPNG and NDoH have developed a pilot programme to train pharmacy assistants in the provinces, which was to be rolled out across five provinces (Eastern Highlands, Milne Bay, West Sepik, Western and Western Highlands) in 2016.

The number of pharmacy graduates has averaged about 20 per year between 2011 and 2016 (Table 20).

3.1.7 Allied and other health professions education

Medical imaging technicians

UPNG offers a four-year Bachelor of Medical Imaging Science (University of Papua New Guinea, 2015). Progress through the programme requires successful completion of a first-year science foundation course and maintenance of a minimum GPA of 2.0. The number of medical imaging graduates between 2011 and 2016 averages 10 annually (Table 20).

Medical laboratory technicians

UPNG offers a four-year Bachelor of Medical Laboratory Science (University of Papua New Guinea, 2015). Progress through the programme requires successful completion of a first-year science foundation course and maintenance of a minimum GPA of 2.0. The number of medical laboratory graduates has fallen quite significantly – by about 50% – between 2014 and 2016 to about 12 per year (Table 20).

Physiotherapists

DWU offers a four-year, full-time Bachelor of Physiotherapy (Divine Word University, 2020b). To enter the programme, applicants must have a minimum A-grade in English and B-grade in biology at grade 12 level. Physiotherapy aides, CHWs, nurses or HEOs can apply for entry after two years of work experience in rehabilitation and a letter of recommendation from a supervising physiotherapist. Physiotherapy enrolment and graduation levels have

remained quite stable at about 20 enrolled and 20 graduating from 2012 to 2018 (Table 19).

Environmental health workers

DWU offers a four-year, full-time Bachelor of Environmental Health (Divine Word University, 2020c). To enter the programme, applicants must have a minimum B-grade in English, mathematics and science subjects including chemistry, biology and physics at the grade 12 level. Environmental health enrolment and graduation levels have fluctuated somewhat between 2011 and 2018, with 28 graduates in 2018 (Table 19).

Health management

DWU offers two courses in health management. The pre-service four-year Bachelor of Health Management (Divine Word University, 2020d) requires applicants to have a minimum B-grade in English, mathematics, economics, business studies and other subjects at the grade 12 level, or be a health worker with work experience. The Diploma in Health Services Management (Divine Word University, 2020e) is a post-basic course open to health professionals who have work experience in a management role. It has a flexible delivery and is usually completed within two years.

Community and public health

UPNG offers a post-basic one-year Diploma in Public Health or a one-year Master of Public Health (University of Papua New Guinea, 2015). DWU offers two-and-a-half-year Master of Public Health – Health Services Management (MPH-HSM) programme at postgraduate level (Divine Word University, 2020f).

Other health programmes

University of Goroka (UoG) offers two separate health educator programmes: Diploma in Health Education and a Diploma in Teaching Health, both of which take one year. Completion of a Diploma in Health Education qualifies graduates to work as health educators or in-service coordinators and/or trainers at provincial or district levels. This programme is open to nurses, HEOs, health inspectors, dental therapists and nutritionists with minimum two years of experience. The Diploma in Teaching Health is open to nurses, HEOs and health inspectors with at least two years of work experience. Graduates of this programme will be able to work as educators and instructors in health training programmes.

Table 20. Number of graduates by allied health cadre, 2011–2016

| Programmes | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--|------|------|------|------|------|------|
| Enrolment | | | | | | |
| Bachelor of Dental Surgery | 15 | 11 | 6 | 8 | 10 | 14 |
| Bachelor of Oral Health | 15 | 20 | 23 | 26 | | |
| Diploma in Dental Technology | 4 | 3 | 4 | 13 | 5 | 9 |
| Bachelor of Pharmacy | 23 | 22 | 15 | 26 | 26 | 23 |
| Bachelor of Medical Imaging Science | 13 | 11 | 12 | 19 | 9 | 14 |
| Bachelor of Medical Laboratory Science | 17 | 24 | 17 | 6 | 26 | 34 |
| Diploma in Medical Laboratory Technician | 7 | 6 | 6 | 7 | 7 | 6 |
| Diploma in Anaesthetic Science | 11 | 9 | 7 | 9 | 8 | 6 |
| Diploma in Public Health | 4 | 20 | 28 | 9 | 18 | 28 |
| Graduates | | | | | | |
| Bachelor of Dental Surgery | 13 | 17 | 17 | 5 | 11 | 6 |
| Bachelor of Oral Health | | 2 | 2 | 3 | 2 | 5 |
| Diploma in Dental Technology | 2 | 5 | 1 | 5 | 2 | 1 |
| Bachelor of Pharmacy | 24 | 18 | 12 | 18 | 23 | 20 |
| Bachelor of Medical Imaging Science | 13 | 6 | 15 | 11 | 9 | 9 |
| Bachelor of Medical Laboratory Science | 21 | 11 | 21 | 21 | 15 | 12 |
| Diploma in Medical Laboratory Technician | 7 | 6 | 4 | 13 | 7 | 5 |
| Diploma in Anaesthetic Science | 5 | 9 | 9 | 7 | 8 | 7 |
| Diploma in Public Health | 9 | 16 | 21 | 20 | 14 | 17 |

Source: National Department of Health, 2018d.

