Planned and unplanned futures for the Public Health Physician Workforce in Australia

A labour market analysis for the Australasian Faculty of Public Health Medicine

2017

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Disclaimer

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Prof Madden and Dr Stewart provided general oversight and advice and also supported the survey of AFPHM Fellows and Trainees.

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We acknowledge this country as belonging to the Aboriginal and Torres Strait Islander peoples of Australia. Australia is the only place in the world where Aboriginal and Torres Strait Islander Australians belong. There is no place in Australia where this is not true.

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Executive summary

Study rationale

This study is the culmination of a concerted effort by AFPHM over nearly eight years – including a series of workshops, internal Faculty debates and commissioned research – directed towards understanding and illuminating possible futures of the Public Health Physician workforce. The Faculty has undertaken this research to support the future for the profession, and the Faculty's role in promoting this outcome.

The Unique Contribution of Public Health Physicians to the Public Health Workforce (Ridoutt, Madden and Day, 2010) identified the need for a thorough study of the Australian Public Health Physician workforce to better understand the true dimensions of current and future supply and the current requirements for Public Health Physicians and future demand. This recommendation was made from an analysis of the Public Health Physician workforce that suggested the occupation was in decline against a backdrop of significant growth in the rest of the physician workforce, a phenomenon reflected in the workforces of many other countries with comparable economies and public health systems.

Accordingly, this current study had the following objectives:

- to obtain a more accurate quantitative estimate of the current Public Health Physician workforce in Australia and measure the true contribution to public health work
- to develop estimates of the projected supply of Public Health Physicians in Australia to 2025, with some sensitivity analysis around workforce wastage rates and Training Program enrolments
- to develop quantitative estimates of current demand for Public Health Physicians in Australia that have high face validity and estimates of projected demand up to 2025
- to undertake analysis of the Public Health Physician labour market (supply and demand) from 2015 to 2025
- to consider appropriate labour market policy options (training enrolments, employment practices, AFPHM membership, etc.) in response to labour market analysis findings.

Method

Traditional approaches to the study of supply and demand of workforces (e.g. Hall and Mejia, 1978) are not easily adapted to the Public Health Physician workforce (Ridoutt, *et al.*, 2002). The traditional approach attempts mathematical simulation of workforce *supply* projections based on a stock and flow model, where people entering and exiting the workforce (flows) periodically adjust the initial number in the workforce (stock). While the data requirements for this approach can be challenging, in general it is considered an acceptable approach for quantifying supply, and was therefore adopted for this study.

Demand projections however in the traditional approach are invariably based on service utilisation rates for each population age and sex cohort — the current demand for services being translated into demand for labour and future demand being driven by population growth. For all but a few types of public health services (e.g. screening, immunisation) the utilisation approach is totally inappropriate for estimating current demand of public health workforces, and even poorer equipped to estimate future workforce demand.

Three separate approaches to demand estimation for Public Health Physicians from the commencement year of the workforce planning (2016) until 2025 were therefore adopted as follows:

- analysis based on trends – largely based on trends in expenditure in public health services and infrastructure
- benchmark analysis – simple benchmark ratios of required Public Health Physician workforce numbers (based on an 'expert' judgement) to appropriate populations
- best practice analysis – expert group judgements on the best practice number of Public Health Physicians required in different public health service settings.

Each approach employed generated one or more sets of projections for the plan years, essentially delivering possible future scenarios. The scenarios created through each approach to demand estimation were classified into 'best guess' (most likely to happen without an intervention), 'optimistic' (could happen with feasible policy and administrative interventions) and/or 'aspirational' (unlikely to happen without significant advocacy and appropriate intervention) scenario categories. In all, five scenarios were created as follows:

	Best Guess	Optimistic	Aspirational
Trend analysis			
Benchmark analysis			
Best practice analysis			

The most innovative of the demand estimate approaches was the 'Best Practice Analysis', which employed a novel process to estimate the demand. This involved utilising qualitative research methods (supported where possible by quantitative evidence) to investigate the 'best practice' role of, and therefore the demand for, Public Health Physicians across 11 specified areas of Public Health Medicine practice. We believe that this approach has not been previously described in the literature.

The current situation

Based on estimates from three separate data sources, Australian Institute of Health and Welfare (AIHW), Australian Health Practitioners Registration Authority (AHPRA) and the Faculty's own administrative database, the headcount of Public Health Physicians in Australia in 2016 ranged from 381 to 393. The 'best guess' estimate was deemed to be the estimate developed by the AIHW of 381. Since 2001, the AIHW workforce size estimates have varied from as low as 314 to a high of 485 (Figure A). Based on a trend analysis of this data the Public Health Physician workforce in Australia appears to be declining by approximately three practitioners each year.

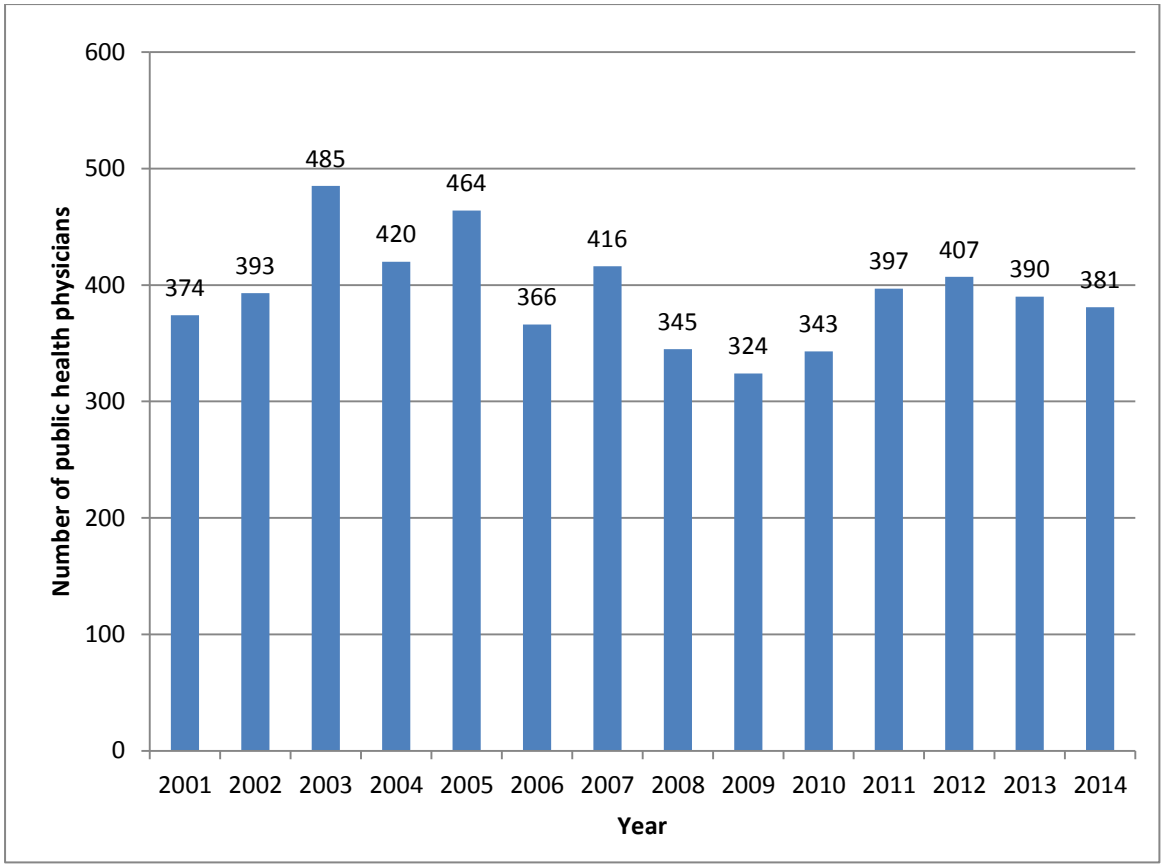

Figure A: Public Health Physician workforce size estimates in Australia, 2001 to 2014

The Public Health Physician workforce has a higher proportion of female practitioners than the rest of the medical practitioner workforce (45.7% and 41.5% respectively) and is older (57% over 55 years old and 27% over 55 years old respectively).

The actual or effective size of the Public Health Physician workforce is smaller than the headcount. Based on the data from a Survey of Fellows and applying standard workforce assumptions to achieve a full time equivalent (FTE) conversion factor estimate, a conversion factor of 0.86 was obtained. That is, each Public Health Physician headcount was on average the equivalent of 86% of a full time worker in terms of participation in the workforce.

The availability of Public Health Physician workers to public health services work is further reduced by Public Health Physician workers engaging in non-public health work, including clinical practice, medical administration and occupational medicine. A participation conversion factor of 0.74 was estimated again based on data from the Survey of Fellows, meaning that on average each Public Health Physician worker was working 74% of their time undertaking public health services work.

Accordingly, each Public Health Physician workforce headcount converts to 0.86 x 0.74 FTE = 0.64. Thus, the effective workforce size is 243.84 FTE.

Public Health Physicians are located in a range of workplace settings with the exception of hospitals (primarily acute inpatient care settings) and residential care settings (especially aged care settings). The two most frequent workplace settings are nonclinical and include various educational settings (tertiary educational facilities, school, other educational facilities) and government departments and agencies. Other hospital settings, general practice and community health are the next three most common workplace settings. A majority (57.6%) of the Public Health Physician workforce delivers services in three areas of public health practice *viz*. disease prevention, policy and planning, and teaching and research (see Table A).

Table A: Distribution of the Public Health Physician workforce by area of public health practice in Australia (*Source: Survey of Fellows, 2016)*)

Areas of practice	Amount of total Public Health Physician worker time spent in each area of practice (%)
Monitoring & Surveillance	9.2
Disease prevention	18.3
Health protection	5.9
Health promotion	4.4
Policy & planning	16.7
System reform	7.3
Engagement & partnerships	4.3
Teaching & research	22.6
Primary health care	5.9
International	5.6

Projected demand estimates

As noted above, five demand scenarios were generated. The 'best guess' scenario estimated very limited growth in demand for Public Health Physician workforce, with demand rising from 242 FTE in 2016 to only 281 FTE in 2026 (1.4% annual compound growth rate). The 'best guess' scenario is shown with the other scenario options in Figure C below, all of which have much higher annual growth rates.

The three 'optimistic' scenarios are separately labelled (A, B and C). The three 'optimistic' scenarios produce a total demand in 2026 of similar size, with an average of 417 FTE and a range in projected 2026 demand estimates from 388 FTE to 467 FTE. Scenario A and B are particularly close with estimates of 395 and 388 FTE respectively.

The difference from the 'best guess' estimate of the average of the 'optimistic' scenarios is 48%. The 'aspirational' scenario, based on a comparatively unsophisticated practitioner to population ratio, appears somewhat unrealistic, and represents over 150% greater demand for Public Health Physician workforce than the 'best guess' scenario.

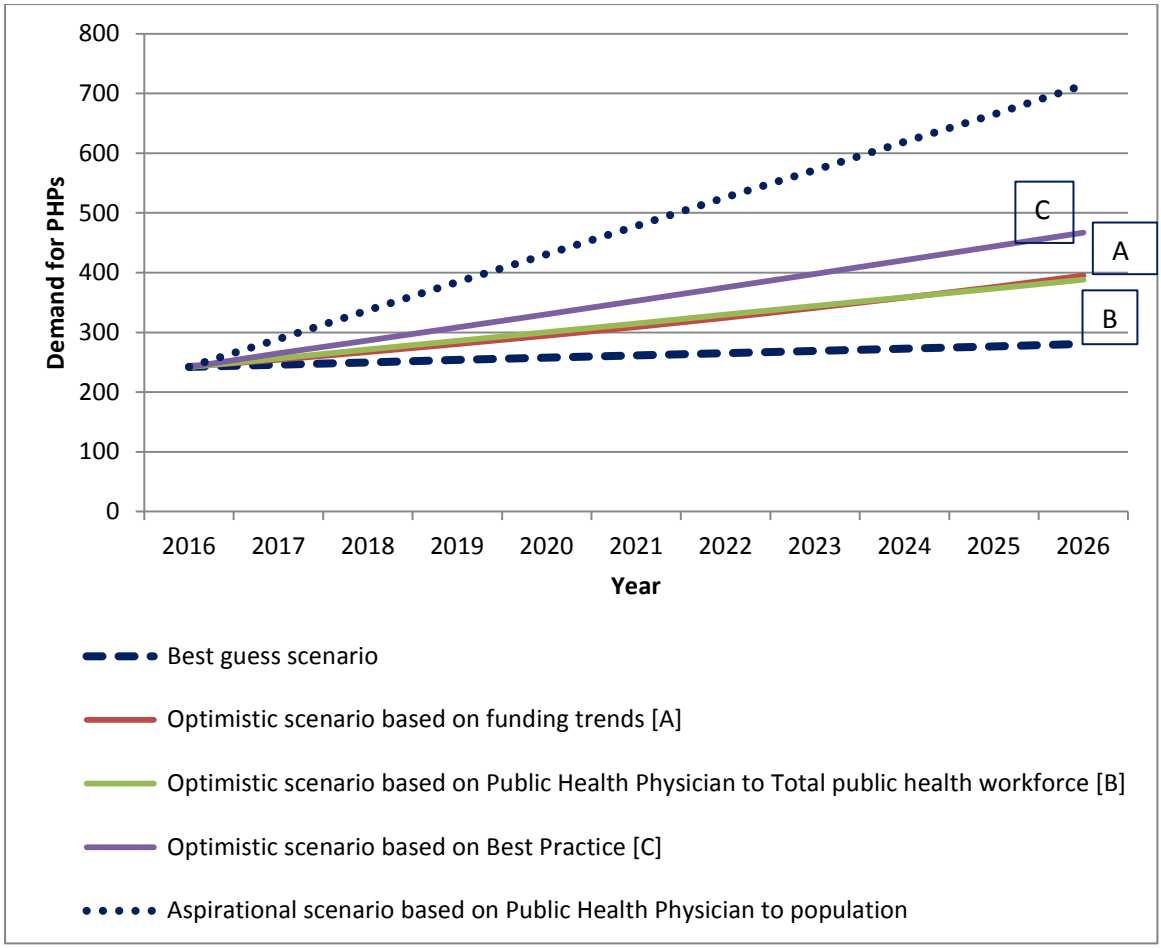

Figure B: Best guess, optimistic and aspirational growth in demand scenarios for Public Health Physician workforce in Australia

The 'best practice' scenario, that which the profession itself might most like to see fulfilled, sees demand rise from 242 FTE in 2016 to 467 FTE in 2026, a compound growth rate of 6.2%. Most observers would accept that this is a quite high rate of annual growth, but this growth is mostly fuelled by projected increases in demand in non-traditional (for Public Health Physicians) areas of practice such as primary health care system/service development, health system reform and health protection.

Projected supply estimates

Data from the RACP, AIHW and AHPRA were analysed to obtain an estimate of new graduates or 'Fellows' of AFPHM, overseas supply, losses to the workforce such as through retirement, and also workforce gains such as 'inactive' Public Health Physicians re-entering the workforce. From the data, employing a 'stock and flow' model, three possible projected Public Health Physician workforce supply scenarios were developed:

1. A 'best guess' scenario – assumes total Trainee position numbers remains at the 2016 level of 68 per year, and that losses of Public Health Physicians from the workforce remain stable at 5% for the duration of the projection period
2. An 'optimistic' scenario – assumes that total Trainee numbers increase after 2016 to the high water mark for the AFPHM Training Program identified in the Medical Training Review

Panel (MTRP) reports as 81. Public Health Physician workforce losses in the first five years stay at 5% but after 2021 the rate of loss decreases to 3%.

3. An 'aspirational' scenario – assumes the number of Trainees entering the AFPHM Training Program continues to grow each year at the rate of optimistic funding growth in public health (5% per annum). Workforce losses are the same as for the 'optimistic' scenario.

The three scenarios are depicted in Figure C. The supply scenarios all begin with 242 FTE in 2016 and provide a range of supply endpoints in 2016 from a low of 289 FTE to 366 FTE, or compound growth rates of 1.6% per annum to 3.8% per annum. Compared with the growth in demand scenarios, the variation in supply growth projections is significantly less.

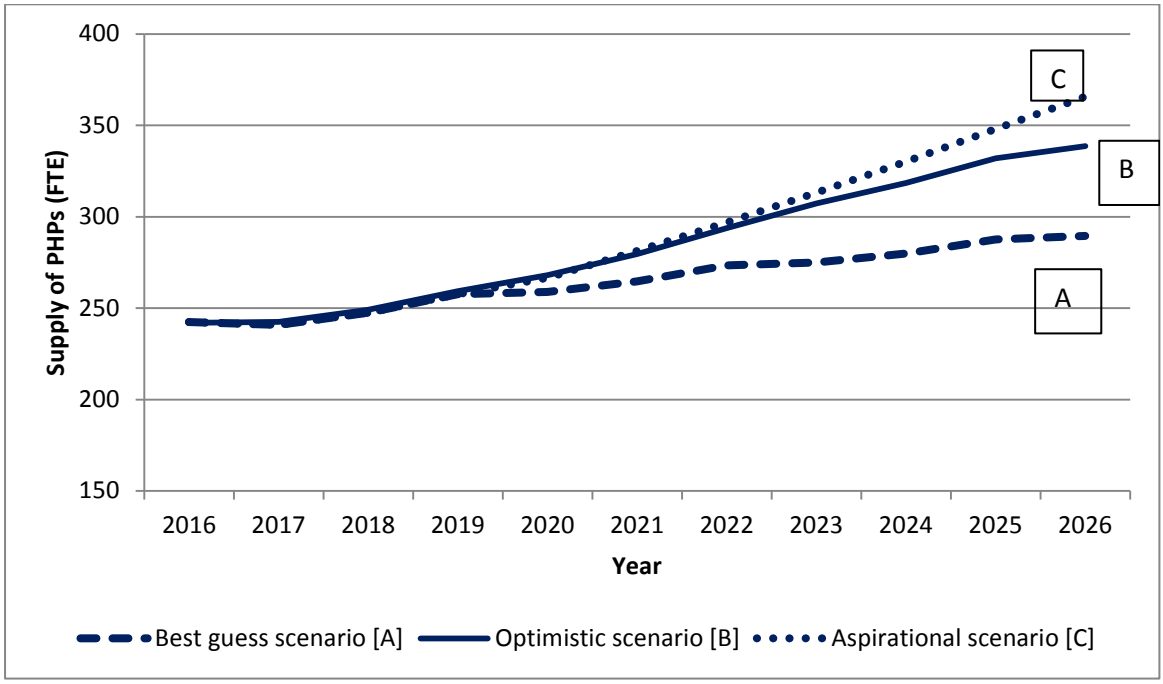

Figure C: Best guess, optimistic and aspirational Public Health Physician supply scenarios in Australia (Workforce in FTE)

Growth rates in Public Health Physician workforce supply, even the more modest 'best guess' scenario estimates, are driven by increased graduates from the AFPHM Training Program. For the last 10 years (2007 to 2016) the supply of Fellows admitted to the AFPHM each year has been relatively stable at an average of 10 per year. But in the years from 2016 to 2026 the average number of new Fellows per year is projected to be closer to 20 for the 'best guess' scenario and more for the other scenarios.

Labour market possibilities

Figure D shows a comparison of the two 'best guess' scenarios for supply and demand for Public Health Physician workforce. In this scenario, if the market is left to follow its own course, both supply and demand of the Public Health Physician workforce is projected to grow much slower in comparison to most other professions in the health system.

Even so, supply will grow quicker than demand for public health physicians leading to an over-supply of physicians in 2026 of approximately 8 FTE, or 2.8% of demand. It is possible in this situation that a greater availability of public health physicians would stimulate employers to use the 'surplus' supply

in novel ways, but this is not guaranteed and 'excess' supply of public health physicians may end up being under-employed (diverted to other areas of medicine).

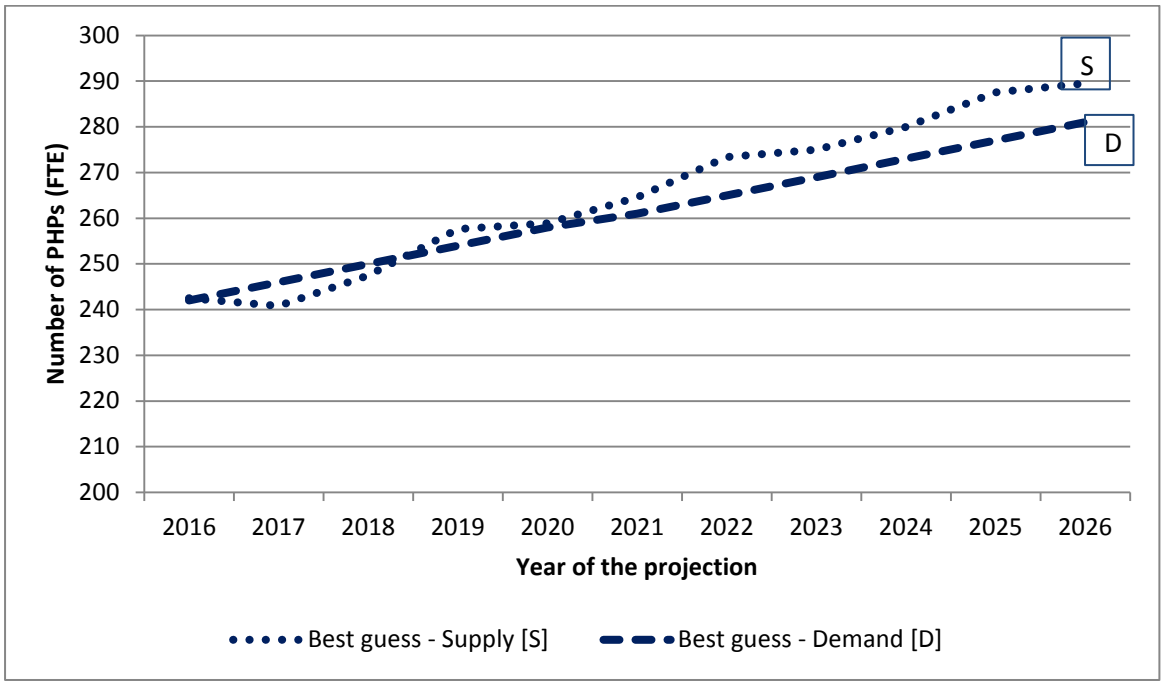

Figure D: Best guess supply versus best guess demand for Public Health Physicians in Australia

This slight over-supply situation would be alleviated by any of the three 'optimistic' demand projection scenarios. In these labour markets, even an 'optimistic' supply projection scenario will deliver a shortfall in supply in 2026 against the demand projections calculated on the basis of funding trends, the Public Health Physician to total public health workforce and best practice respectively of 5.6%, 20.6% and 24.9%.

This situation on the whole remains even if an 'aspirational' supply projection is considered, although supply would restrain achievement of demand outcomes less.

Planning for the future

The 'best guess' labour market scenario projects an excess of Public Health Physician workforce supply over the next decade to growth in demand. This is primarily because projected demand growth is weak. This scenario is likely to lead ultimately to a stagnation of growth in workforce numbers, a fate foreshadowed some years ago by Ridoutt, *et al.* (2010).

Counterpointing this scenario is an 'optimistic' set of demand (best practice) and supply projections, almost the exact opposite of the 'best guess' projections — where demand grows significantly faster than supply.

Neither of these scenarios is predetermined. If no intervention to influence the labour market is undertaken, then the likelihood is that the 'best guess' scenario will come to pass. The 'optimistic' scenario projections are only likely to be realised through concerted advocacy and action in several areas including:

- Locking in the current training numbers in the AFPHM Training Program and if possible expanding its capacity and influence through greater national coordination and integration of the Program, stronger relationships with training position funders (including employers) and by providing ever more efficient and effective Trainee learning experiences

- Advocating government funding in new areas of work for Public Health Physicians consistent with both government priorities and population health objectives to significantly grow demand for Public Health Physician workforce
- Encouraging Public Health Physicians to identify and engage with emerging areas of practice where their skills add value
- Re-orienting where necessary the direction of the Faculty Training Program and individual Trainee learning plans to reflect more closely the future areas of demand for Public Health Physician workforce
- Increasing participation of the Public Health Physician trained workforce in actual public health work through a range of strategies.

Acronyms & abbreviations

ABS	Australian Bureau of Statistics
AFPHM	Australasian Faculty of Public Health Medicine
AHPA	Australian Health Promotion Association
AHPRA	Australian Health Practitioners Registration Authority
AIHW	Australian Institute of Health and Welfare
AMSANT	Aboriginal Medical Service Alliance Northern Territory
CCG	Clinical commissioning groups
CfWI	Centre for Workforce Intelligence
CPD	Continuing Professional Development
CRC	College Research Committee
DPH	Diploma Public Health
FAFPHM	Fellow of the Australasian Faculty of Public Health Medicine
FTE	Full-time equivalent
FPH	Faculty of Public Health (UK)
HCA	Human Capital Alliance (International) Pty Ltd
HWA	Health Workforce Australia
MAE	Master of Applied Epidemiology
MIN	Member Identification Number
MPH	Masters Public Health
NHWDS	National Health Workforce Data Set
NPHP	National Public Health Partnership
NRAS	National Registration and Accreditation Scheme
PHERP	Public Health Education and Research Program
PHN	Primary Healthcare Networks
RACP	Royal Australian College of Physicians
STP	Specialist Training Program
UK	United Kingdom

Contents

Tables

Figures

1. Introduction

This study is the culmination of a concerted effort by the Australasian Faculty of Public Health Medicine over nearly eight years, including a series of workshops, internal Faculty debates and commissioned research directed towards understanding and illuminating possible futures of the public health physician (Public Health Physician) workforce.

While there is growth in other medical workforces, evidence indicates that the Public Health Physician workforce in Australia, and internationally, may be in decline. Understanding and quantifying the supply of and demand for the Public Health Physician workforce in Australia is therefore imperative, however it is a challenging task due to the complex nature of the work performed by Public Health Physicians.

This study set out to achieve the following objectives:

- *to obtain a more accurate quantitative estimate of the current Public Health Physician workforce in Australia and measure the true contribution to public health work*
- *to develop estimates of the projected supply of Public Health Physicians in Australia to 2025, with some sensitivity analysis around workforce wastage rates and training program enrolments*
- *to develop quantitative estimates of current demand for Public Health Physicians in Australia that have high face validity and estimates of projected demand up to 2025*
- *to undertake analysis of the Public Health Physician labour market (supply and demand) from 2015 to 2025*
- *to consider appropriate labour market policy options (training enrolments, employment practices, AFPHM membership, etc.) in response to labour market analysis findings.*

Background to this study

An AFPHM study of *the Unique Contribution of Public Health Physicians* identified the need for a thorough study of the Australian Public Health Physician workforce to better understand: the dimensions of current and future supply; the current requirements for Public Health Physicians; and the future demand (Ridoutt, Madden and Day, 2010). This recommendation was made following an analysis of the Public Health Physician workforce that suggested the specialty was in decline in Australia against a backdrop of significant growth in the rest of the physician workforce. It was one of few specialties seeming to shrink.[1]

The international literature confirms this finding that in Australia and other comparable health systems, the size of the public health workforce in general is 'inadequate' and 'under-supplied' (Glass, 2000, Institute of Medicine, 2007; Faculty of Public Health (FPH), 2008). Perlino (2006) in the USA commented:

[1] Data presented in this report confirm that the size of the Public Health Physician workforce has been trending for a decade down by approximately three to four workers every year.

> *'Despite the importance of public health to the health of our society, this workforce is facing critical challenges, namely a precipitous decline in numbers and resources.'*

In the United Kingdom (UK), the FPH (2008) noted the same trend as Ridoutt *et al.* (2010) of an apparent fall in the numbers working at the specialist level in public health and commented:

> *'Staffing levels of the consultant workforce in the UK remain well below the level required to deliver 'the fully engaged scenario' envisaged by Wanless … and below the 25 per million population recommended and endorsed by the Faculty of Public Health.'* [2]

Current knowledge and understanding

There is scant literature for either Australia or for comparable overseas health systems on the Public Health Physician labour market — that is, objective studies investigating the balance between workforce demand and supply.[3] Where Public Health Physician workforce issues are addressed, few authors have done so on the basis of quantitative data analysis, preferring to rely instead on qualitative or more often opinion (for example Perlino, 2006). This may be due to the well documented challenges of studying both supply of the Public Health Physician workforce (see for example Gebbie, 1999; Moore, 2009) and estimating demand (Ridoutt, *et al*., 2004). The quantitative workforce studies that have been attempted tend to only enumerate supply (e.g. FPH, 2008; Russell and McIntyre 2009; Martin & Spencer, 2015).

Traditional approaches to the study of supply and demand (e.g. Hall and Mejia, 1978) have not proven to be easy to adapt to the Public Health Physician workforce (Ridoutt, *et al.*, 2002). The traditional approach attempts mathematical simulation of workforce *supply* projections based on a stock and flow model, where people entering and exiting the workforce (flows) periodically adjust the initial number in the workforce (stock).

Demand projections in the traditional approach are invariably based on service utilisation rates for each population, age and sex cohort — the current demand for services being directly translated into demand for labour and future demand being driven by population growth. This approach was employed in a recent Health Workforce Australia (HWA) (2012) study of the medical workforce.

The traditional approach — especially for the demand side of calculations — has, in recent years, become increasingly discredited or at least highly questioned (e.g. Segal and Bolton, 2009; Scott, *et. al*., 2011). These authors now argue that trends in service utilisation are poor indicators of future service use. For instance, Scott, *et al.* (2011) argues:

> *'Demand is not the same as utilisation which is not the same as need … [most current models] currently use utilisation which is a function of demand, supply and need. These terms are currently misunderstood and misused, and the economic underpinnings and definitions rarely applied.'*

Irrespective of its deficiencies in general, it is most problematic for the Public Health Physician workforce. Service 'utilisation' statistics, except for a few public health services (e.g. screening, immunisation), tend to have no individual health consumer 'utilising' services. As Ridoutt, *et al*. (2004) described:

> *'The nature of the demand for public health professionals working to improve the health of populations differs significantly from the demand for other health professionals whose primary concern is with the health of individuals … The demand for these types of [clinical] personnel derives directly from the sum of the series of individual demands for their services. Their*

[2] 'Consultants' are mostly, but not exclusively, Public Health Physicians.
[3] One notable exception being a study of the UK public health specialist labour market (Centre for Workforce Intelligence, 2016)

aggregate workload will be influenced by considerations that include especially the size, age/ sex composition and general health status of their respective patient catchment populations … The demand for public health professionals on the other hand is less directly sensitive to population size and composition. Regardless of the size of the population it services, there is always likely to be a critical minimum infrastructure required to maintain the integrity necessary for the successful operation of a public health service.'

The relationship between the size of the Public Health Physician workforce and the population is thus more complex than just the number of people and the age composition (impacting on morbidity levels). This is explored in a Public Health England (2014; see also Allwood, *et al.*, 2012) document:

'Past experience has shown that, where the same set of functions is delivered, a similar size of core team is required. This is true even for a small population. A larger population may not necessarily require a proportionately larger team to deliver some functions like information and statistical analysis but it may for others such as relationship building and managing partnerships. Team size is also affected by the complexity of the local community. For example, a small, highly diverse population with complex health issues may require a larger public health team than a larger, but simpler population in terms of health needs.'

This issue of population size and workforce demand is explored later in the report.

Scoping study

A scoping study was initiated in June 2012 by AFPHM to prepare for a study of the Public Health Physician's workforce, and a final report was accepted in February 2013. The parameters of the scoping study related to the workforce elements that required better understanding:

- To identify ***Australia's*** current Public Health Physician workforce needs. The scoping study determined there would be significant difficulty in attempting to study the Australian and New Zealand Public Health Physician labour markets together, especially given the potentially divergent factors influencing workforce demand in both countries. Hence it recommended separate studies for each country
- To identify what the Public Health Physician workforce will be doing (or could be doing) in Australia in the future (next 5, 10, 15 years) and how this will impact on workforce requirements
- To identify key workforce supply and demand metrics
- To deliver a set of recommendations for use by the RACP and AFPHM to inform the development of the Training Program tailored to meet workforce demand requirements for the next 10 – 15 years.

The *Public Health Physicians Workforce Scoping Study* (Ridoutt, Lin and Hall, 2013) concluded that estimating supply was relatively straight forward (methodologically) using traditional methods but, as noted above, the traditional approach was not appropriate for estimating demand.

Accordingly, three alternative approaches to estimating demand were proposed as possibilities for a future Public Health Physician workforce study. These were:

1. ***Benchmarking and targets approach*** — a theoretical relationship (ratio) is established between the population (segmented into different age categories) and the requirement for health service professionals.

2. ***Service-based workforce planning approach*** — involves planning from the 'bottom up' starting with the provision of specific health care services at a local or regional level. Demand is determined by staffing requirements to operate the service effectively.
3. ***'Best practice' or 'models of care' approach*** — this defines the need for workforce in terms of evidence-based 'best practice' guidelines. The assumption is that once best practice guidelines have been established the staffing/workforce requirements will be transparent.

The following research was recommended to estimate workforce demand:

- undertake a review of the literature on appropriate benchmarks, best practice public health services and staffing requirements
- organise and facilitate a series of 'meetings' of an Expert Panel with the aim of obtaining input to appropriate service benchmarks and 'best practice' approaches. Application of 'Expert Panel' judgements to available data for modelling demand
- administer a survey to an agreed list of employers of Public Health Physicians. Analyse survey data and develop assumptions on a range of demand variables.

This current study has addressed the first two of the above recommended steps.

Objectives of this study

The objectives of the current study are:

- to obtain a more accurate quantitative estimate of the current Public Health Physician workforce in Australia and measure the true contribution to public health work
- to develop estimates of the projected supply of Public Health Physicians in Australia to 2025, with some sensitivity analysis around workforce wastage rates and Training Program enrolments
- to develop quantitative estimates of current demand for Public Health Physicians in Australia that have high face validity and estimates of projected demand up to 2025
- to undertake analysis of the Public Health Physician labour market (supply and demand) from 2015 to 2025
- To consider appropriate labour market policy options (training enrolments, employment practices, AFPHM membership, etc.) in response to labour market analysis findings.

2. Method

In estimating the current supply or size of the Public Health Physician workforce, a traditional 'stock and flow' method was applied by examining a number of different secondary data sources. These included the AIHW, the AHPRA and the RACP. A survey of Fellows and Trainees of AFPHM was also administered to obtain up-to-date information.

The method for demand was estimated using a combination of less traditional approaches:

1. *analysis based on past trends – examination of historic growth in the headcount size of the Public Health Physicians workforce and historic expenditure and investment in public health*
2. *benchmark analysis – investigation of Public Health Physician to population ratio and Public Health Physician workforce to population health workforce ratio*
3. *best practice analysis – a novel approach utilising qualitative research methods to investigate the 'best practice' role of, or demand for, Public Health Physicians across all areas of Public Health Medicine.*

Each approach generated one or more sets of projections for the plan years (2016-2026), delivering five possible future scenarios. The scenarios created through each approach to demand estimation were classified into 'best guess' (most likely to happen without an intervention), 'optimistic' (could happen with feasible policy and administrative interventions) and /or 'aspirational' (unlikely to happen without significant advocacy and appropriate intervention) scenario categories.

Estimate of current workforce size

Traditionally the current demand for workforce is assumed to be the current workforce size (which is also the estimate for supply), economists assuming that the 'market' has found the balance between what can be paid for and what is available at any point in time. In some circumstances, especially where demand for workforce is largely generated by the public sector and there is reason to believe supply is not responding to demand signals in a true market sense, workforce planners talk of 'unmet demand' and will attempt to make adjustments to the current demand estimate accordingly.