3.2 Capacities of health professions education institutions

3.2.1 Physical infrastructure

Training institutions have indicated that they lack resources, including for new equipment and renovations or extensions of current teaching facilities. Generally, universities are better equipped than the schools of nursing and CHW schools. The audit of schools of nursing in 2012 found some schools required urgent upgrades to classrooms and accommodation facilities (Rumsey, et al., 2012). Others required negotiations to build on additional land, or needed improved security for staff and students. Schools of nursing have also reported the daily stipend paid to the schools to accommodate students is inadequate. The current rate of 40 kina per student per week has not increased in line with inflation and has resulted in students living in poor accommodations and eating poor-quality food that hinders study (Rumsey, et al., 2012). The CHW schools report similar barriers in increasing teaching capabilities as the schools of nursing – namely limited land space that restricts expansion, overdue repairs and upgrades to basic infrastructure, the raising of teaching qualifications and high staff turnover. CHS reported that all educators at church-operated schools of nursing and CHW schools are required to have a minimum of three to four years of work experience and have completed a one-year Diploma in Teaching Health at UoG.

Facilities and buildings at the Taurama Campus of UPNG are old with some basic infrastructure, including lighting and a leaking ceiling, needing repair. Currently, the campus can accommodate approximately 450 students, has a large medical library, three computer labs, three lecture theatres, eight teaching laboratories, 30 tutorial rooms and a pathology museum. Improving information and communications technology (ICT) infrastructure would be a long-term objective as it would enable external teaching of regional students. Plans are currently being drawn up by UPNG and Port Moresby General Hospital (PMGH) to redevelop their respective and adjoining facilities to create one campus where teaching and clinical work is close together, with easy movement between sites for students. However, there are currently no funds to implement this plan. UPNG receives funding directly from DHERST. However, the funding is not sufficient to expand and improve to their teaching capacity in line with HWEP. As a result, the university has taken the initiative to look to other sources of funding. For example, an agreement has

been reached with a private enterprise, as part of their community development work, to upgrade the road leading into the university, which is in need of repair.

3.2.2 Technical infrastructure

There are shortages of teaching staff in nearly all training institutions. However, reports say recruitment of teaching staff has been difficult due to low salaries in the early years of teaching. There is a gap between the salaries of clinical public service staff and early career educators. However, the gap narrows as educators are promoted, with the associate professor and professor levels well paid. There are reportedly few mid-career teachers. Many are either highly experienced but nearing retirement, or are early career young educators with only a few years of experience.

The 2012 audit of nursing schools found most teaching staff in these schools are young, with many having been in their current position for five years or less, and there is a lack of experienced educators (Rumsey, et al., 2012). Morale among staff has reportedly been low due to inadequate teaching resources, lack of continuing education opportunities and low salaries.

3.3 Admission and selection of students

Where available, the admission and selection process for students and the drop-out rate have been highlighted in section 3.1.

It has been reported by NDoH and CHS that there is a significant problem concerning a lack of interest or understanding of health as a career path by school-leavers. Better promotion of health as a career is needed. One suggestion is to set up a health-specific vocational high school to ensure school-leavers are well prepared for careers in health.

3.4 Regulation and accreditation of health professions education institutions

All training courses are required to be approved by NDoH, the Medical Board, the Pharmaceutical Board or the Nursing Council, and DHERST. Curricula standards are in part under the control of the Medical Standards Division as the heads of each medical discipline are managed by this branch. However, the role of this branch is unclear within NDoH as there is a belief that if DHERST approves a course, the Medical Standards Division should not interfere. There are currently no national competency examinations for any cadre, and renewal of registration does not require proof of continued competency.

3.4.1 Medical education

There is no internal assessment of the medical programme by NDoH, although it is assessed by international agencies to international standards. The last accreditation of the UPNG medical school occurred in 2004. A review of the MBBS occurred in 2013, which resulted in the development of the postgraduate Master of Rural Medicine to meet the demands of medical practice in the provinces. The school received accreditation by the World Federation for Medical Education in 2017. A team of Australian and New Zealand medical school deans reviewed and assessed the MBBS curriculum in June 2015, to highlight areas of improvement in preparation for international accreditation. The dentistry curriculum at UPNG has been reviewed recently, but the programmes for medical laboratory science and medical imaging science are due for appraisal soon.

3.4.2 Nursing education

All schools of nursing structure their curriculum around the nationally approved nursing curriculum developed by the Nursing Council in 2002. However, this national curriculum is due for review as it now lies outside the current *National Health Plan 2011–2020* priorities, National Health Service Standards and best educational practices (PNG Nursing Council, 2017).

Auditing and inspection of the nursing schools is occurring slowly. Five midwifery programmes have been ratified. In 2014, four schools of nursing were audited: PAU, St Barnabas, St Mary's and Lae.

3.5 In-service and continuing professional education

There is currently no national in-service or continuing professional education (CPE) training plan in place for any cadre, except for the Rural Health Facility Management Training (RHFMT) for the officer-in-charge of health facilities. The RHFMT programme is a competency-based training (distance-education methods) delivered by DWU, with support from NDoH. Post-basic training scholarships and support are available from both government and donors, with midwifery the main priority through the Australian Maternal and Child Health Initiative. All new public servants are given a five-day induction programme, delivered by NDoH, which outlines the governance of the health system, national health plans and strategic priorities. Any in-service training is ad hoc and usually coordinated at the central level, by NDoH, based on the nominations received from the provinces.