For the Public Health Physician workforce, a current workforce size/demand estimate for 2016 is possible using a number of different secondary data sources (see discussion of supply data sources below). The choice of averaging the estimates or, instead, selecting one estimate on the basis of judgement was considered and a decision was made to employ a judgement to select the best estimate.

The workforce size estimate was subsequently used as the estimate for both current supply and current demand in the commencement year of workforce modelling. An adjustment for 'unmet demand' could have been incorporated into the estimate for current demand, but there was no compelling evidence to adopt this path (for instance persistent high levels of position vacancies across geographic areas or numerous reports of widespread recruitment difficulties).

Demand projections

Growth in the demand for Public Health Physicians from the commencement year of the workforce planning (2016) until 2025 was estimated through a number of different approaches, ranging in degree of complexity, appropriateness and credibility. The main approaches adopted were:

- analysis based on trends – largely based on trends in expenditure in public health services and infrastructure
- benchmark analysis – simple benchmark ratios of required Public Health Physician workforce numbers (based on an 'expert' judgement) to appropriate populations
- best practice analysis – expert group judgements on the best practice number of Public Health Physicians required in different public health service settings.

Each approach was used to generate one or more sets of projections for the plan years, delivering possible future scenarios. The scenarios created through each approach to demand estimation were categorised as one of the following:

- 'best guess' (most likely to happen without an intervention)
- 'optimistic' (could happen with feasible policy and administrative interventions), and/or,
- 'aspirational' (unlikely to happen without significant advocacy and appropriate intervention).

Each approach employed generated one or more sets of projections for the plan years, essentially delivering possible future scenarios. The scenarios created through each approach to demand estimation were classified into scenario categories. In all, five scenarios were created as follows:

	Best Guess	Optimistic	Aspirational
Trend analysis			
Benchmark analysis			
Best practice analysis			

Each of these scenario forms are described below.

Analysis based on past trends

Future Public Health Physician workforce growth expectations based on analysis of trends (that is, to obtain an estimate of the percentage growth rate per annum) considered two possible trends:

- The trend in historic growth in the headcount size of the Public Health Physicians workforce
- The trend in historic expenditure/investment in public health.

A relationship between Public Health Physician workforce size and time (years) was established through assembling AIHW workforce size estimates from 2001 to 2014.[4] Given that in some of those years data only on 'principal' area of specialty was published, in some years an adjustment to create a total Public Health Physician workforce figure was required[5]. The trend was estimated through simple linear regression analysis.

[4] Using annually published Medical Labourforce data from AIHW.

[5] In the annual workforce survey of medical practitioner registrants upon which Medical Labourforce data is developed, survey respondents are requested to nominate a 'principal' area of specialist practice and a 'secondary' specialist area. Up to 40% of Public Health Physicians in certain years nominate public health

In the case of expenditure on public health, a relationship between expenditure and time (years) was created for the financial years 1995/96 to 2008/9 based on data from the AIHW publication 'Public health expenditure in Australia 2008–09' (AIHW, 2011). This relationship was extended to 2014/15 by exploring the National Health Expenditure data cubes (AIHW, 2016a) and extracting data for the expenditure category 'public health'. The trend was estimated again using simple linear regression analysis, but because of the somewhat irregular or lumpy nature of public health expenditure (characterised by abrupt increases and decreases in total funding as certain government program specific funds are added or deleted from the total) the regression obtained was somewhat problematic. Alternative regression equations attempting to create a better fit were not an improvement on the simple regression analysis.

Using growth in total public health expenditure and applying this to the Public Health Physician workforce raises some concerns, since the relationship between total expenditure and Public Health Physician workforce is unlikely to be direct. For instance, a significant increase in funding to preventive health programs, such as the National Partnership Agreement on Preventative Health which commenced in 2009, may not impact on the Public Health Physician workforce in the same way as on the health promotion officer workforce. As will be shown later, the Public Health Physician workforce is disproportionately concentrated in certain areas of public health practice and therefore funding increases, if not appropriately targeted, may only have a marginal influence on the Public Health Physician workforce.

In the absence of data which would allow such differential analysis, broad rates of growth in demand derived from trends in total public health expenditure were applied to the Public Health Physician workforce.

Benchmark analysis

There are many benchmark measures that can be used ranging from simple ratios of practitioner to population (e.g. Acheson, 1998) through to more complex workload or staffing requirements based on published evidence (e.g. Shipp, 1998). Two comparatively simple benchmark approaches were adopted for this study:

- Public Health Physician practitioner / population ratio
- Public Health Physician workforce / population health workforce ratio.

Public Health Physician practitioner / population ratio

The simplest way of estimating demand for Public Health Physicians is by adopting a benchmark that could be easily measured, such as a set number of Public Health Physicians per unit number of population. The UK Faculty of Public Health (FPH) have adopted a benchmark, based on the projections of the '*Securing our Future Health*' report (Wanless, 2002), that 25 'consultants' (roughly equivalent to Public Health Physicians) are needed for every one million people.[6] A review of the literature, which focuses especially on ratios relevant to different public health systems (the UK, USA, Canada), along with consultation with key stakeholders, helped determine an appropriate

medicine as their 'secondary' area of specialist practice, thus if only 'principal' area of specialist practice is counted the Public Health Physician workforce will be substantially undercounted.

[6] More recent updates on this benchmark have been generated in 2013 (*Healthy Lives, Healthy People: A public health workforce strategy*) and in 2014 (*Healthy Lives, Healthy People: Strategy Update*), although neither of these two reports changed the original ratio judgement.

benchmark practitioner to population ratio. This ratio was then applied to Australian Bureau of Statistics (ABS) population projections[7] to obtain broad Public Health Physician requirements.

While very simple, and somewhat little valued in the literature (e.g. Scott, *et al*., 2011), the benefit of this method is that it provides a genuine 'benchmark' against which to compare and calibrate estimates from all other demand estimate approaches. Generally speaking, such benchmarks tend to reflect optimisation of the profession in the assessment of workforce requirements.

Public Health Physician / Public Health workforce ratio

An alternative approach is a ratio of Public Health Physicians to the whole of the public health workforce including all other types of public health workforce roles. Given the influence of infrastructure requirements on shaping the demand for Public Health Physician workforce and the types of roles that Public Health Physicians tend to occupy (senior management and leadership roles) this relationship between Public Health Physicians and the rest of the public health workforce is critical (Ridoutt, *et al.*, 2010).

A review of the literature was undertaken to identify either recommended ratios or existing ratios in comparable health systems to Australia (or recommendations based on service establishment in different Australian jurisdictions).

This approach works better for making judgements about staffing arrangements in particular service situations (for instance Schipp, 1998) where a total staffing budget can be determined, but is less suitable for the purpose of this study — to estimate the Public Health Physician workforce for all of Australia. This is because while the Public Health Physician workforce size can be estimated with some reliability (e.g. Beck, *et al*., 2014), the total population of the public health workforce is quite difficult to establish and has not often been attempted, certainly in Australia.

For this study, an estimate for the total Australian public health workforce was developed using available estimates of the constituent parts (e.g. public health nurses, environmental health officers, health promotion officers, etc.) from various sources. The sources included ABS occupation size estimates from the 2011 Population Census and the AIHW workforce publications on registered health professions.

Best practice analysis

The 'Best Practice Analysis' employed a process that appears to be a novel and innovative approach in estimating the demand for any health workforce but certainly the Public Health Physician workforce. This involved utilising qualitative research methods to investigate the 'best practice' role of, or demand for, Public Health Physicians across all areas of Public Health Medicine.

The first step involved identifying and agreeing upon a way to categorise the work of Public Health Physicians in such a way that the workforce requirements of performing that work could be deduced. A literature review was undertaken to generate a list of possible means of classification. The more complex means of classifying public health activity (e.g. Jorm, *et al*., 2009), while potentially more accurate, were rejected primarily on the basis of difficulty in facilitating consultation.

An initial workshop was facilitated in July 2015 in conjunction with the AFPHM Strategic Planning meeting that included representatives from each State and Territory and a number of senior Faculty

[7] ABS publications and downloadable data for population trends and estimates e.g. ABS, Population Projections, Australia, 2004 to 2101 (3222.0) and associated publications are readily available. Past experience has indicated it is best to use 'B' scenario projections or even the higher 'C' scenario.

members and office bearers.[8] One of the two days originally set aside for planning purposes in the project timeline was occupied by the workshop.

The purpose of the workshop was to initiate the thinking and direction for the study in developing and identifying a new method of estimating workforce demand. The specific objectives were to:

- establish a convincing approach for determining an ideal mix of public health services
- identify an acceptable means of quantifying the Public Health Physician contribution to different public health service elements.

Following on from the initial AFPHM Strategic Planning workshop, a series of electronic 'meetings' with the workshop participants were facilitated in order to obtain resolution to the discussions. During these consultations the group identified that determining 'best practice' for specific 'areas of practice' was the most appropriate method to estimate the demand for Public Health Physicians; that is, demand should be understood by evidence-informed guides within each area of practice to then define the staffing/workforce requirements. It was also determined that 'areas of practice' needed to be considered and understood through a 'role delineation' lens.

Significant discussion occurred around the principal areas of practice in which Public Health Physicians might practice. This included 'traditionally understood' areas of practice and new and evolving areas of practice. The discussions and the outcome of those discussions, deriving 10 major areas of practice and a total of 30 sub-areas, are summarised in the 'Guide to consultations determining best practice demand for Public Health Physicians', attached to this report as Appendix A. A summary of the entire approach is provided in Figure 1.

'Expert groups' were formed according to the 10 areas of practice to investigate 'best practice'. Participants (AFPHM Fellows) were purposefully selected for each of the expert groups and invited to participate via teleconference. This ensured appropriate coverage of assembled experts across geographic areas and areas of practice expertise. A list of all the experts who participated in discussions is provided in Appendix B.

A minimum of two rounds of discussions were held with each group, but some groups also held a third discussion. The first round discussions were held for up to two hours and a summary of findings circulated to participants to ensure the discussions were accurately reflected. The second round of discussions were held for approximately one hour and were utilised to explore some of the emerging themes from round one and also to attempt to quantify the role of Public Health Physicians for each area of practice. Due to the overlap that emerged between several of the areas of practice, some of the groups were merged for the second round of discussions.

Information collected through this format was analysed to identify common themes within and across groups.

[8] Since AFPHM is an Australasian organisation, some members from New Zealand were also present. Despite the NZ workforce not being within the scope of the study these Fellows nevertheless played an active part in the discussions.

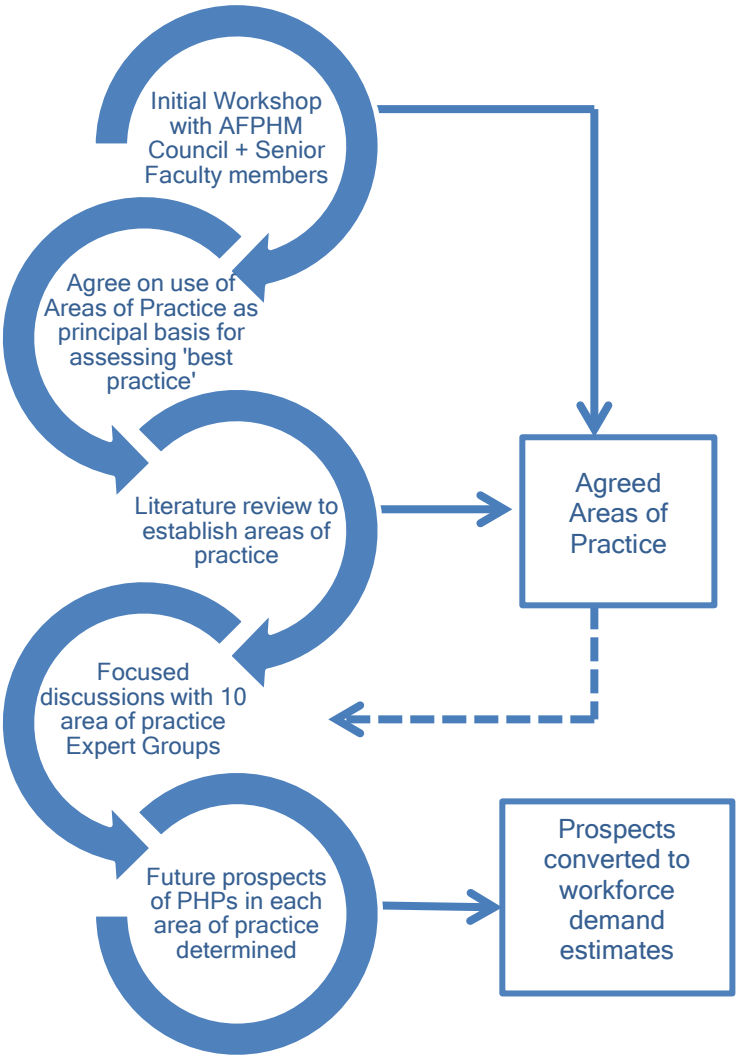

Figure 1: Summary outline of process employed to obtain 'best practice' demand estimates

Sources of data to estimate supply variables

Analysis of secondary data

Australian Health Practitioners Registration Authority (AHPRA)

Workforce data for the total number of Public Health Physicians in Australia and for each state was obtained from AHPRA for the years 2013 to 2016. While AHPRA was established in 2010, registration data is only available from 2012 and separate data for Public Health Physician registrations is only available from 2013.[9]

AHPRA data is collected through annual registrations of health practitioners in Australia and assessed by the Medical Board of Australia. Specialist registration may be granted if a medical practitioner meets the eligibility and qualifications requirements set out in sections 57 and 58 of the *Health Practitioner Regulation National Law*, as well as any registration standards issued by the

[9] Only aggregated data is available for specialists in 2012 from AHPRA, from 2013 data is separated in to specialist categories.

Medical Board of Australia. The Ministerial Council has approved the recognised specialties and specialist titles for each recognised specialty, and 'Public Health Medicine' is on the list of *Specialties & Specialty Fields* recognised.

Australian Institute of Health and Welfare (AIHW)

Data was obtained from the AIHW through a specifically designed and ordered data extract for the years 2011 to 2014 (the latest year for which full data was available at the time of report preparation). The data was drawn from the National Health Workforce Data Set (NHWDS) which contains information on the demographics, employment characteristics, work location and work activity of all medical practitioners in Australia who renewed their medical registration with the Medical Board of Australia via the National Registration and Accreditation Scheme (NRAS) that was introduced on 1 July 2010.

The NHWDS is constructed from registration data and data collected by an electronic survey of medical practitioners administered at the time of registration renewal. The overall response rate to this survey in 2014 was 91.8%. That is, the number of responses to the survey represented 91.8% of total registered medical practitioners.

The data provided in tables and figures in this report from the AIHW source have been adjusted by the AIHW for the non-response rate using standard imputation procedures for item and survey non-response records. From 2013 a change has been made to the method used by AIHW for handling non-response records. Previously, records with survey responses were weighted to make up for those without responses. From 2013 non-responses are imputed instead - see the *AIHW Data Quality Statement* for further detail.[10] This change in method may affect the comparability of the data across the years.

RACP and AFPHM membership statistics

Data for 2016 membership of AFPHM was obtained from the RACP. The RACP manages an administrative database of all AFPHM members and includes the following fields:

- Member Identification Number (MIN) a unique member identifier
- name
- date of birth
- gender
- date commenced training
- home country (country of residence)
- fellowship status (active, honorary, resigned, retired, terminated)
- resignation date
- retired date
- work postcode
- work country
- home postcode
- fellowship admission date

Non-identifiable RACP data was provided to HCA for the entire current AFPHM membership. In 2016 this included 1113 records.

[10] See the AIHW's '*National Health Workforce Data Set: medical practitioners 2014: National Health Workforce Data Set, 2014: Data Quality Statement*' to understand more about the dataset and in particular the means of extrapolating data to cover non respondents.

Survey of Fellows and Trainees

Australian Fellows and Trainees of AFPHM were surveyed to collect information related to supply for the study through two separate surveys (attached as Appendix C and D respectively). The surveys were administered by the RACP using the online survey platform SurveyMonkey to all active (currently financial) Australian AFPHM Fellows and to all Trainees.[11] Both surveys were reviewed and approved by the RACP College Research Committee (CRC) and the Sydney Local Health District Human Research Ethics Committee.

The surveys informed objectives 1 and 2 of the study (see Introduction) which are relevant to Public Health Physician workforce *supply*. The surveys collected information that:

- describes the current Public Health Physician workforce supply in Australia
- assists with understanding and interpreting data from the Medical Workforce Survey administered annually by AHPRA.

The following type of information was collected:

- age
- gender
- work settings
- employer types
- geographic distribution
- future work participation intentions
- types of work practice
- workforce participation
- recent history of employment

In terms of current workforce activity, the survey instruments attempted (1) to capture data similar to that in the AIHW annual survey of registered medical practitioners and (2) to gather data on the current activity of Public Health Physicians in the 'areas of practice' identified during the demand estimate consultations.

Survey of Fellows

An email was sent to 479 Fellows on the administration database, all those who satisfied the two criteria of (1) being 'active' members and (2) having a 'home country' of Australia. They were requested to follow a link to the survey tool. The survey was actively promoted through a number of reminders by email, AFPHM eBulletin, at the AFPHM Strategy Day and other means of standard communication, again offering an electronic link to the survey tool.

A total of 219 Fellows responded to the Survey of Fellows, from which 214 valid responses were obtained for all survey questions (this represents approximately 45% of the 'active' Fellowship).

Survey of Trainees

Trainees were surveyed to examine the 'pipeline' effect on training supply for the future. The Trainee Survey was distributed to 138 eligible Trainees meeting one of the category criteria in Table 1. The definition of each category is provided later in the report.