4. Human resources for health utilization

4.1 Recruitment

Due to the decentralization of the health system, recruitment of HWs is the responsibility of the provincial administration or PHAs and hospital boards, each with their own recruitment methods. A significant barrier is accommodations. Homes are not provided to public servants as a condition of employment, and no accommodations allowance exists. Deploying public service HWs to their home villages to stay with family is not usually a solution since many believe there is a conflict of interest in treating family or people known to them. There is also pressure on HWs to provide money and support to their families if they are deployed to their home villages. This is in contrast to CHS, where deploying staff to their home villages has traditionally occurred. Graduates nominate their preferred posting and usually have gone to home districts. However, the recent trend is for graduates to request posts closer to bigger towns with better services and entertainment.

Almost all graduates are able to find employment in their desired location and are able to change posts relatively easily due to the severe shortages of staff. However, this has produced a secondary dilemma as it has been reported that a small number of HWs, who are academically capable but not clinically proficient, are being allowed to work due to the dire shortages. To circumvent this, discussions are in place to change the education quality framework to ensure that graduates are clinically competent.

4.2 Deployment and distribution policies and mechanisms

4.2.1 Staff turnover, attrition, absenteeism and motivation

There are no accurate data to inform staff attrition, turnover and absenteeism rates, but attrition due to ageing and retirement is expected to increase in the near future (see section 2.2.2) (Morris & Somanathan, 2012). The data that are available are often inaccurate (see section 6.4). CHS reports that some HWs are leaving to join private enterprises or public service as pay and conditions are better (see section 5.2), and staff have more freedom as they do not have to adhere to stricter moral standards enforced by the churches. Overall, however, the retention rates of HWs in church health facilities is better than in the

public service as students trained in church-operated schools have a “missionary mindset” that contributes to greater workforce stability. There is an inverse relationship between rurality on the one hand and attrition and absenteeism on the other, with more rural facilities having lower rates of attrition due to fewer distractions in isolated communities. However, there is lack of empirical data to validate this claim.

Public sector HWs are relatively well paid compared to other public servants (see section 5.2), and it is not thought this is the main reason for attrition and absenteeism. Rather, a lack of clear career pathways for promotion (for example, there is no mechanism for a good nurse to become a doctor, or a highly competent CHW to become a nurse), poor discipline, low morale and high staff workloads are contributing factors. Most HWs in the public service leave to join the private sector rather than leave health altogether, although the growth in the mining and natural resources sector has attracted some HWs to leave their professions.

4.2.2 Management structure

A 2011 review of health leadership and management capacity (Asante & Hall, 2011) reported a lack of effective management and leadership, especially at the lower district levels. An estimated 30% of skilled staff is not utilizing their training and are in managerial or administrative roles instead (National Department of Health, 2010). Many of the district health services are managed by HEOs who have been taken out of clinical care but are not given adequate managerial skills to perform the tasks involved. Currently, attempts are being made to redirect clinically skilled HWs back into front-line services, but there is some resistance to this.

Decentralization has led to some unintended consequences. District managers are responsible for coordinating and implementing health plans developed by NDoH, but they have no control over the staff required for delivering such plans. In some instances, there appears to be too much devolvement in health governance with disparate management policies that do not coordinate well. For example, provincial health offices manage primary health care services in aid posts and health centres, but provincial hospitals are managed by hospital boards and funded directly by NDoH. These are separate from the church-run health facilities, which run relatively

independently of each other and from CHS, which is based in Port Moresby. This has reportedly led to uncoordinated patient care between primary and higher-level health services.

In many places, weak management has led to a poor work culture, as evidenced by high rates of absenteeism, tardiness and poor attitudes. Administrators without adequate management skill are less likely to adhere to nationally set standards, with few audits of staff or implementing measures to ensure continued staff competency such as in-service training. The National Health Administration Law and National Health Service Standards underpin HW practice, but audits of compliance and in-service training are inconsistent. It is largely up to the individual health authority or facility to implement standards, but there are no funds set aside for this activity. Some managers take the initiative to ensure their staffs are adhering to National Health Service Standards by instigating a good work culture where performance reviews are frequently assessed and collecting health indicator data is routine to inform progress. For provinces that undertake these initiatives, they are rewarded with improved health outcomes for their patients and recognition by NDoH of their efforts (National Department of Health, 2018a). For example, Milne Bay Province has consistently performed well, in part due to the introduction of a local competition between district health facilities to improve performance indicators. They do not have extra funds to do this but ensure these activities form part of their budgetary measures.

Weak management has contributed to reduced patient safety. Legally, only doctors are permitted to prescribe drugs, but other non-medical HWs are known to prescribe medication. Despite this, actions are rarely taken by management to prevent this from happening. Hospital boards and PHA administrators can, and have been, legally removed from their post by the NDoH Medical Standards Division due to poor managerial performance. However, simply removing ineffective managers is not a solution. As there are not enough skilled workers to fill high-level positions, it would leave a leadership vacuum. Sociocultural factors associated with Papua New Guinea's ethnic diversity and *wantok* system also affect the effectiveness of local managers, with some unable to manage staff from other cultures and clans.

District and provincial health bodies rely on manuals developed by NDoH to guide their work. There is some anecdotal evidence that compliance with these

manuals is inversely related to rurality, where rural health facilities use the manuals more frequently and faithfully than other facilities.