A total of 43 effective responses were obtained, representing a survey response rate of 31%. The number of responses for each Trainee category is provided in Table 1.

Table 1: Summary of responses to Survey of Trainees by training category in Australia (*Source: Survey of Trainees, 2016*)

Training category	Number of respondents
In active training	39
On interruption to active training	4
At entry to training but not yet started active training	0
Total	43

[11] 'Active members' denotes Fellows and Trainees who have paid their annual AFPHM registration.

Respondents were predominantly female (67% or n=29) and more than half were aged 34 years and under (53% or n=23) with Trainee numbers decreasing with age. One-quarter of respondents commenced their training in 2016 while approximately 20% (n=17) have been in the AFPHM Training Program for at least 3 years.

Over one-third (n=15) of respondents identified that they had an additional specialist registration, the most common being General Practice (n=11).

Estimating supply projections

In a recent large Australian workforce planning study of doctors, nurses and midwives (HWA, 2012) a traditional method approach was employed to project workforce supply to the year 2025. HWA summarise their method as:

> *'The simulation model employed to generate the workforce supply projections is referred to as a **stock and flow model**, where people entering and exiting the workforce (flows) periodically adjust the initial number in the workforce (stock). The workforce is broken down into age and gender cohorts and different flow rates are applied to each cohort. The model then takes these different flow rates into account by progressive ageing of the workforce through iteration of the stock and flow process.'*

This process is represented in Figure 2 below.

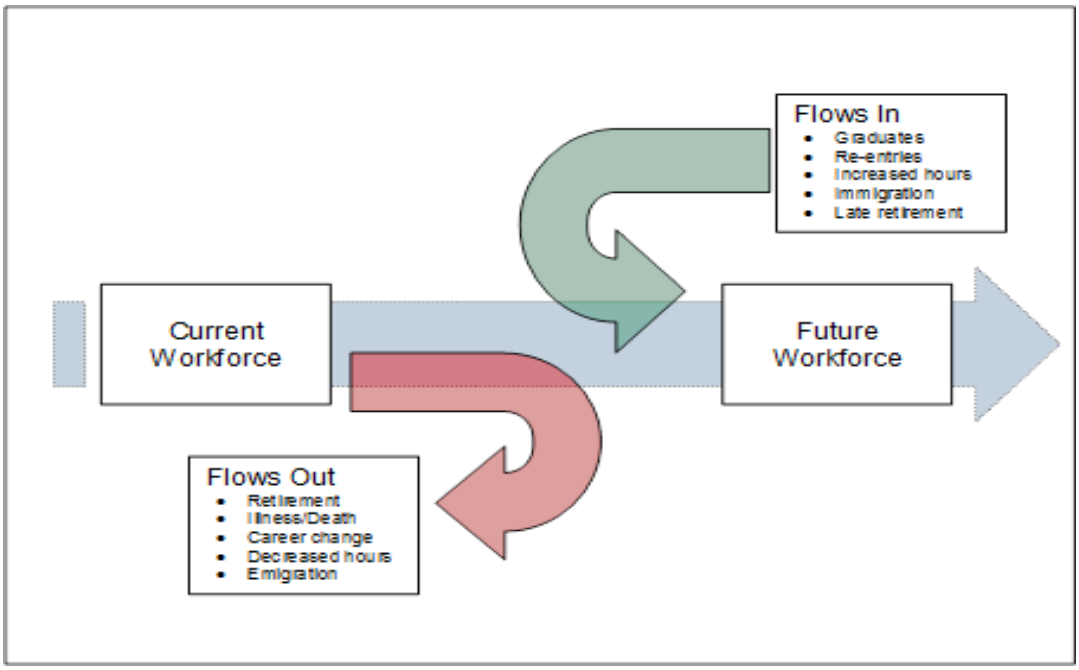

Figure 2: Stock and flow process used by HWA in modelling workforce supply *(Source: HWA, 2012)*

Figure 2 identifies an initial stock, that is, the 'current workforce', which is modified through flows in and out of the workforce, to produce a new stock, 'future workforce'. This process can be modelled on an annual basis to produce projected workforce supply for a designated number of years into the future. For this study, the modelling of projected supply included the 'flow' variables summarised in Table 2. The sources of data used to make estimate calculations are also shown in the Table.

Table 2: Potential variables to model current and future supply and sources of data

Supply variable	Source of data
Active workforce stock (Headcount), adjusted by a FTE conversion factor	**AIHW, AHPRA, RACP**
Gains to the workforce	
▪ new graduate supply – short – medium – longer term	▪ RACP Education & Training database ▪ RACP database ▪ Trainee survey
▪ immigration of Australian trained Public Health Physicians (limited)	▪ RACP database ▪ AHPRA
▪ gains from inactive workforce	▪ Fellows survey
Losses from the workforce	
▪ loss from active workforce	▪ RACP database ▪ Fellows survey
▪ loss from retirement ▪ loss from death & disability	▪ ABS
▪ immigration of overseas trained Public Health Physicians (there are not many of these entrants each year and they should be readily numerated)	▪ RACP database ▪ Fellows survey

The means of estimating different variables and the underlying assumptions made are discussed in more detail in the text of the report.

3. Description of current supply

Utilising various data sources, this chapter provides a description of the current supply of the Public Health Physician workforce. Information about the Public Health Physician workforce is collected by the AIHW, AHPRA and the RACP in varying degrees of detail and reliability. By combining and adjusting the data from all three sources, in terms of workforce participation and year, a 'best guess' estimate or 'headcount' of the workforce size and a description of workforce composition and distribution was obtained.

Estimating actual workforce participation, however, provides a more in-depth and useful description of the workforce. This requires an examination of actual hours worked in Public Health Medicine (Public Health Medicine). Such information can be obtained from the Medical Workforce Survey administered annually by the AIHW. However, there are shortcomings with this data; Public Health Medicine is a secondary speciality for many medical practitioners, and only primary speciality is reported. Data is also incomplete for some years thereby obscuring the actual workforce participation. Data collected from the survey of Fellows administered for this study allowed for greater insight into how much time is actually apportioned to Public Health Medicine. By analysing these data sources a participation rate was calculated which could be applied to the future supply of Public Health Physicians.

Estimated headcount of the 'active' Public Health Medicine workforce

AHPRA estimate

To work as a Public Health Physician in Australia, technically speaking you must first be registered as a Public Health Medicine specialist with AHPRA. Registration as a specialist requires being a Fellow of AFPHM.[12] The number of Public Health Medicine specialist registrants forms a potentially 'hard' boundary around the size of the workforce although there are some Fellows who are potentially not registered but still practising Public Health Medicine (primarily in teaching and research only environments). AHPRA publishes registrant numbers quarterly and the number of registered Public Health Medicine specialists for the period 2013-2016 is shown in Figure 3.

The average number over the last 3.5 years is 434. These numbers include registrants who may not be working, or not working in Public Health Medicine.

AIHW estimate

An estimate of workforce size can be derived from the AIHW NHWDS. This is invariably argued to be the most reliable of estimates of workforce size (see for example HWA, 2012). The estimates from this source for the years 2011 to 2014 are shown in Figure 4. [13] These figures are headcounts of people actually working and do not include registered medical practitioners (with a Public Health

[12] Technically speaking the requirement is to be eligible for Fellowship, although there is no way of knowing if any Public Health Physicians currently in the workforce are not financially up to date Fellows of the Faculty.
[13] The AIHW advise that 2011 data should be treated with caution.

Medicine specialist qualification) who are currently not working (either not working at all or not working in Public Health Medicine).

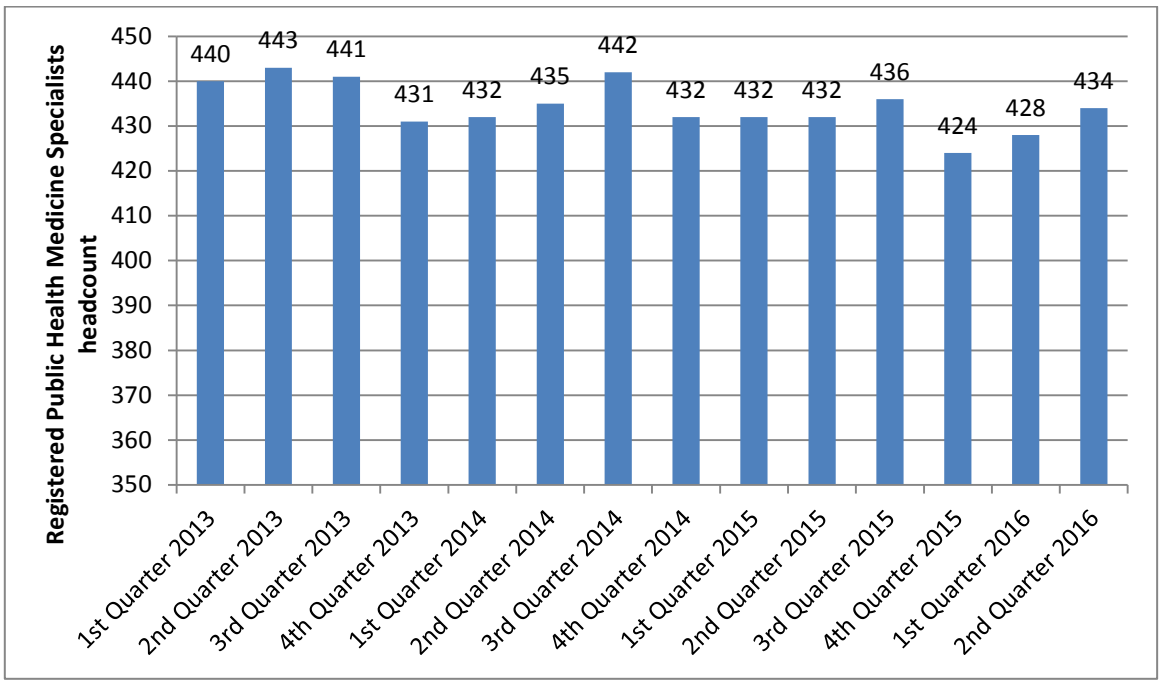

Figure 3: Estimate of the size of the Public Health Physician workforce in Australia based on AHPRA statistics (*Source: AHPRA website*) for the period June 2013-June 2016 in 3 month intervals

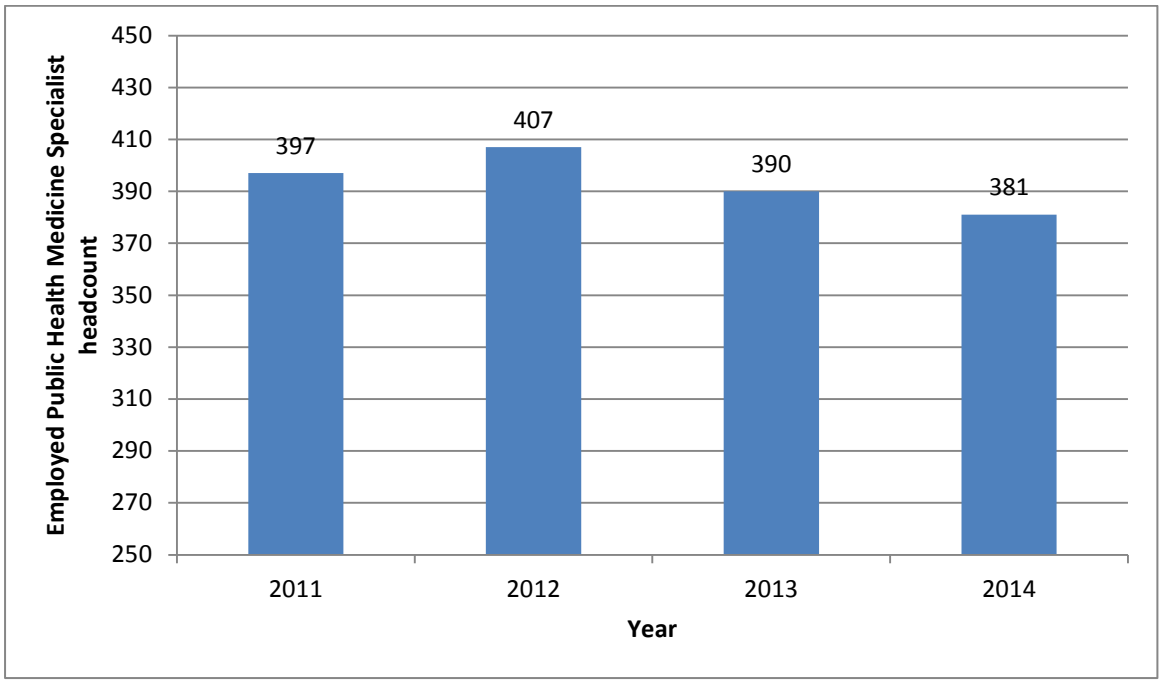

Figure 4: Estimate of the size of the Public Health Physician workforce in Australia based on AIHW data by year for the period 2011-2014 (*Source: AIHW NHWDS)*

Estimate from the RACP database

An alternative way of looking at the total possible workforce size is through AFPHM membership. In 2016 there were 1113 Fellows able to be identified through the RACP database.[14] The administrative status of these Fellows is shown in Table 3, which indicates that only 57% of the Fellows are 'active' (574), that is, currently financial. This does not mean they are also currently working (or working in Public Health Medicine) but it is the most likely reason for maintaining membership.

Table 3: Distribution of the 2016 AFPHM membership by 'Fellow Status' working in Australia (*Source: RACP data, 2016)*

Fellow status	Frequency of Fellow status	Proportion of total Fellows (%)
Active	574	56.7
Honorary	9	0.9
Resigned	197	19.5
Retired	149	14.7
Terminated	83	8.2
	1012[15]	100

AFPHM oversees professional standards for Public Health Medicine in both Australia and New Zealand and currently there are 41 Active New Zealand Fellows. For the purpose of this study, which was to obtain an Australian workforce estimate, New Zealand Fellows as well as those Fellows working full time overseas were excluded.[16] This leaves 479 Fellows 'active' in Australia.

Best guess estimate of workforce size

Although the AIHW data is ascribed greater reliability, for this workforce each of these sources of data has shortcomings. Both the AHPRA and RACP data need to be adjusted for workforce participation, while the AIHW data needs to be adjusted to provide a current (2016) estimate.

The AIHW data on medical practitioners suggests that 89.6% of total registrants are in the workforce at any time (and almost the same figure of 89.7% for Public Health Medicine specialists). However, an estimate constructed from the AFPHM Fellows survey data (arguably more appropriate to apply to RACP data) of workforce participation is 82.2%. These participation rates can be applied to the AHPRA and RACP data to seek an estimate of Public Health Medicine specialists actually working. To adjust the AIHW data to obtain a 2016 estimate, a trend can be established from the AHPRA data for the last two years.

The three estimates of active workforce size of Public Health Medicine specialists are summarised in Table 4.

The estimates range between 381 and 393, a surprisingly narrow band of estimates that vary by only 3%, with the AIHW estimate in the middle. In future projection calculations later in this report the AIHW estimate of current workforce size, a particularly critical variable in workforce projections, is applied. The above estimates provide confidence that this estimate is sound.

[14] This represents the records for all Fellows listed since the commencement of Fellowship.
[15] There are 'members' of the RACP data base who have no Fellowship status. They are specialists in training, or persons who have registered an interest in entering the training program.
[16] Fellows of the Faculty are also working in France, India, Ireland, Malaysia, Netherlands, Philippines, Sweden, Switzerland, Trinidad and Tobago, United Kingdom and the United States.

Table 4: Best guess estimate of current workforce participation rate in Australia

Data source	Raw estimate (Year of data in brackets)	Applying a best guess workforce participation rate
AIHW	381 (2014)	381 (adjusting to 2016 by applying trend on AHPRA data)
AHPRA	434 (2016)	389 (applying AIHW workforce participation rate)
RACP	479 (2016)	393 (applying AFPHM Fellows Survey workforce participation rate)

Workforce composition

The current Public Health Physician workforce is composed of just over 45.7% women compared with the total medical practitioner workforce of 41.5% (AHPRA, 2016). According to AIHW data, the Public Health Physician workforce is also older, with nearly 57% aged over 55 or more years. This is different to the total medical work, with 27.2% of the workforce population aged 55 and over years old. By way of further comparison, 24% of the UK specialist public health workforce (FPH, 2008) is over 55 (a similar proportion to the total Australian medical workforce). Details on the gender and age distribution of the workforce are provided in Figure 5.

Respondents to the AFPHM survey over the age of 55 are predominantly male (70%). Conversely, respondents aged 54 and under were predominantly female (75%).

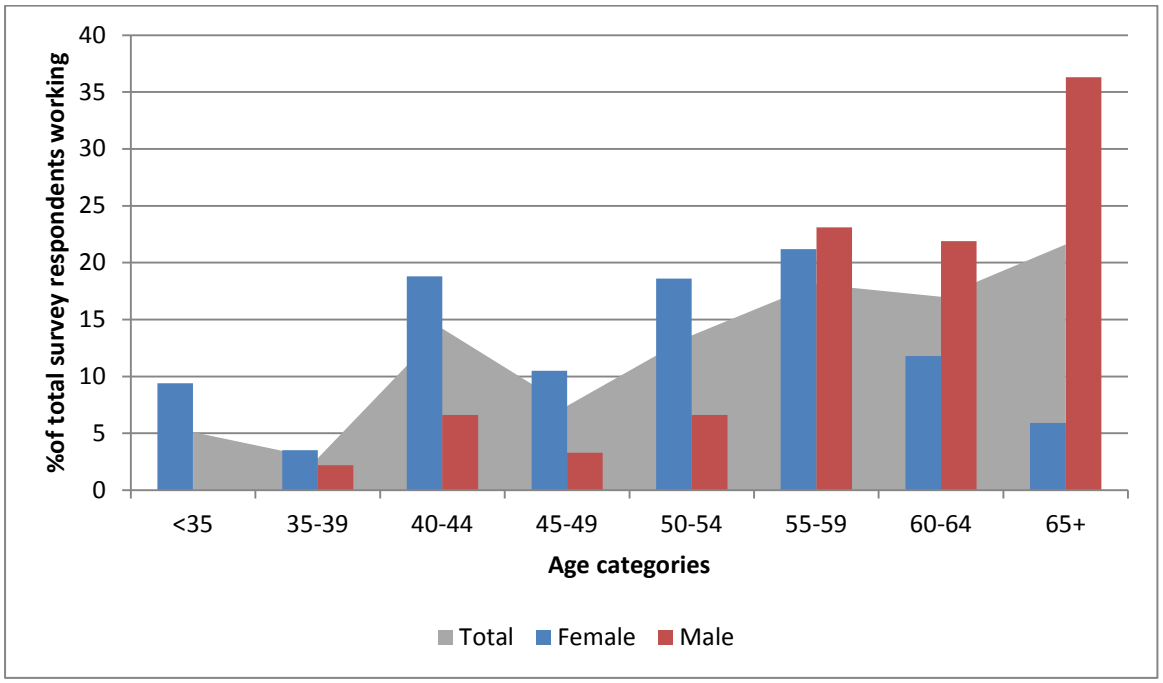

Figure 5: Distribution of the Public Health Physician workforce in Australia by age and gender (n=177) (*Source: AFPHM Fellows Survey, 2016)*

Workforce distribution

Geographic distribution

Most Public Health Physicians are working in metropolitan locations (see Figure 6), approximately 78%.

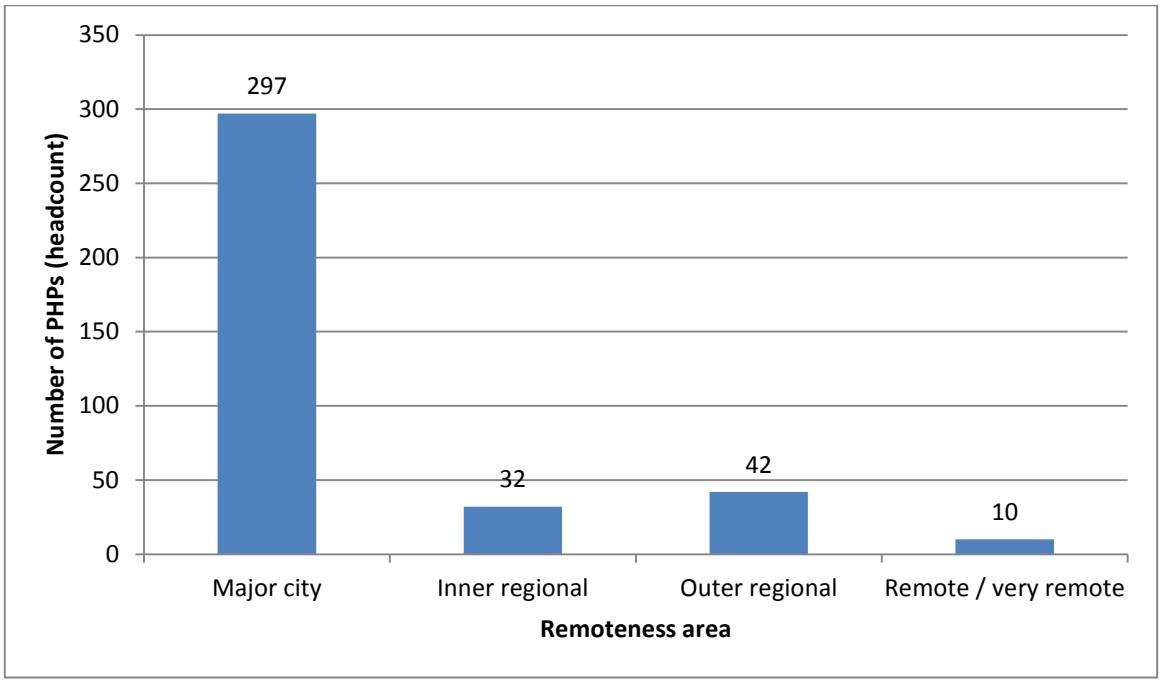

Figure 6: Distribution of Public Health Physician workforce by remoteness of area in Australia (*Source: AIHW NHWDS, 2014 data)*

Distribution by state & territory

Similarly, the distribution of the workforce between the different jurisdictions is not in keeping with the population distribution (see Table 5).

Table 5: Distribution of the Public Health Physician workforce by Australian state and territory of primary place of work (*Source: AIHW NHWDS, 2014 data*)

Jurisdiction	Number of Public Health Physicians (headcount)	Public Health Physicians per 100,000 population[17]
NSW	125	1.66
Victoria	72	1.23
QLD	64	2.48
WA	37	1.43
SA	26	1.54
Tasmania	9	1.74
ACT	25	6.47
NT	23	9.38

[17] Based on data provided in Australian Bureau of Statistics (2014) *3101.0 - Australian Demographic Statistics, June*.

Table 5 suggests a generally inverse relationship between State and Territory population size, and the ratio of the Public Health Physician workforce to population in each jurisdiction. The cause of this is open to conjecture.

Distribution by workplace setting

Public health physicians are located in a range of workplace settings (see Table 6 and Figure 7) with the exception of hospitals (primarily acute inpatient care settings) and residential care settings (especially aged care settings). The two most prevalent workplace settings are nonclinical and include various educational settings (tertiary educational facilities, school, other educational facilities) and government departments and agencies. Other hospital settings, general practice and community health are the next three most common workplace settings.

There are different patterns of workforce distribution between public health physicians who nominated Public Health Medicine as their primary or secondary specialty. Those who identified Public Health Medicine as their secondary specialty were much more likely to work in solo and group (general) private clinical practice settings and in other hospital settings. Those who nominated Public Health Medicine as their primary specialty were more likely to be employed in tertiary educational facilities and other government departments and agencies.

Table 6: Distribution of the Public Health Physician workforce by nominated order of specialty primary and secondary and by workplace setting in Australia (*Source: AIHW NHWDS, 2014 data*)

Order of specialty	Workplace settings (see below for key to settings)																		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Primary specialty	7	9	4	9	0	4	20	0	6	17	0	0	0	7	56	1	1	76	18
Second-ary specialty	13	25	2	10	2	3	3	0	8	30	0	1	0	4	20	2	3	6	8
Total	20	34	6	19	2	7	23	0	14	47	0	1	0	11	76	3	4	82	26

Key to workplace settings

A = Solo private practice
B = Group private practice
C = Locum private practice
D = Aboriginal health service
E = Community mental health service
F = Community drug and alcohol service
G = Other community health care service
H = Hospital
I = Outpatient services
J = Other hospital service
K = Residential aged care facility
L = Residential mental health care service
M = Other residential health care facility
N = Commercial/business service
O = Tertiary educational facility, School, Other educational facility
P = Correctional service
Q = Defence forces
R = Other government department or agency
S = Other

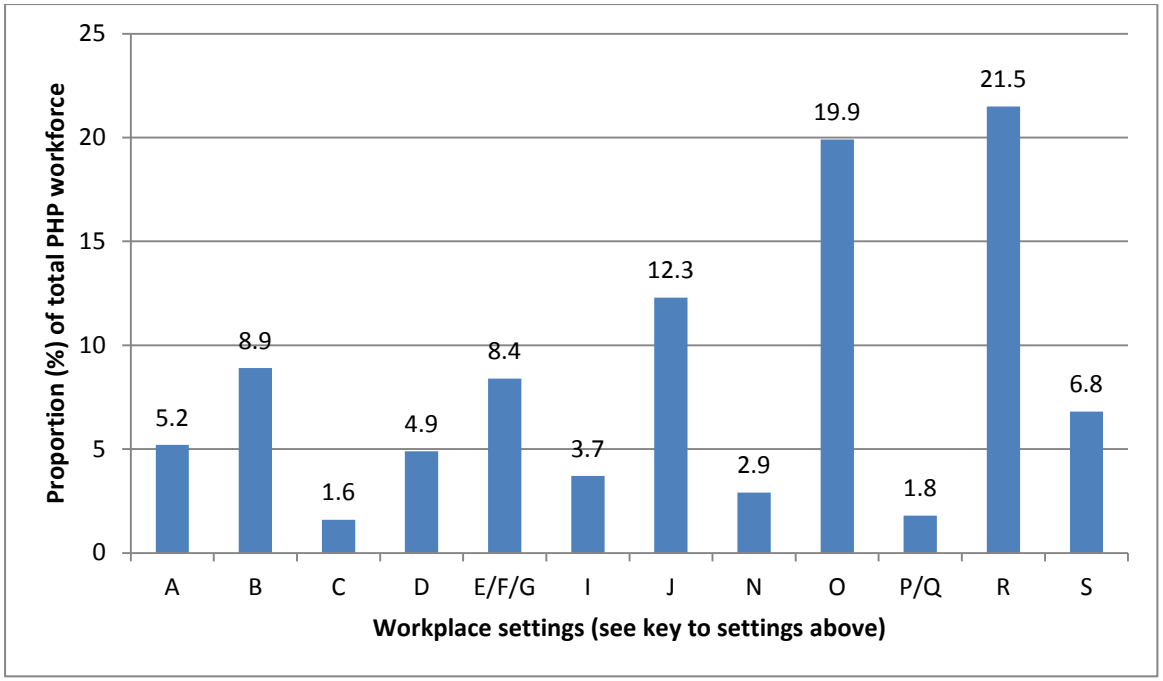

Figure 7: Summary of total Public Health Physician workforce in Australia proportional (%) distribution by workplace setting (*Source: AIHW NHWDS, 2014 data*)

Estimated actual participation in the Public Health Physician workforce

Headcount figures need to be adjusted for actual participation in terms of total hours worked and, more importantly in the case of Public Health Medicine, hours performed in the work of Public Health Medicine. Just because a Public Health Medicine specialist is working, does not mean they are doing Public Health Medicine work.

Full-time equivalent

Data from the Survey of Fellows indicated that those Fellows who are working did so, on average, 36.6 hours per week, ranging from one hour per week to 80 hours. This provides for a 'full-time conversation factor' (assuming a 40 hour week to be full-time) of 0.91.

The AIHW data estimates that all Public Health Physicians worked in 2014 on average 41.7 hours per week. The average workforce participation rate though varied between job settings and practice settings. For the three main settings for jobs performed by Public Health Physicians in 2014, the average hours per week worked ranged from 41.8 hours (government department or agency) to 44.8 hours (Hospital[18], see Figure 8).

[18] Primarily outpatient and 'other hospital' service settings.

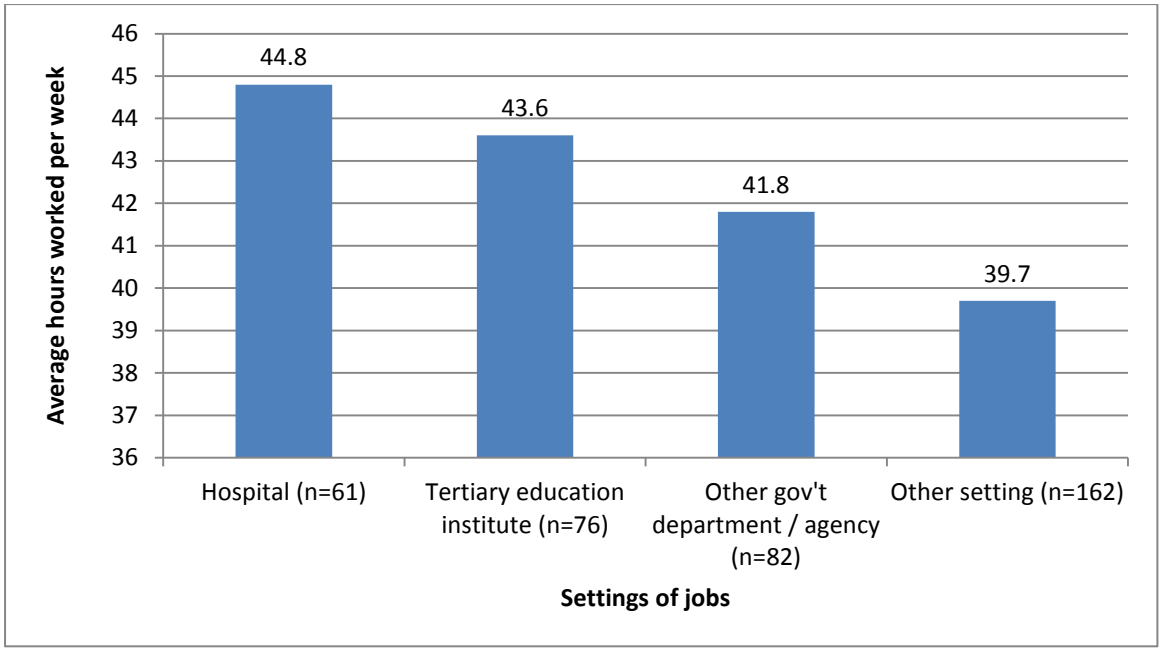

Figure 8: Average hours worked per week of main categories of Public Health Medicine Specialists in Australia in 2014 (*Source: AIHW NHWDS*)

Some detail on the categories in the 'Other setting' is provided in Figure 9.

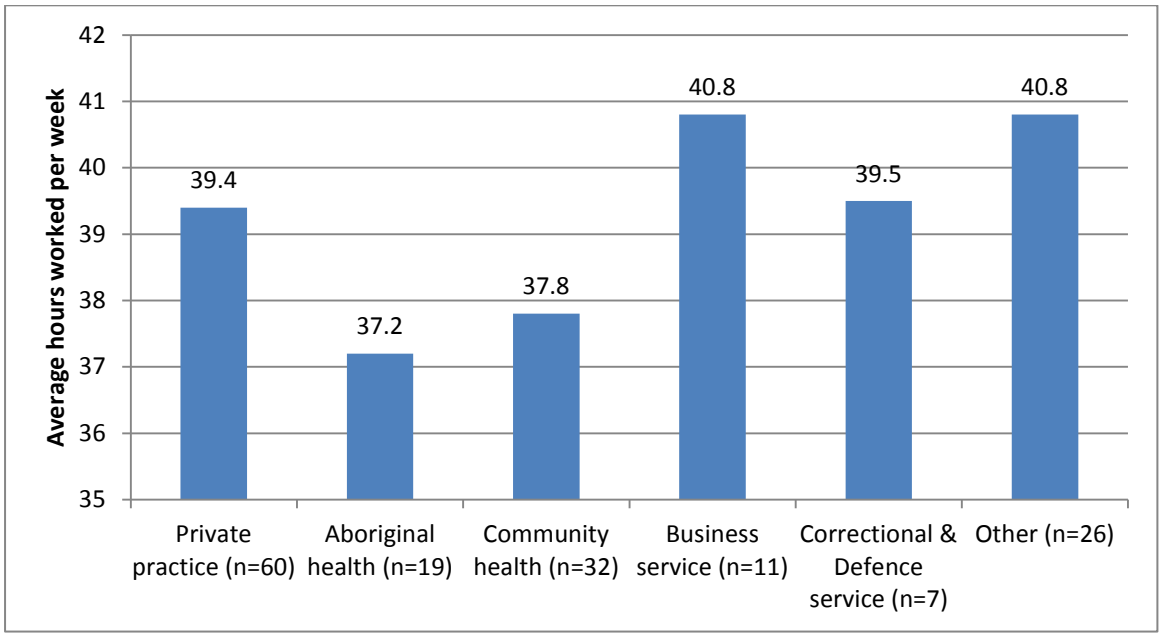

Figure 9: Other practice settings for Public Health Physicians Australia (*Source: AIHW NHWDS*)

Based on the AIHW data, an FTE conversion factor (that converts headcounts into a 'full-time equivalent' number) would need to be set quite high at almost 1.0. However, a limitation with the AIHW data is that FTE is calculated by averaging all hours worked. From a workforce planning perspective, a 'headcount' of one person who is working 80 hours per week does not translate into 2 FTE; if this person leaves the workforce it will rarely create two full-time vacancies. A more appropriate way to calculate the FTE conversion factor is to consider all workers working at 40 hours or more simply as 1 FTE (that is 40 hours), and then average the total hours. **Using the Survey of Fellows data, and applying the above rule, an FTE conversion factor of 0.86 was obtained**.

Participation in the Public Health Physician workforce

While medical practitioners with a Public Health Medicine specialist title participate in the workforce close to full-time levels, it is not clear that they are always performing the work of a Public Health Physician. This is typical of Public Health Physician workforces in other countries, for instance in Canada only 60% of 'qualified' Public Health Physicians actually perform Public Health Physician work (Russell and McIntyre, 2009).

The Survey of Fellows data shows that approximately one-third (31.8%) have at least one other area of recognised specialty. Nearly 20% of those with a second specialty have more than two. The most common other types of specialist fellowship held by Fellows in addition to their FAFPHM were General Practice (18 or 8.1% of all Public Health Medicine Fellows), followed by Medical Administration, Psychiatry/ Addiction Medicine and then several other physician specialties (see Table 7).

Table 7: Distribution of Public Health Physician workforce by type of second area of specialty in Australia (where possessed, n=215) (*Source: AFPHM Fellows Survey, 2016*)

Other speciality types	Count of other speciality types[19]	Proportion of total Fellows with other specialty (%)
General Practice	18	8.1
Medical administration	10	4.5
Psychiatry / Addiction medicine	10	4.5
General paediatrics	7	3.2
Occupational and environmental medicine	7	3.2
General medicine	6	2.7
Sexual health medicine	5	2.3
Palliative medicine / Pain medicine	4	1.8
Community and child health	4	1.8
General pathology / Forensic pathology / Microbiology / Haematology	4	1.8
Infectious diseases	2	0.9
Respiratory and sleep medicine,	2	0.9
Specialist physician	2	0.9
Cardiology,	1	0.5
Geriatric medicine	1	0.5
Gastroenterology and hepatology	1	0.5
Immunology and allergy	1	0.5

AIHW data indicates that the survey of AFPHM Fellows might be underestimating the proportion of Public Health Physicians with a second specialty (see Table 8).