4.2.3 Supervision mechanisms

There is a correlation between supervision of health facilities by district management staff and key performance indicators such as child and maternal deaths, immunization rates and outpatient visits (National Department of Health, 2018a). However, supervisory and clinical outreach programmes are rarely implemented due to staffing shortages, transportation and funding difficulties. Supervision of isolated health facilities and staff could be improved through ensuring communication means are accessible, but the proportion of health facilities with working radios has decreased from 69% to 35% between 2013 and 2017 (National Department of Health, 2018a).

The Health Workforce Standards and Accreditation Branch of NDoH is an HR analytics division that applies the National Health Service Standards to ensure patient care and uphold hospital standards. This division is working on the development of the Health Workforce Standards and Monitoring System based on WHO's Workload Indicators of Staffing Need methodology. The system is envisioned to be used for two main purposes: 1) to optimize the available health workforce by reviewing the current deployment of staff based on the actual workload; and 2) to determine the health workforce requirements based on the service functions outlined in the National Health Service Standards.

Within the church-operated facilities, CHS does not inspect the facilities or supervise the staff. It is usually done at the local level by the church health secretaries, although it is unclear if this occurs regularly.

4.2.4 Physical environment and access to essential equipment and supplies/resources

Many health facilities, particularly those in rural areas, are in poor condition and in need of a repair or upgrade. Stock-outs of essential medication are frequent, and the theft of medication is a serious problem. It was reported that the allocated public funds to spend on drugs is approximately 23 kina per capita annually, but the theft of drugs reduces this down to approximately 9 kina per capita. The percentage of months in which essential medical supplies were available in health facilities did not improve between 2013 and 2017: it stood at 53%

in 2013, increased to 87% in 2014–2015, but then decreased to 51% in 2016 and 44% in 2017 (National Department of Health, 2018a).

4.3 Unemployment

Theoretically, due to the major shortages of health workers, there should be no unemployment of qualified staff as there are an abundance of vacant posts. Some trained staff are listed as being “unemployed” as they are not registered or their training is not endorsed by either the Medical Board or the Nursing Council. However, there are not enough data to validate this conclusion or to determine the number of vacant posts.

4.4 Employment of health workers in the private sector

There is some attrition of health workers from the public to the private sector. However, there are no accurate data to determine the number of health workers in the private sector or in dual practice.

4.5 Health workforce performance

The Public Services (Management) Act 1995 outlines procedures and legislation to manage resignations, creation of posts, recruitment, salary determination, training and career path planning, and discipline (Government of Papua New Guinea, 1995). There are National Health Service Standards for hospitals but no national competency standards for individual staff. The registration boards do not require their members to prove continued competency before renewal of practise licences. Annual performance reviews are required under General Orders (Government of Papua New Guinea, 2012), where performance is linked to pay increases. These reviews are up to local managers to implement, and it is unclear if HWs are assessed regularly. However, based on the reportedly high rates of absenteeism, tardiness, theft of essential medication and low morale, it is clear that there is weak supervision of HWs as poor behaviour is rarely disciplined (see section 4.2.2).

5. Financing human resources for health

5.1 HRH expenditure

The *National Health Plan 2011–2020* does not include health workforce issues as part of financial forecasting – a significant oversight since workforce expenditure is the main component of health spending (Matheson, et al., 2015). However, this is not unreasonable considering there are no reliable health workforce data on which to develop policies. HWEF 2013–2016 is also not costed (Matheson, et al., 2015).

Total public expenditure on health, including development assistance, was approximately 925 million kina in 2010, or 140 kina per capita, which is made up of 631 million kina in government funds (68% of total funds) and 294 million kina from donor partners (32%) (National Department of Health, 2010). Development assistance covered staff employment, training and other overhead costs, but it excluded medical supplies. Expenditure on personnel has increased from 225 million kina (63% of total public expenditure) to 355 million kina (61%) from 2007 to 2010 (National Department of Health, 2010). Spending on HWs is forecasted to grow to 434 million kina each year between 2016 and 2020. Some 16 million kina was set aside for pre-service training in 2010 and is expected to increase to 22 million kina per year between 2016 and 2020 (National Department of Health, 2010).

5.2 Remuneration to health workers

Work and pay conditions for public servants are outlined in the General Orders, fourth edition (Government of Papua New Guinea, 2012). In, comparison to other public sector staff, HWs are relatively well paid due to a highly unionized workforce. All public servants are paid a base salary, deposited electronically every fortnight, administered by the payroll division of the Department of Personnel

Management. Health workers are additionally entitled to allowances and bonuses that boost their overall take home pay, which is more than many other public servants (Table 21). Despite this, there is continued campaigning for better salaries by HWs. The large cultural diversity within the country has meant that there are varying expectations and demands for remuneration. Public servants are allowed 10 days of sick, representational and compassionate leave and 12 weeks paid maternity leave, but there is no study or recreation leave. Senior medical officers are also entitled to receive a six-month sabbatical for training and refresher courses every four years.

All public health workers and church-employed workers (funded by NDoH through church grants) are paid the same base salary, but bonuses, awards and allowances differ. When combined, the total salary for public servants is higher than their church counterparts, which is thought to lead to some attrition from church health facilities to public service. Foreign workers filling vacant posts are paid the same award wage as locals. However, those on contract are paid a contractual wage, which is more than the local public servant rate, which has led to some resentment from local HWs.

Annual work performance reviews are used to determine pay increases (Government of Papua New Guinea, 2012). There are five performance ratings: 1) poor/well below average; 2) below average; 3) average; 4) above average; and 5) excellent/well above average. An above average rating would result in a 5% increase (based on a mid-level salary), and an excellent rating would give a 10% increase. However, it is unclear if these performance reviews are undertaken regularly, as anecdotal evidence suggests many HWs are fixed in the same salary band for many years, which contributes to workforce attrition.