[19] Note that some survey respondents have more than two specialist qualifications in total.

Table 8: Proportion of Public Health Physicians working in Australia who nominated a secondary specialty area in each of the years 2001 to 2015 (Source: AIHW NHWDS)

Status of Public Health Medicine speciality	Year of data collection			
	2011	*2012*	*2013*	*2014*
Primary specialty is Public Health Physician	209	261	239	240
Primary specialty is other	188	147	151	141
Proportion (%) of total identifying Public Health Medicine as secondary specialty	47.4	35.6	38.7	37.1

The AIHW estimates that between 36% and 47% of Public Health Physicians practising in Australia in the Public Health Medicine specialty are also practising in a second medical speciality. [20] While evidence is hard to assemble, it is thought that the level of possession of multiple specialist accreditation within the Public Health Physician workforce is higher than other areas of specialist medical practice.

The survey of AFPHM Fellows allows greater insight into just how much work time qualified Public Health Physicians devote to Public Health Medicine work. Figure 10 shows the distribution of Fellows work hours (those currently working in Australia who have indicated at least some of their time is allocated to Public Health Medicine, n=176[21]) according to broad areas of medical practice.

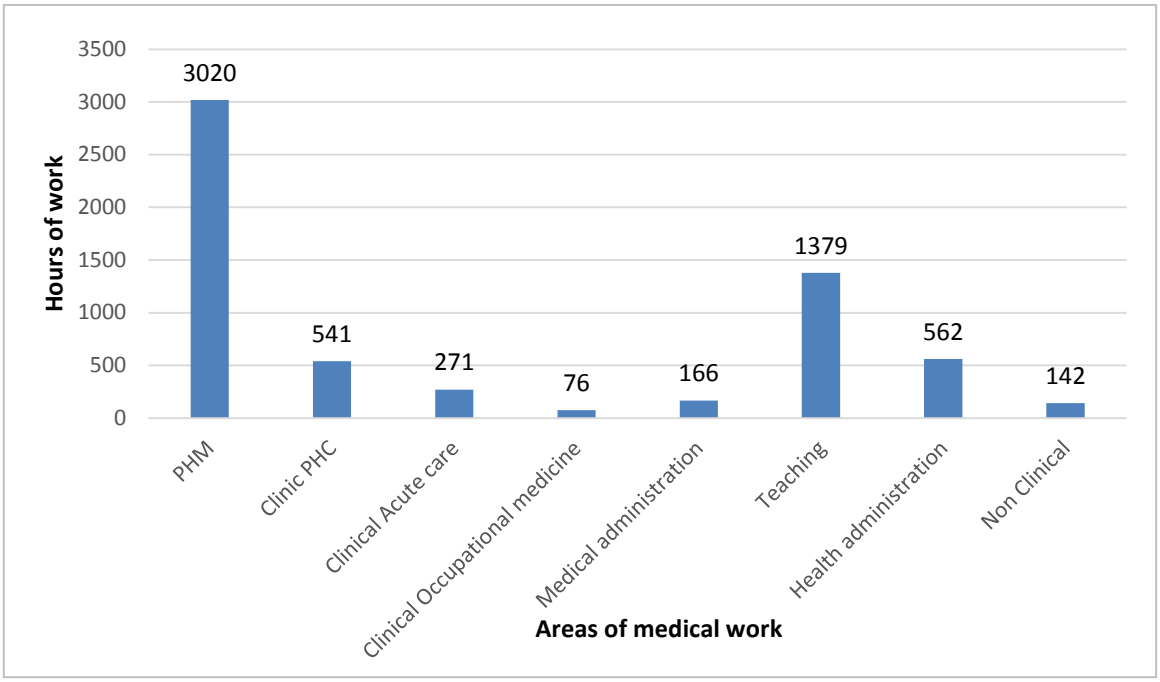

Figure 10: Distribution of total work hours per week of Fellows in Australia by areas of medical work (n=176) (*Source: AFPHM Fellows Survey, 2016*)

[20] The higher estimate in this range is based on the 2011 data, which elsewhere has been shown to be problematic. Otherwise the range is from 35.6% to 38.7%. Note also that the AIHW data is based on self-reporting.

[21] Excludes those 'Not Working' or those 'Working overseas'.

Just under half of the total hours worked by Fellows (49.0%) is directly in Public Health Medicine practice. If it is considered that all 'teaching' hours (22.4%) and all 'non clinical' hours (2.3%) are also Public Health Medicine practice, then just under three-quarters (73.7%) of those Fellows total work hours are contributing to Public Health Medicine work.

This potentially provides a participation rate of 0.74, which can be applied to new supply to the Public Health Medicine workforce (that is, graduating Trainees and new registrants entering through immigration).

4. Demand projections

The findings obtained from analyses for the demand of the Public Health Physician workforce demand projections for the workforce are presented. As described in Chapter 2, demand was examined in three ways: by analysing trends in employment of Public Health Physicians from 2001 and trends in government expenditure on public health; through analysis of benchmarking ratios for Public Health Physicians to population and Public Health Physicians to other public health practitioners; and by analysing 'best practice' demand by area of practice for Public Health Physicians.

The analysis of 'best practice' was undertaken using qualitative research methods providing a novel approach for defining the role of Public Health Physicians, and therefore the demand for Public Health Physicians. Findings from discussions with the expert groups provide insight into the current and emerging Public Health Medicine areas of practice and challenge accepted definitions and jurisdictions for the role of Public Health Physicians in Australia.

The 'best guess' scenario estimated very limited growth in demand for Public Health Physician workforce, with demand rising from 242 FTE in 2016 to 281 FTE in 2026 (1.5% annual compound growth rate). The three 'optimistic' scenarios produce a total demand in 2026 of similar size to each other, with an average of 437 and a range variation from this average of less than 10%. By contrast, the average difference from the 'best guess' estimate of the optimistic scenarios is 35.7%, with an average annual compound growth rate of 6.4%.

The 'aspirational' scenario, based on a comparatively unsophisticated practitioner to population ratio, appears unrealistic, and represents over 150% greater demand for public health physician workforce than the 'best guess' scenario.

Demand estimates based on trend analysis

Trends in employment of Public Health Physicians

Data on the size of the Public Health Physician workforce is available from AIHW from 1998, but the data collection is inconsistent because:

- in certain years some jurisdictions did not provide medical workforce data and
- for many years the Public Health Physician numbers reported only reflected 'primary specialty' figures, which might account for only 40% to 60% of the total Public Health Physician workforce.

Figure 11 summarises the estimated Public Health Physician workforce size for the period 2001-2014 inclusive. Note that several years are estimates adjusted for either incomplete survey numbers (missing jurisdictions) or only 'primary specialty' number reported, or both.

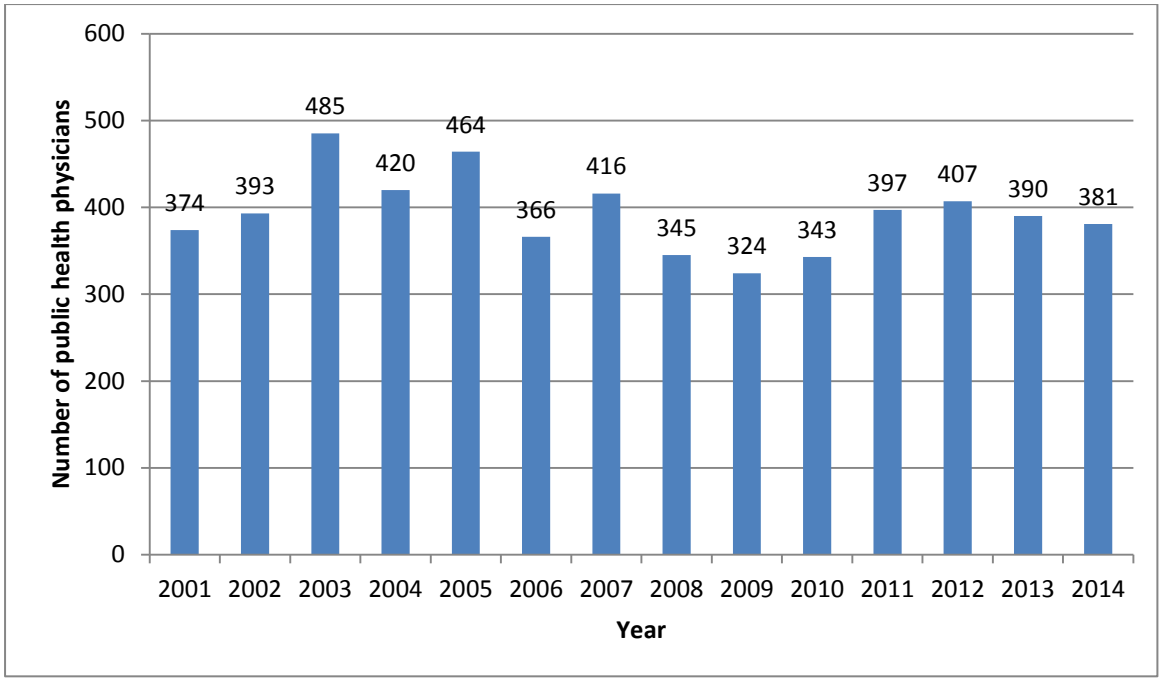

Figure 11: Size of the Public Health Physician workforce in Australia, 2001 to 2014 (2008 -2010 estimates based on 'Primary specialty' designation) (*Source: AIHW Annual Medical Workforce Reports*)

To the extent that applying a regression analysis to this data is appropriate (given the uncertainty around the data from some years) the workforce size trend appears to be towards a diminishing workforce (slope of -3.5, significant at the 95% level). If the trend was sustained, the Public Health Physician workforce headcount in 2025 would be 342.

This figure could be assumed to be the underlying demand for the Public Health Physician workforce as increasingly Public Health Physicians are being replaced by non-Public Health Physician workforce with other seemingly relevant qualifications and public health experience. As argued in *The Unique Contribution of Public Health Physicians to the Public Health Workforce* by Ridoutt, *et al*. (2010), this does not represent an appropriate example of labour substitution, since the Public Health Physician skills set at best is only partly being replaced and there are unique skills that in most circumstances cannot be replaced. Nevertheless, pressure to reduce salary expenditure with less expensive labour will continue to be strong on public health service managers and other employers of Public Health Physicians.

Trends in expenditure on public health

Expenditure in the area of public health has been trending towards an absolute increase (in constant prices) over the last 20 years (see Appendix E for details of total Government expenditure on public health in constant prices and $'s per person). The increase over that period of time has been approximately 5% per annum (see Figure 12).

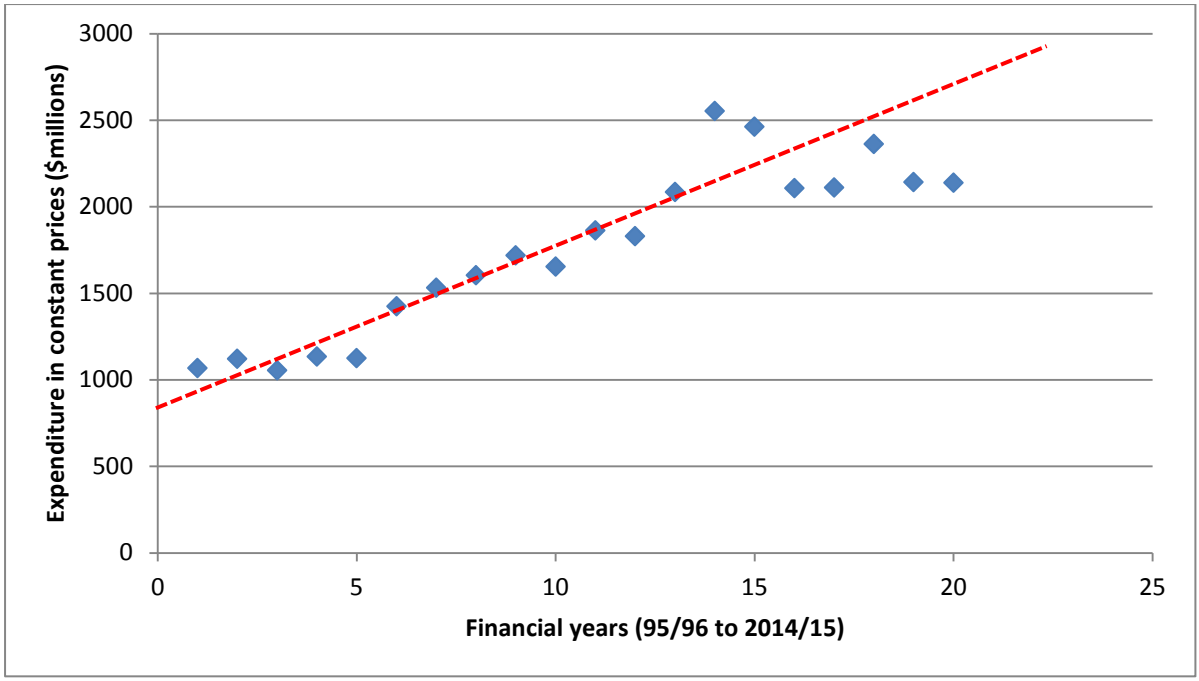

Figure 12: Distribution of expenditure on public health by Australian Governments (Commonwealth and State and Territory) in constant prices between FY 1995/96 and 2014/15 (*Source: AIHW health expenditure database)*

The regression equation for the slope of the line of best fit (R Squared = 0.82, P<0.01) in Figure 12 is:

$$Y = 955 + 75.9X$$

This equates to an annual growth rate in Government (Commonwealth and State/Territory) expenditure on public health as noted above of 5%.

However this regression equation, constructed from 20 years of data (1996 to 2015) is strongly influenced by 'surges' in Commonwealth Government funding (see Table 9) often around specific programs (such as the National Partnership Agreement on Preventative Health which commenced in 2009). Arguably, short and medium term future investment might be better based on funding performance of the last ten years. Between the financial years 2003/4 and 2013/14, public health expenditure grew at just over 3% per annum. This compares with growth rates for Total Health Expenditure, Expenditure on Hospitals and Expenditure on Primary Health Care (of which 'public health' is a component) of 5.7%, 5.4% and 5.3% respectively. If a trend is based only on the last 5 years of public health expenditure, then the growth rate is only 1.5% per annum on average.

Key finding:

The 'best guess' for future trends in expenditure would be the more recent 1.5% per annum growth — the current political environment seems unlikely to significantly shift expenditure on health in general and on public health in particular. An 'optimistic' outlook would be for public health expenditure growth to mirror that of other sectors (hospital, primary health care) and grow at 5% per annum. Projected demand estimates based on both these growth rates are provided in Table 9.

Table 9: Projected demand for Public Health Physicians in Australia 2016-2026 based on public health investment trends

Year	Projected demand for Public Health Physician workforce (headcount) based on 'best guess' growth rate		Projected demand for Public Health Physician workforce (headcount) based on 'optimistic' growth rate	
	Headcount	FTE	Headcount	FTE
2016	381	242.5	381	242.5
2017	387	246.3	400	254.6
2018	393	250.1	420	267.3
2019	399	253.9	441	280.7
2020	405	257.7	463	294.7
2021	411	261.6	486	309.3
2022	417	265.4	510	324.7
2023	423	269.2	536	341.1
2024	429	273.1	563	358.3
2025	435	276.8	591	376.1
2026	442	281.3	621	395.2

Also of relevance to the overall growth in public health expenditure is the areas of public health work where funding is being distributed. The largest areas of government expenditure (immunisation, health promotion, screening programs, prevention of harmful drug use) which account for almost three quarters of total funding (74.3%) are all areas of work that employ small numbers of Public Health Physicians (see Table 10).

Table 10: Total government expenditure on public health activities, current prices, by activity in Australia ($million) (*Source: AIHW health expenditure database, 2015, Activity categories defined by AIHW*)

Activity	Australian Government	State and territory governments	Total	Proportion of total expenditure (%)
Communicable disease control	25.1	259.8	284.9	12.4
Selected health promotion	132.9	305.4	438.3	19.1
Organised immunisation	64.7	574.7	639.4	27.8
Environmental health	20.3	79.6	99.9	4.3
Food standards and hygiene	19.0	19.0	38.0	1.7
Screening programs	110.5	225.8	336.3	14.6
Prevention of hazardous and harmful drug use	122.6	172.4	295.0	12.8
Public health research	138.6	29.7	168.3	7.3
Total expenditure	633.7	1666.4	2300.2	100

Demand estimates based on benchmarking

Simple ratio benchmarks

Because of its simplicity, many authors have offered opinions about an appropriate **Public Health Physician practitioner to population ratio**, based on either an individual or collective (expert group) judgement (e.g. FPH, 2004) or through some analysis of available data (e.g. Leep, 2006).

Arguably the most influential practitioner to population ratio estimate, or at least most quoted, has been that promoted for the UK public health specialist workforce (FPH, 2004). In this report the FPH recommended a minimum target of 25 public health consultants (which are assumed to be FTEs although the guidelines do not make this clear) per million population, a significant increase on the previous recommended staffing target of 15.8 consultants per million of population (Acheson, 1998).[22] The FPH provided a detailed justification of the recommended figure based on a synthesis of a number of studies. Subsequently the FPH offered in 2006 a guide (which remains current) as to how this practitioner to population ratio might be distributed across organisations / functions to satisfy the needs of a hypothetical five million population of a 'typical' Strategic Health Authority. This hypothetical staff structure is shown in Table 11 below.

Table 11: Recommended consultant staffing for a 'typical' public health service for a population of 5 million in the UK (*Source: FPH, UK*)

Organisation	No. of Consultants	Comments
SHA/ Regional Office[23]	12	Includes PH Observatory, networks, registries and postgraduate education and training
Health Protection Agency[24]	25	To cover full range of health protection duties but does not include PCT support
PCTs[25] including joint working with local government	75-80	Health improvement - 35 Health service quality - 25-30, complementing PH staff in the Trust Health protection - 10
Trusts[26]	5-10	The eventual aim should be to have the equivalent of a consultant in every trust working on service quality improvement/clinical effectiveness and governance
Central	6	The 25 per million target includes staff in central organisations with PH responsibilities, including centralised department of health and the health protection authority

In a separate study, and based on a survey of Local Health Departments in the USA, Leep (2006) identified three Public Health Physicians per department where the population being served is 500,000 or more. However, up to another 15 physicians might exist per department but employed as Managers or Directors, providing for a ratio of between 6 and 36 Public Health Physicians per million

[22] Note that this ratio does not include an allowance for Public Health Physician workforce contribution to teaching and research.
[23] Equivalent to a Commonwealth or State Health Authority in Australia
[24] Generally located in a Commonwealth or State Health Authority in Australia
[25] Primary Health Care trusts have recently been abolished in the UK. The functions have mostly been redistributed to local government authorities, although some responsibilities (for which Public Health Physicians are considered important to fulfilling) have devolved to Clinical Commissioning Groups.
[26] These are more equivalent to Primary Healthcare Networks in Australia with a commissioning function.

population.[27] The best guess would be approximately 26 per million of population, similar to the UK recommendations.

Consequently adopting the UK recommendations, and assuming the current Australian population is 24,273,827 (ABS, 2016), the current demand for Public Health Physician workforce would be:

24.273 million x 25 Public Health Physicians = 606

This is well in excess of current supply. If an allowance is made for additional Public Health Physician workers employed in teaching and research (approximately a quarter of the Australian Public Health Physician workforce according to Table 11), then a current demand estimate would be:

24.273 million x 30.5 Public Health Physicians = 740

In order to make future projections we can draw upon ABS publications and accessible data for population trends and estimates, for example ABS, Population Projections, Australia, 2004 to 2101 (3222.0) and associated publications. A brief description of the ABS Population Projections is provided in Appendix F. Table 12 identifies the current and projected demand (FTE) for Public Health Physician workforce based on the ABS population projections and using the lower ratio of 25 Public Health Physicians per million population.

Table 12: Projected demand for Public Health Physicians in Australia 2016-2026 based on a simple practitioner to population ratio

Year	Projected population	Estimated demand for Public Health Physician workforce (FTE)[28]	Estimated demand with initial unmet demand allocated over all 10 years
2016	24,359,761[29]	608	242
2017	24,781,121	619	289.6
2018	25,201,317	630	337.2
2019	25,619,895	640	383.8
2020	26,037,356	651	431.4
2021	26,452,147	661	478
2022	26,866,209	672	525.6
2023	27,279,046	682	572.2
2024	27,690,209	692	618.8
2025	28,099,273	702	665.4
2026	28,505,871	714	714

This indicates that the current level of 'unmet' demand is 366 FTE, more than double the current Public Health Physician FTE workforce. Since the current (2016) demand must start at a headcount of 381 (FTE of 242), the significant unmet demand cannot be accommodated in a single year. For modelling purposes, the shortfall is 'made up' over the 10 years of projection (see the last column in Table 12).

[27] Note that these calculations ignore Public Health Physicians potentially working in central agencies (such as the CDC) and other areas of practice such as teaching and research.
[28] Adopting the smaller practitioner to population ratio of 25 Public Health Physicians per million population.
[29] Using the originally projected figure for Series B rather than the actual population number obtained from current ABS estimates.

A **ratio of Public Health Physician practitioner to the rest of public health workforce** is also conceptually simple to apply, and has an advantage, in theory, as it does not rely on a direct relationship with population growth. As noted previously, the relationship between public health services and population is complex, potentially influenced by workforce size for some services (e.g. immunisation and screening) but for other services the relationship is independent of population size and influenced more by organisational capacity requirements.

Postulating a relationship between the Public Health Physician component of the workforce and the total public health workforce offers a stronger logic. In *The Unique Contribution of Public Health Physicians to the Public Health Workforce*, Ridoutt, *et al.* (2010) strongly suggested a minimum input of Public Health Physician labour into most if not all public health endeavours, particularly for strategic planning where program direction and design is set and appropriate public health interventions developed. This report also argued that an important transactional leadership function is played by the Public Health Physician workforce, which provides quality control for the rest of the workforce.

Similarly, Sims, *et al.* (2007) note:

> *'The role envisaged for the specialist workforce is to act as a catalyst to support evidence based interventions that can be undertaken locally by competent public health practitioners and the wider workforce.'*

One of the major problems with this approach is enumerating the public health workforce itself. Sims, *et al.* (2007) identified three major categories in the public health workforce — specialist, practitioner and the wider workforce — noting the specialist public health workforce is easiest to define and enumerate, practitioners, given their diversity of roles and employers, much harder, and the wider workforce impossible. In respect to the UK public health workforce the Centre for Workforce Intelligence (CfWI) noted:

> '*It is currently impossible to estimate the number of practitioners in the workforce with any confidence. There are simply too many employers with their own organisational arrangements (and an increasing number outside the public sector) and there is no common coding structure, even within larger employers (local authorities, PHE and the NHS). In addition, most professional bodies do not hold reliable or readily accessible data (many hold no data) on the employment status of their members*.'

These difficulties are no less challenging in Australia. Unlike the USA and the UK, where there have been recent attempts to enumerate the entire public health workforce (e.g. CfWI, 2014; Beck, *et al*., 2014), the last known attempt to enumerate the Australian public health workforce was 20 years ago (Rotem, *et al.*, 1995). For this study, an estimate is made of the current total public health workforce size using data from the 2011 Population Census and more recent AIHW publications where relevant. These estimates are shown in Table 13, and provide a total workforce size estimate of 9,246.[30] This estimate is subject to many limitations, including (1) the lack of currency of the main data source (2011 Population Census) and (2) the imprecise nature of some of the occupational categories upon which the estimate is based.

[30] In the literature most authors make allowance for at least three categories of public health workforce which are categorised using different terms but with quite similar meaning. Essentially the categories include 'specialists or consultants' and 'practitioners', both of which tend to be included in any enumeration, and a much larger category of 'advocates' or 'indirect' workforce, composed of persons for whom public health work is incidental. These workers tend not to be included in any enumeration (e.g. Beck *et al*, 2014).

Table 13: Estimated size of the total public health workforce in Australia based on available sources of data

Type of public health workforce	Estimate of workforce headcount	Source of estimate
Health promotion professionals	1180 (1)	ABS 2011 Population Census
Indigenous Health Workers	1,372 (2)	ABS 2011 Population Census
Public health nurses	1,296 (3)	AIHW 2012
Health & Welfare support workers (NFD)	775 (4)	ABS 2011 Population Census
Environmental health workers	3,742 (5)	ABS 2011 Population Census
Other types of workforce (e.g. epidemiologists, bio-statisticians, health economists)	500 (6)	
Public Health Physicians	381	AIHW 2014
TOTAL	9,246	

(1) Health promotion professionals are included in a broader occupational category by ABS, which over estimates the workforce size. The Australian Health Promotion Association (AHPA) has approximately 590 members, so an estimate for the workforce size is based on the AHPA having at least 50% coverage of the workforce.
(2) Not all of these can be considered as working in public health; many have a clear clinical role, although these are likely to be registered (233 in 2012 according to AIHW).
(3) Actually designated as 'health promotion' nurses, assume includes persons working in Communicable Disease Control (CDC) and health promotion.
(4) Assume covers public health practitioners in non-professional workforce.
(5) ABS statistics includes occupational health workers. In the 2011 Population Census, environmental heath officers accounted for approximately 20% of the total Occupational and Environmental Health professionals group which leaves the figure provided.
(6) The Public Health Association of Australia has 1900 members, of whom many would belong to other professional associations. It is estimated 500 are not represented by other workforce categories.

Assuming a figure for the total public health workforce in Australia could be estimated with some reliability, it still begs the question as to what would be an appropriate ratio of Public Health Physician worker to total public health worker. In providing advice to local councils in the UK charged newly with responsibility for organising the bulk of public health services, Public Health England (2014) offered:

> *'Councils need to ensure that, within their public health workforce, they have the right mix of specialists and practitioners from different professional backgrounds to enable them to discharge their duties effectively.'*

They went on to warn against pursuing false economics of employment of lower skilled workers:

> *'As public health teams continue to develop in local government, councils will need to employ a mix of medically and non-medically qualified public health specialists alongside other staff who bring particular skills to the task of improving and protecting the public's health. The skills of medically qualified staff are clearly essential in enabling the team to fulfil the broadest range of functions including providing medical public health advice to clinical commissioning groups (CCGs) and other local NHS partners… councils will of course seek to weigh all the usual factors around cost, quality, consistency of service and other risks when deciding how best to ensure they have access to medically qualified staff. Councils will also recognise the leadership contribution that medically qualified staff can make alongside other public health staff in the delivery of new responsibilities that councils now have in relation to health and wellbeing boards.'*

In *The Unique Contribution of Public Health Physicians to the Public Health Workforce*, Ridoutt *et al*. (2010) noted the consistency with which Australian health managers during interviews nominated a requirement for one Public Health Physician worker for every 12 other types of public health worker. In the UK the CfWI (2014) estimated that the ratio of Public Health Physician workforce (including non-medical consultants) to other types of public health workforce was as high as 1:23. However, the total workforce number (compared to the Australian context) was possibly inflated by the 'health visitors' workforce category, which has a more individual than population focus in delivery. If this group is excluded, the ratio is 1:16. In Scotland, Martin and Speller (2015), found a smaller ratio of 1:12, and even lower (1:8) if 'health visitors' are excluded from the analysis.

In the USA, Beck, *et al*. (2014), in an enumeration of the public health workforce at all levels of government, estimated the number of Public Health Physicians in relation to the total public health workforce was 1: 24, although this varied by level of government from as low as 1:7 (Federal Government level) to as high as 1:53 (local government level). If, however, it is allowed that a proportion of epidemiologists and some public health managers are also Public Health Physicians, then the ratio overall could reduce to as low as 1:10. In a separate study in the USA, also by Leep (2006), of the 'local health department' public health workforce, an estimate of 1 Public Health Physician per 60 total public health workers was obtained. Again, if epidemiologists and a proportion of service managers/directors are assumed to be Public Health Physicians, then the ratio could be as low as 1:15.

Leep (2006) demonstrated that the ratio varies with the size of the public health service, which in turn varies (contrary to earlier arguments) with the size of the population served. Figure 13 illustrates the relationship between total staffing of public health services and the size of the population served identified by Leep (2006). In services with higher staffing levels (that is larger populations served) the ratio of Public Health Physician to all other public health workforce is approximately 1:19, yet at smaller-sized public health services with fewer staff, the employment of Public Health Physicians is negligible.

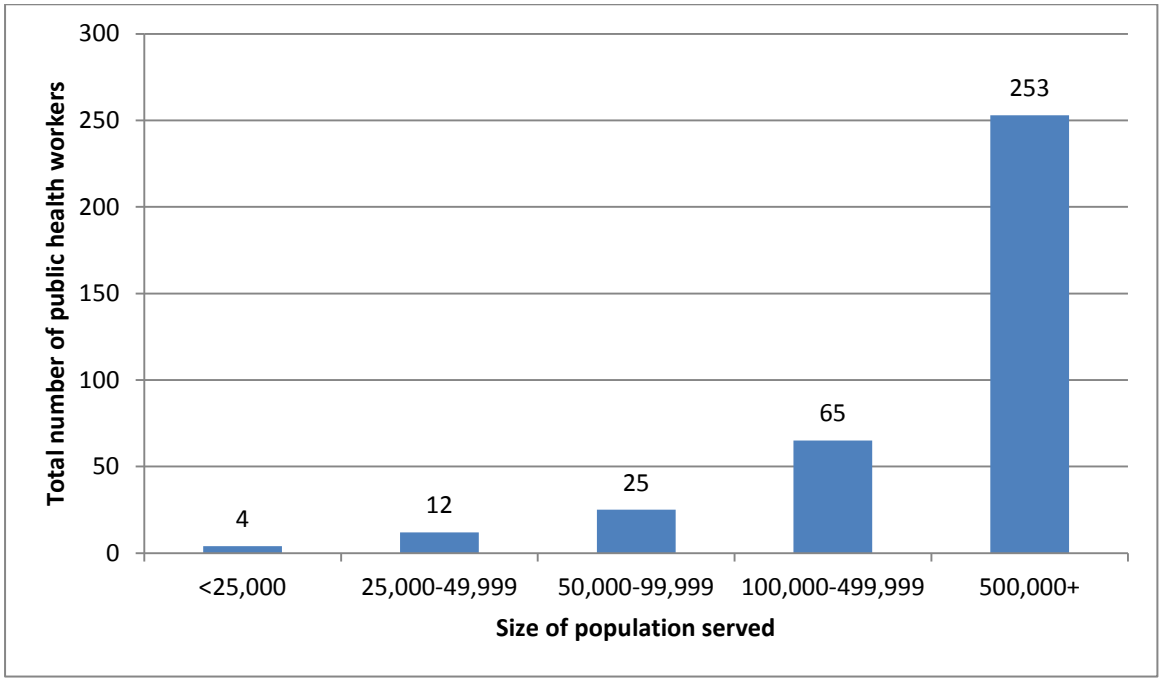

Figure 13: Relationship between size of population served and number of workers in public health service (Leep, 2006)

Consequently, based on the evidence available, a ratio of 1:12 appears unrealistic and a more feasible or likely estimate might be 1:23, if applied to the entire public health workforce across all areas of practice. However, based on figures in Table 13, the current ratio of Public Health Physicians to the rest of the public health workforce is approximately 1:24, hence applying a ratio of 1:23 would be very conservative and not particularly optimistic. A reasonable ratio to apply, therefore, would be between 1:12 and 1:23, at 1:17. If the ratio of 1:17 is applied to the total figure in Table 13 then the estimated current demand for Public Health Physician workforce would be 521 Public Health Physicians, or 331 FTE — appreciably higher than the current demand of 242 (37% difference).

In Table 14, since it is not feasible to meet the unmet need gap between the current demand/supply and the estimated demand based on the Public Health Physician to total public health workforce ratio, the resolution of the unmet need is spread evenly over the 10 years of the projection period, so that the unmet need is not fully resolved until 2026.

Table 14: Projected demand for Public Health Physicians in Australia 2016-2026 based on a Public Health Physician to total public health workforce ratio

Year	Projected size of total public health workforce	Estimated demand for Public Health Physician workforce (FTE)	Estimated demand with unmet demand accommodated over 10 years (FTE)
2016	8865 (1)	331 (2)	242
2017	9018 (1.7%)	338	256.6
2018	9171 (1.7%)	343	271.2
2019	9323 (1.7%)	349	285.8
2020	9475 (1.6%)	355	300.4
2021	9626 (1.6%)	360	315.0
2022	9777 (1.6%)	366	329.6
2023	9933 (1.5%)	372	344.2
2024	10082 (1.5%)	377	358.8
2025	10233 (1.5%)	383	373.4
2026	10376 (1.4%)	388	388.0

(1) Annual estimates derived through tagging total public health workforce growth to population growth (see Table 12). The calculation for each year is [% growth Year N1 to N2] x Year N1 + Year N1.

(2) Calculation based on a total workforce estimate of for the year (minus Public Health Physicians) / 17

Demand estimates based on 'Best Practice' thinking

Areas of practice

Ideally an existing means of classifying public health *work* would have been employed for the exploration of the implications for the work of the Public Health Physician workforce. However, numerous attempts in the literature to develop such a classification, one that receives wide acceptance, has proven elusive. Illustrative of the common frustration in relation to this quest are the comments of Sainsbury (1999):

> *"There has … been little effort to determine the core population health services that should be available to all communities, and little agreement about ways to accredit the providers of those services."*

Although in more recent years greater effort has been invested in trying to define a core set of public health services for instance in the USA (National Association of County & City Health Officials (NACCHO), 2005; Institute of Public Medicine, 2012), the UK (FPH, 2016; Allwood, *et al*., 2012) and in Australia (Wilson, 2000), it remains true that little agreement has been reached.

Available classification approaches that could be adopted range from simple listings of functional activity areas / services (e.g. Shah, *et al*., 2012) to multidimensional approaches using up to six vectors (e.g. Jorm, *et al*., 2009). As noted in Chapter 2 (Method), a number of the one-dimensional approaches were offered for discussion to an AFPHM expert group, and for reasons of practicality and capacity to relate to workforce implications, an 'area of practice' approach was chosen, modified by level of government / location of services. Since 'areas of practice' within the public health context have been explored often in a number of slightly different ways in the literature including as functions (Wilson, 2000; Jorm, *et al*., 2015), service areas (NACCHO, 2005), operations (WHO, 2002) and areas of skills (Public Health Resource Unit, 2008), the expert committee were offered numerous 'areas of practice' taxonomies to consider.

A sample of the perspectives on public health 'areas of practice' from the literature is provided in Table 15 (many other papers could have been cited).