Table 21. Average annual income levels of public servants by cadre in 2013 (kina)

| Cadre | Health profession | Salary grades | Salary range | Domestic market allowance |
|------------------------------------|------------------------------------|---------------|---------------|---------------------------|
| Doctors | Senior specialist medical officer | 15–16 | 39 882–44 253 | 7000 |
| | Medical officer (senior) | 14–15 | 36 167–39 882 | |
| | Medical officer | 10–14 | 23 974–36 167 | 2000–5000 |
| | Resident medical officer | 9 | 21,079 | 1000–1500 |
| HEOs | Health extension officer | 7–11 | 16 498–27 373 | |
| Nurses | Matron (PMGH) | 12 | 30 731 | |
| | Matron | 9–10 | 21 079–23 974 | |
| | Nursing officer | 5–11 | 13 093–27 373 | |
| | Superintendent (nursing education) | 11 | 27 373 | |
| | Senior nurse (tutor) | 8 | 18 579 | |
| | Lecturer (nursing) | 8 | 18 579 | |
| | Nurse (tutor) | 7 | 16 498 | |
| | Tutor (nursing studies) | 7 | 16 498 | |
| CHWs | Community health worker | 2–4 | 9691–11 771 | |
| Dentists | Dental officer | 10–15 | 23 974–39 882 | 2000–7000 |
| | Resident dentist | 9 | 21 079 | 1500 |
| Dental technicians and assistants | Dental therapist | 5–9 | 13 093–21 079 | |
| | Dental technician | 5–8 | 13 093–18 579 | |
| Pharmacists | Chief pharmacist | 14 | 36 167 | |
| | Pharmacist | 9–14 | 21 079–36 167 | 1500–3000 |
| Medical imaging professionals | Radiation therapist | 7–10 | 16 498–23 974 | |
| | Radiographer | 5–9 | 13 093–21 079 | |
| | X-ray assistant | 2–4 | 9691–11 771 | |
| Medical laboratory staff | Medical laboratory technician | 5–9 | 13 093–21 079 | |
| | Medical laboratory assistant | 3–5 | 10 662–13 093 | |
| Allied health professionals | Medical technologist | 8–12 | 18 579–30 731 | 1000–1500 |
| | Occupational therapist | 8/10 | 18 579–23 974 | |
| | Physiotherapist | 8/10 | 18 579–23 974 | |
| | Psychologist | 8–10 | 18 579–23 974 | |
| | Social worker | 5–9 | 13 093–21 079 | |
| Environmental health professionals | Health inspector | 7–10 | 16 498–23 974 | |
| | Malaria eradication officer | 5–8 | 13 093–18 579 | |
| | Health inspector assistant | 2–4 | 9691–11 771 | |
| Other | Anaesthetic technician | 7–9 | 16 498–21 079 | |
| | Lecturer | 8–14 | 18 579–36 167 | |
| | Medical orderly | 2–4 | 9691–11 771 | |
| Police officers | Patrol Officer | 2–4 | 9691–11 771 | |
| Teachers | Education officer | 11/13 | 27 373–33 262 | 1500 |
| Firefighter | Firefighter | 3–5 | 10 662–13 093 | |

Source: Government of Papua New Guinea, 2012.

5.3 Financing health professions education

DHERST is responsible for managing government and donor scholarships. In 2013, there were 17 010 students completing the Higher School Certificate Examinations (DHERST, 2014). Of those, 4312 received a scholarship to study in a range of courses. The allocation of scholarships is meant to be based on school-leaving grades, but there are instances where those with very low GPAs (301 students had a GPA of 0–1.5) received a scholarship while those with high grades were left out (4868 students with eligible GPAs were not selected). The reasons for this are unclear. While training schools have additional selection processes and would automatically exclude those who do not meet the minimum GPA requirement, it does indicate that some students with good grades, but who could not afford tuition, would miss out on a scholarship.

The scholarship quota for 2014–2015 (including both government- and donor-funded) to study nursing and allied health is 230 with the following breakdown: Lae School of Nursing (25), Mendi School of Nursing (40), Highlands Regional School of Nursing (25), Lutheran School of Nursing (20), Nazarene School of Nursing (25), St Barnabas School of Nursing (20), St Mary’s School of Nursing (30) and PAU School of Nursing (85) (DHERST, 2014). Scholarships for degrees at DWU were Bachelor of Health Administration (20), Bachelor of Physiotherapy (National Department of Health, 2018c), Bachelor of Health Sciences in Rural Health (50) and Bachelor of Environmental Health (25) (DHERST, 2014). Australia is one of the largest donors of scholarships. The Australia Awards Pacific Scholarships provide opportunities for pre-service nursing, midwifery and CHW training. Individuals may also choose to enter training provided they can pay tuition fees and

have met minimum academic requirements. Tuition fees in CHW and nursing schools vary as there is no minimum standard, but CHS reports average fees are approximately 2000 kina per year. The tuition fees at UPNG are listed in Table 22. Compulsory fees, including service, administrative and student representative council are 4896 kina per year for MBBS, Bachelor of Oral Health and nursing students, and 4242 kina for other health science students (University of Papua New Guinea, 2019). Accommodation fees, which are inclusive of meals, range from 8890 kina to 12 861 kina per year depending on the type of accommodation (basic twin, single room, including/excluding en suites) and enrolled courses.

Table 22. Tuition fees at UPNG, 2019

| | Cost per year (kina) | Duration (years) | Total programme fee |
|---|----------------------|------------------|---------------------|
| Medicine | 11 727 | 5 | 58 635 |
| Nursing | 8818 | 3 | 26 454 |
| Higher postgraduate Diploma in Clinical and Laboratory Medicine | 4324 | 2 | 8648 |
| Master of Medical Science | 9884 | 2 | 19 768 |
| Master of Public Health | 11 120 | 2 | 22 240 |
| Master of Medicine | 4324 | 4 | 17 296 |
| Postgraduate Clinical Diploma (Anaesthesiology, Child Health, Ophthalmology, Obstetrics & Gynaecology, Otorhinolaryngology) | 2169 | 1 | 2169 |

Source: University of Papua New Guinea, 2019.

6. Governance for human resources for health

6.1 HRH policies and plans

The 2013 *Health Sector Human Resource Management Policy* sets operation guidelines, processes and procedures for effective and efficient HR management in the health sector. The main HRH plan is the *Health Workforce Enhancement Plan 2013–2016* (HWEF), which has been extended until 2019 (National Department of Health, 2013b). It was developed as a response to a 2009 World Bank review of the health workforce situation, and its objectives and actions are guided by the recommendations in the World Bank report – namely, the implementation of Scenario 5 – increases in pre-service training and in-service training, staff for support services and quality-enhancing non-salary budget expenditures (Morris & Somanathan, 2012). Other national plans that include health workforce priorities are Papua New Guinea Vision 2050, Papua New Guinea Development Strategic Plan 2010–2030, National Health Plan 2011–2020, medium-term development plans, and the National Health Standards 2011–2020. A review of HWEF was undertaken in 2018, which reported that initial implementation was slow due to a lack of leadership to operationalize it. The implementation of the plan only began after the HR Branch, with support from WHO, initiated the activities. There were 16 objectives in HWEF, of which each had at least one action.

6.2 Policy development, planning and managing for HRH

The main responsibility for policy development lies with the Strategic Policy Division of NDoH (see Appendix), in coordination with other branches. Stakeholders including donor partners are also critical in supporting the development and implementation of HRH plans and policies.

The HWEF was criticized in the *Mid-term Review of the National Health Plan 2011–2020* for failing to “grasp the magnitude and urgency required to address critical manpower numbers and skill sets” and noting that “there is a profound disconnect between the workforce supply [in the HWEF] and expectations of service improvement in the NHP [National Health Plan] 2011–20” (Matheson, et al., 2015). The disagreement

between these national policies highlights a core issue in health workforce planning: that aspirational goals need to be supported by long-term commitments of funding to ensure these goals are attainable. HWEF is not costed and targets set would not be reached until after the expiration of the current NHP (Matheson, et al., 2015). There is currently no guarantee of a long-term significant funding increase needed to increase training capacity in educational institutes. While the production rate of doctors, nurses and CHWs has increased over the past five years, in order maintain the positive trend in training, more resources need to be committed.

6.3 Professional regulation

6.3.1 Medical Board

The Medical Registration Act 1980 enabled the development of the Papua New Guinea Medical Board, which is responsible for the registration of public and private sector medical, dental and allied health practitioners (including physiotherapists, medical imaging and laboratory scientists, nutritionists and psychologists, eye health, environmental health officers, and anaesthetic technicians), HEOs and CHWs. It is made up of a disciplinary committee, medical education standards committee and registration committee. Generalist and specialist medical practitioners are registered separately. There are three levels of registration: probational, provisional and full. New medical and dental graduates from recognized universities initially hold a two-year provisional licence. After two years of clinical practice, they are eligible to move to full registration. Probational registration is given to HWs who were trained at an unrecognized training institution, or were previously fully or provisionally registered but has not had any clinical practice in the previous three years. Some allied HWs are initially provisionally registered for one year, and after 12 months of full-time employment in an approved health facility or under the supervision of a registered allied HW, can upgrade to full registration. Environmental health officers, anaesthetic technicians and CHWs are the only cadres that do not require a provisional licence before applying for full registration.

There is a 30-day grace period between 31 March and 30 April each year to renew licences. It was

reported that the processing of applications of licences or renewals can be done within a day, but there is anecdotal evidence that processing of a single application can take many months, by which stage it is nearly time to renew for the following year. Unregistered or unlicensed HWs found to be practising illegally can be fined 2000 kina, but whether this is enforced regularly is uncertain. Renewals of licences often do not occur for staff working in isolated areas due to the difficulties for them to send necessary money and paperwork. Employers are not able to be penalized for hiring unlicensed medical, dental and allied health staff, even though they are required to check that all their employees are legally able to work. This is in contrast to employers of pharmaceutical practitioners who, under the Medicines and Cosmetics Act 1999, are able to be fined by the Pharmacy Board for hiring unlicensed staff (see section 6.3.3).

It was reported that every HW is currently registered with the Medical Board, although this is unlikely. There is a shortage of staff at the Medical Board who are currently in the process of “cleansing” the database – a term used to describe the process of ensuring all variables for each record, including date of birth, place of employment and training information, are completed and up to date, and duplicates are removed. The last major cleansing of the database occurred in 2006 and was done manually. From this, it was found that approximately 7000 were “active” (currently licensed), with approximately 12 000 needing to have their licences renewed. These figures are questionable since the 2009 HCS reported that there were a total of 13 063 HWs.

The Medical Board is responsible for assessing all curricula and ensuring that new graduates are competent by obtaining graduate lists from training schools. However, once HWs are registered, there are no further checks to ensure HWs continue to remain competent as this is seen as being the responsibility of the NDoH Medical Standards Division. However, this branch does not carry out these checks regularly, and there is no in-service training for HWs to maintain or upskill. Unless HWs undergo regular performance reviews by their respective employer, there are no checks in place to ensure HWs are practising safely. There are reports that some HWs produced by some training institutions are academically competent (which is the focus of the training institution) but are not clinically competent (a requirement of NDoH), caused in part by the lack of clinical supervisors to train students. The severe shortage of HWs has meant that these students are given employment,

even though they are not fit to practise. NDoH has little control over this since hiring of staff is the responsibility of the provincial administration, PHAs and provincial hospitals. Complaints of malpractice can be lodged to the Medical Board by the public but is more frequently done by the hospitals or PHAs. Complaints number approximately five to six each year, which are investigated by the disciplinary committee.

6.3.2 Nursing personnel

The Papua New Guinea Nursing Council operates under the Medical Registration Act 1980 and Part 3 of the Nurses By-law 1984. Originally, the registration of doctors and nurses were combined, but the boards were split in 1983 after the size of the workforce registration became unmanageable. The Health Practitioners Bill, if enacted, will allow for the Nursing Council to become the Nursing and Midwifery Board, which will see them take the responsibility of registering CHWs from the Medical Board.

The Nursing Council keeps a registry of all nursing practitioners including registered and enrolled nurses and nurse aides. New graduates from an approved institution are given a six-month provisional licence after providing documentation outlining successful completion of the course, a statement of competency and character references. After six months of clinical work, the graduate nurse can apply for full registration.

There has been a recent overhaul of the Nursing Council registration system. Registration fees have been raised in an effort to cover the increasing costs of operating the Nursing Council (PNG Nursing Council, 2017). Previously, an application for registration was 5 kina, and 2 kina for a licence renewal. Now, the provisional registration fee is 30 kina and full registration is 50 kina. Licence renewals are 70 kina, although renewals have been extended from annually to biennially. The raising of fees has had an impact on registration, with the number of Authority to Practise notices (practise licences) increasing from 823 before the fee increase to 4006 (PNG Nursing Council, 2017).

The Health Care Practitioners Registration System (HCPRS) database has also been reviewed. The HCPRS database was inaccurate as there were gaps in the data, duplicates of nurses, and cases of retired nurses still listed. The HCPRS database with validated data became operational in 2016, which enabled renewals and registration of new graduates to be directly entered into the database. Historically, provisional nurses were not included in the registration database

until they received full registration to reduce duplication and were not tracked. An analysis by the Nursing Council in 2014 found that since 2004, only 44% of provisional nurses had converted to full registration (881 of 1964) (PNG Nursing Council, 2017). The low conversion rate is worrying, but the causes are unknown. It may be due to graduate nurses leaving the profession (in which case there is a significant waste of training resources), they have not received the competency statement required to move to full registration (which may be an indicator of training quality), or they are practising without the correct licence.

As with HWs registered with the Medical Board, there are no continued competency checks on nurses, nor is there any legal framework to penalize employers for hiring unlicensed staff. Any disciplinary incidents are referred to the disciplinary committee of the Nursing Council, which then decides on appropriate action. Deregistration is based on the decision by the disciplinary committee or failure to renew registration for three consecutive years (JCU and AUT, 2011).

6.3.3 Pharmacy Board

The Pharmacy Board was established under the Medicines and Cosmetics Act 1999 and is responsible for registering all pharmacists, pharmacy technicians and pharmacy assistants. As there are fewer pharmaceutical practitioners compared to nurses and HWs registered with the Medical Board, management of the registrants on the Pharmacy Board is easier and the database is reasonably accurate. Since 2000, all graduate lists from UPNG are given directly to the Pharmacy Board for registration purposes, and licence renewals occur annually.

The smaller cadre of HWs also enables compliance checks to be conducted more easily. A circular is sent to all public and private facilities prior to an inspection unit checking licensure of HWs and ensuring operational standards are met. Any employer found to have employed unlicensed staff is fined 5000 kina, which is allowable under the Medicines and Cosmetics Act 1999. However, as with other registration boards, there are no checks after the provisional phase to ensure continued competence or any requirement to complete CPE activities. The Pharmacy Society is currently in discussions to design CPE programmes for members, but this has yet to be accomplished.

Unlike the Medical Board and Nursing Council, which have education standard committees to oversee training curricula, there is no such oversight

or contribution of the Pharmacy Board to the development of the pharmacy curriculum at UPNG. However, they have collaborated with the university to develop a pilot pharmacy assistant programme to be trialled in five provinces (Eastern Highlands, Milne Bay, West Sepik, Western, Western Highlands) in 2016.

6.4 HRH information

The most critical issue in the Papua New Guinea health workforce is the lack of accurate HR data. The Health Sector Human Resource Policy 2013 states that each province and public hospital should establish and maintain a central database and job profiles for their health employees, but this does not seem to have occurred. There is a heavy reliance on the provinces and districts to send data, but this only happens sporadically, after many repeated requests, and there is concern that once the data are received, they are not accurate as there are many gaps in information.

An attempt to overhaul the HR information system was initiated in 2015, but numerous problems with data collection, processing, validation and data input had to be addressed.

To address the dire need for HRH information, NDoH initiated the development of a centralized HR information system. The information system is now ready to upload the available HR information, but it had to be removed from the NDoH server due to security issues during the compilation of this profile. Concurrently, NDoH has compiled the basic HR information in an Excel spreadsheet and is being updated in consultation with the provinces, CHS, private facilities and NGOs. The HR information used for this HRH profile was compiled from the existing HRH database. NDoH plans to link the centralized HR information system with the PHAs and faith-based organizations when the system is reinstalled on the NDoH server and the available HR information is transferred to the system. The PHAs and faith-based organizations are expected to validate and update the information in the system.

It has been reported that privacy concerns have led to a reluctance to share data by the districts and provinces. But it is suspected that by providing data to NDoH, the provinces and districts could open themselves up to criticism and reproach if health indicators are poor. The alumni networks, which are relatively independent of NDoH, could assist in providing qualitative data, for example reasons for attrition out of public service. There does not appear

to be any immediate solution to integrating the various sources of HR data at present as this requires a large investment in ICT to link all health facilities to NDoH, and ICT is not a high priority. Improved ICT infrastructure would strengthen the current initiative by establishing the health sector-wide HR information system and also improve communication between NDoH and the provinces, and within provinces.

6.5 Health workforce requirements

The lack of reliable health workforce data has impeded accurate health workforce planning. HWEF 2013–2016, which has been extended until 2019, is based on one of the several costed models developed by the World Bank (Morris & Somanathan, 2012). The model has forecast the most sustainable HW plan for

Papua New Guinea, which is detailed in Table 23. It is based on data from the 2009 HCS (baseline) and is inclusive of attrition due to ageing and other causes, and the recommended training schedule. The number of health workers (doctors, nurses, HEOs, CHWs) is expected to dip initially from 8440 in 2009 to 8260 due to ageing and retirements, but then increase in 2020 due to the catch-up in training. By 2030, the total number of HWs is expected to be 18 407. The HWs (doctors, nurses and midwives) per 1000 population ratio increases from 0.55 to 0.84, which is an improvement, but never reaches the minimum WHO threshold of 4.45 per 1000 population (WHO, 2016). Models based on the WHO target have been deemed to be too expensive, unsustainable and very unlikely to be achieved.

Table 23. Projections of health workforce requirements, based on Scenario 5 of the World Bank review

| Cadre | 2009 | 2015 | 2020 | 2025 | 2030 |
|---------------------------------|-------------|-------------|---------------|---------------|---------------|
| Estimated population | 6 637 000 | 7 846 000 | 9 025 023 | 10 210 985 | 11 329 125 |
| Doctors | 379 | 515 | 694 | 1069 | 1535 |
| HEOs | 411 | 498 | 546 | 580 | 604 |
| Nurses | 3252 | 3136 | 4277 | 6082 | 8012 |
| CHWs | 4398 | 4111 | 5133 | 6671 | 8256 |
| Total | 8440 | 8260 | 10 650 | 14 402 | 18 407 |
| HWs* per 1000 population | 0.55 | 0.47 | 0.55 | 0.70 | 0.84 |

* Doctors, nurses and midwives

Source: Morris and Somanathan, 2012.

7. Conclusion

The dire health workforce situation in Papua New Guinea has been well documented, but progressive measures are being undertaken to address the problem. Key recommendations from the World Bank's comprehensive review have been adopted, namely through the development of the *Health Workforce Enhancement Plan 2013–2016* (HWEF), which has been extended until 2019. Implementation of HWEF is a significant step forward in improving the health workforce situation. While the initial implementation was slow, some of the objectives outlined have been implemented already, with other objectives in the process of being implemented.

Most of the positive developments in recent years are in the production of HWs, including the significant improvements in midwifery training, in part due to the support of donors through the Maternal and Child Health Initiative, the reopening of several previously closed nursing schools and the construction of new schools, and improved curriculum standards. Based on current training rates, the country is meeting the training targets set by the World Bank in its suggested training schedule. A lot of effort has been made towards the production of health workers, but there also needs to be consideration of what happens to those graduates upon entering the workforce.

The main areas for improvement include the deployment and management side of the health

workforce. There is a detrimental reluctance by departments, both within NDoH and between the central government and the provinces, to share data readily. This needs to be rectified. The most critical issue is to develop an accurate and maintainable HR information system. It is central to all aspects of the production, deployment, management and planning of health workers. The current system of sporadic data collection from the provinces and districts is not efficient or effective. However, creating a centralized database would require several improvements: in ICT infrastructure to allow the provinces and districts to regularly update the HR information system; training of local managers in the importance of collecting and maintaining accurate health workforce data; training of local managers in the importance of regular staff reviews; and providing the funding to complete such activities. Without committed funds, it is unlikely NDoH can move on from collecting HW data on an ad hoc basis.

It is acknowledged that funding is limited and that there are many parts of the health-care system that require improvement. However, it can be argued that the most important and largest aspect of any health-care system is the health workers, and that planning and managing health workers require accurate data. Therefore, the foremost task is to improve the method of HRH data collection, which will have positive flow-on effects on the rest of the health sector.

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Appendix

National Department of Health (NDoH) organizational chart