Table 15: Overview of literature perspectives on public health 'Areas of Practice'

Sainsbury (1999)	Wilson (2000)	NACCHO (2005)	NPRU (2008)	WHO (2011)	IOM (2012)
Health information	Disease surveillance Monitoring morbidity and mortality Monitoring the determinants of health	Monitor health status and understand health issues facing the community	Surveillance and assessment of the population's health and wellbeing Public health intelligence	Surveillance & assessment of the health of the population	Information systems and resources, including surveillance and epidemiology
Environmental health	Risk assessment and management in relation to environmental hazards Developing and advocating for legislation and regulations that protect and promote health	Protect people from health problems and health hazards. Enforce public health laws and regulations	Health protection	Identification of health problems & hazards in the community	Environmental health
CDC	Disease outbreak control Immunisation provision Screening for selected communicable diseases		Assessing the evidence of effectiveness of interventions, programs and services to improve population health and wellbeing	Disease prevention Preparedness for public health emergencies	CDC
Health promotion		Give people information they need to make healthy choices	Health improvement	Health promotion	Chronic disease prevention Communication (including health literacy and cultural competence
Performance contracts management	Developing and implementing quality assurance processes for public health	Evaluate and improve programs and interventions	Health and social care quality	Evaluation of quality of personal health services	Public health research, evaluation, and quality improvement

Sainsbury (1999)	Wilson (2000)	NACCHO (2005)	NPRU (2008)	WHO (2011)	IOM (2012)
Health services planning and development	Assessing the differential impact of health policies on disadvantaged communities	Develop public health policies and plans	Policy and strategy development and implementation for population health and wellbeing	Development & leadership of planning & public health policy	Health planning (including community health improvement planning) Policy development, analysis, and decision support
		Engage the community to identify and solve health problems	Leadership and collaborative working for population health and wellbeing		Partnership development and community mobilisation
Public health research			Academic public health	Research	
Aboriginal health		Help people receive health services			

The areas of practice were then defined at the expert group workshop and through subsequent consultations were ultimately finalised as the following 10 broad categories:

1. Health monitoring and surveillance
2. Health system reform leadership and management
3. Disease prevention and control
4. Community engagement and partnerships
5. Health promotion
6. Academia, including teaching and generation of evidence (research)
7. Health protection
8. Primary health care
9. Health policy, planning and management
10. International Public Health Medicine

The sub-areas for each area of practice are provided in full as Appendix G. The above areas of practice provided a framework for the study as a whole and were used as part of the Survey of Fellows and Survey of Trainees (see 'Chapter 5: Supply projections') as well as for consideration of demand issues.

Practice areas in which Public Health Physicians currently work

The survey of AFPHM Fellows asked only those who indicated they work in Public Health Medicine to identify their proportion of Public Health Medicine working hours across the 10 major areas of practice. The results of this distribution are shown in Figure 14, which indicate that the three most identified areas of work are 'Teaching and research', 'Disease prevention' and 'Policy and Planning', taking up 22.6%, 18.3% and 16.7% (57.6% in total) respectively of total Public Health Physician workforce work time (that is, of that time spent in Public Health Medicine).

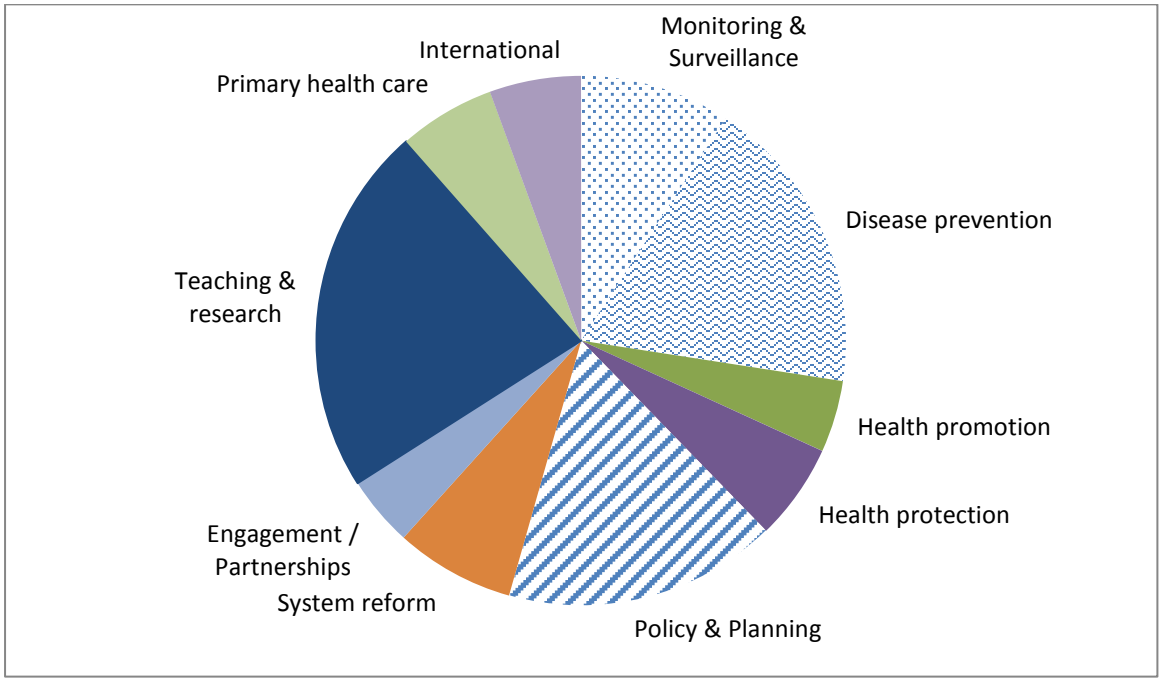

Figure 14: Distribution (%) of Fellow time in Public Health Medicine in Australia work between areas of practice (n=165) (*Source: Survey of Fellows, 2016*) – See item values below

Table 16: Time spent by Public Health Physician workers in Australia by area of practice

Areas of practice	Amount of total Public Health Physician worker time spent in each area of practice (%)
Monitoring & Surveillance	9.2
Disease prevention	18.3
Health protection	5.9
Health promotion	4.4
Policy & planning	16.7
System reform	7.3
Engagement & partnerships	4.3
Teaching & research	22.6
Primary health care	5.9
International	5.6

The widely acknowledged 'traditional' areas of practice for Public Health Physicians (Griffiths, *et al*., 2012) — Monitoring and Surveillance, Disease Prevention and Health Protection — together take up approximately one-third of total workforce hours (33.4%). Potential growth areas in Public Health Physician workforce effort, health promotion and primary health care (see later analysis in Chapter 3: Description of current supply), currently take up only 10.3% of total workforce hours of work. Similarly, the three largest areas of expenditure (see Table 10) — health promotion, immunisation and screening — are not areas where significant Public Health Physician workforce effort is expended.

Public Health Physician workers tend to work across multiple areas of practice, even if their hours are distributed to a more select group of areas (see Figure 15). Even in those areas of practice where less hours of work are contributed, there is still almost a third of the total workforce contributing at least some hours. For instance, while health promotion consumes only 4.4% of total Public Health Physician workforce FTE, 40.6% of the Public Health Physician workforce does some work in health promotion. Similarly, while only 4.3% of total Public Health Physician workforce FTE is invested in engagement and partnerships practice, 40.6% of Public Health Physician workers spend some work hours in this area of practice.

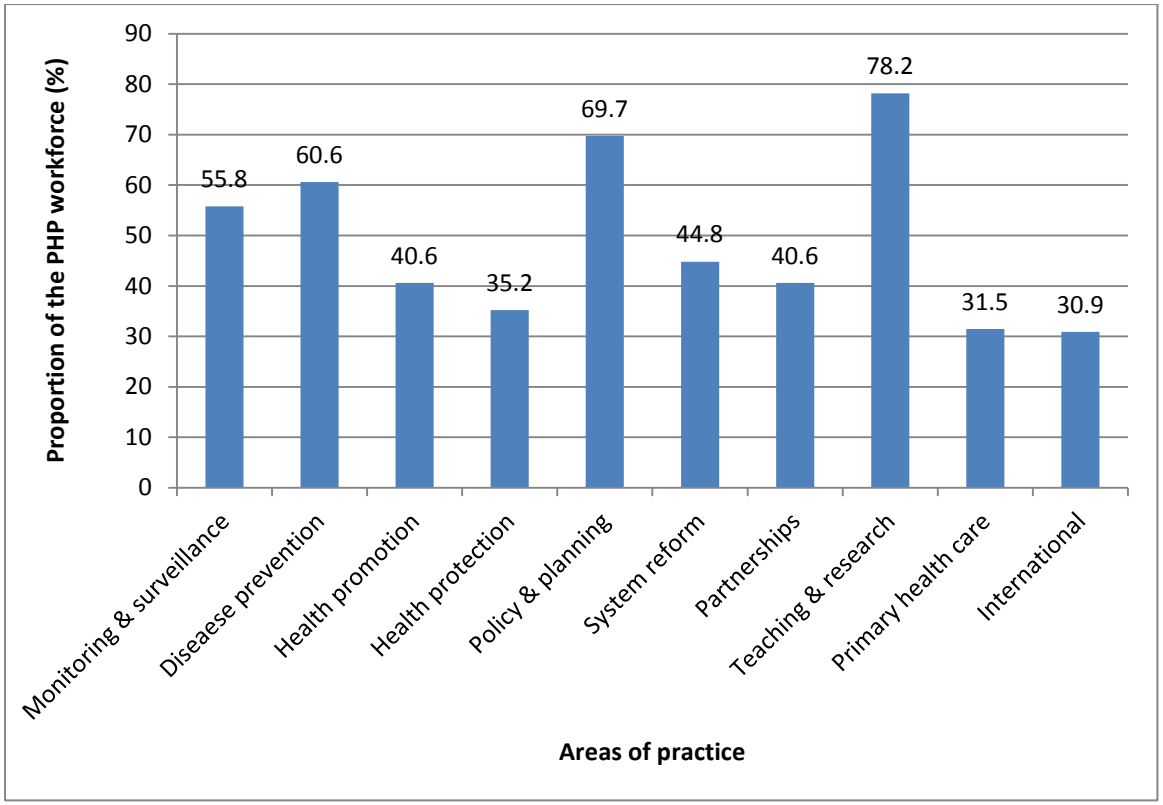

Figure 15: Proportion (%) of the Public Health Physician workforce in Australia working at least some hours in each of the PH areas of practice (n=165) (*Source: Survey of Fellows, 2016*)

The findings in Figure 14 suggest that there is relative flexibility in the deployment of Public Health Physician workforce; that even though it might be concentrated to some extent in terms of FTE contribution to three main areas of practice, there is some availability of Public Health Physician skills in other areas of practice. This is confirmed with consideration of designated work areas, with fewer than one-quarter (24.2%) of the workforce spending more than 80% of their time in a single area of practice.

In other countries, for instance the UK, New Zealand, the USA, Public Health Physicians are found to be more prominent in a range of other areas of public health practice, including 'system reform' (quality and safety, leadership, organisation) and the 'primary health care' area. In these countries the interest is in population-based service planning and coordination, chronic disease prevention and management at the population level. There is a growing sentiment in Australia for Public Health Physician deployment to better reflect the changing nature of the health system, given health reforms and other trends (e.g. Bennett, 2009), and to involve Public Health Physicians more where they are skilled to contribute (and can potentially have greater influence).

Areas of practice growth prospects — best practice

General considerations

Research, either empirical or based on qualitative data collection and analysis, of best practice structures and processes for delivering public health services, including the specific role of Public Health Physicians, was noted in the Chapter 2 (Method) to be limited. Mays & Scutchfield (2014) have been prompted to observe:

> *'Knowledge about how best to organize, finance, and deliver these public health strategies in complex and constrained delivery systems is too often in short supply. The science surrounding*

the efficacy of individual public health interventions currently far outpaces the science surrounding the delivery system features and capabilities that support these interventions collectively in real world settings.'

This current AFPHM study used expert groups organised around the 10 identified areas of practice to vision best practice service delivery and to detail the role (and the amount of work) of the Public Health Physician in this best practice vision.

A common theme that emerged in all the discussions was the general leadership role of Public Health Physicians, both in terms of thought leadership and team or work organisation. This again was a theme that emerged in *The Unique Contribution of Public Health Physicians to the Public Health Workforce* (Ridoutt, *et.al.* 2010). That study identified the key and unique attributes of Public Health Physicians, and those which employers most valued, as:

- transformational leadership skills which involve providing a vision, facilitating (making) decisions, emphasising collaborative practice of multidisciplinary teams
- ability to independently critique evidence
- an in-depth understanding of the continuum of health and illness allowing Public Health Physicians to formulate a response using a system wide perspective
- ability to independently and rapidly interpret risk. A rapid assessment of risk allows interpretation of implications for policy and practice and being able to appropriately prioritise a response.

These findings were largely supported in the UK public health environment (Public Health England, 2014):

'*Within the core public health team of the council, public health specialists will have an extensive role across the whole spectrum of preventive work, including promotion of health and wellbeing and addressing inequalities within the population as part of the wider determinants of health agenda*.'

Health monitoring and surveillance

This is an established and well understood area of Public Health Physician practice, even though it accounted for only 9.2% of total Public Health Physician workforce time. The current nature of work was considered by the expert group as still being the work required and best practice into the future. It was noted that the current focus on communicable diseases, both in terms of the data bases created and maintained and surveillance effort, would be better balanced by a matching level of systematic capturing of data on other non-communicable conditions (cancer, heart conditions, diabetes, etc.) and on environmental factors that influence health outcomes (which may currently only be done, if at all, in 'health protection'). The monitoring focus should be prioritised on the basis of health impact.

Apart from a broader surveillance focus, 'best practice' in the future should concentrate on the data itself. Much data is already collected, but is often not linked in ways that would make it both more valuable and powerful, and when it is (for instance in research based projects) it can be only narrowly applied and have limited accessibility.

Some of the problems and opportunities underpinning this part of the discussion seem to be highlighted by Olver (2014). Data was discussed as being more valuable if it could (1) be in reach of people who needed to use it (for instance clinicians wanting to see impact on health outcomes of practice) and (2) helpful in preventing conditions not just monitor. In this regard an ideal database

that captured *well-being* data routinely on an individual basis was explored, with a set number of measures being captured through primary health care or ED environments.

Some in the expert group suggested that the current skills mix, which employs nurses, epidemiologists, etc., in the future might need to adapt towards having a much stronger technology base, with the skills of data engineers, software programming skills, data capture and storage, genetics, bio informatics. It was argued that content knowledge (e.g. in relation to particular conditions) would be less important than to know more about how to use the information. Public Health Physicians would still be a critical part of this evolving mix of competencies, providing the link between warehoused data, the general population, and clinical practice, and assisting each of these stakeholders to gain access to the data.

Key finding:

The general consensus was that a ratio of one Public Health Physician to 20 other types of workforce in the health monitoring and surveillance area of practice was appropriate, which is in line with current, existing ratio. Except for jurisdictions where this ratio is significantly higher, growth in demand for Public Health Physicians would be limited in this area of practice.

Disease prevention and control

The expert group also noted the disproportionate response capacity in regard to communicable versus non-communicable/chronic disease conditions. This disproportionate response capacity is especially pronounced in terms of the Public Health Physician input.

It was noted that responses to chronic diseases tend to be politically driven than evidence-based. It was strongly argued that the response to chronic disease control should be in line with the same evidence-based response to communicable disease control, given the 'tools of trade' are similar and applicable to both areas. Expertise could be made available to particular niche areas but they would all use the same underlying values and skills – including proper monitoring and surveillance, which is core to all areas of public health.

The expert group noted that one element of public health is about managing and influencing people and policies, and another element is about identifying and deciding appropriate actions. In a best practice scenario, public health would be more successful if there was an explicit recognition of its management role and function within the health system – and that Public Health Physician leadership is critical.[31]

The immunisation program which arose from Michael Wooldridge's seven point plan was identified as an example (Ruff, *et al.,* 2012) – political leverage led to: strong control of General Practice activity; national control of vaccines; protocols for immunisation process; and monitoring of behaviour. It can be demonstrated that responses developed and implemented by Public Health Physicians can have a significant impact on health.

[31] There was some discussion about whether specific training is required to develop the skills of Public Health Physicians to undertake a management role in the health system.

Key finding:

The expert group noted that growth in disease prevention and control would be limited. Yet, it was argued that disease prevention should be expanded to include chronic diseases. Designing and managing chronic disease interventions would require minimal numbers of Public Health Physicians; depending on the size of the jurisdiction, 1 to 2 Public Health Physicians in every local health network/district would be sufficient.

An important health concern to address would be high blood pressure by implementing a connected and strategic approach using legislation, clinical services and primary health care to address the determinants of health. The role of Public Health Physicians would be at the National level to design and implement, and at the regional level to manage the program.

Health protection

A common theme in the expert group discussions on the health protection area of practice was the need to consider the work of disease control and health protection (and health promotion) as interrelated. A narrow focus on environmental vectors rather than a broader perspective on diseases (and the contribution of environment) including chronic illnesses, was lamented.

Considering public health as a coherent whole requires incorporating surveillance in a more integrated manner. The group noted that surveillance was strongest in regard to communicable diseases and weakest in regard to chronic diseases. The response to obesity, for example, took almost 20 years and thus, the group argued, public health should strive for an improvement in the timeliness of responses. In regard to environmental health, for instance from chemical and land quality perspectives, there is no surveillance system that indicates if there is an environmental health problem – consequently there is a need for data linkage and access to such data in a timely way.

The expert group believed that health protection needed to be less 'reactionary' to approach best practice and to foster greater interaction with health promotion. Health promotion is about improving health while health protection is about stopping poor health from occurring in the first place — these roles could easily be reversed.

Key finding:

Growth of Public Health Physicians in health protection, even allowing for its low initial base of numbers, was considered by the expert group as being of limited scope, and possibly likely only where Public Health Physicians are currently absent completely from any health protection infrastructure.

Health promotion

The expert group discussion on health promotion work also focussed on the social determinants of health. It was argued that health promotion (and therefore Public Health Physicians working in the space) needs to encompass a range of non-health areas. These areas include planning and developing urban spaces and transport and industry (for instance the health star rating to help individuals make the right food choices). These are important focal issues for health promotion when pursuing best practice. There are also other aspects of health policy that are important, such as advocating and pursuing a sugar tax, bans on junk food, subsidising fruit and vegetable consumption.

The group observed that health departments tend to hire dieticians to talk to people about diet and nutrition, however, as a professional group they do not understand the population perspective and therefore tend take a narrow focus. Public Health Physicians on the other hand are trained to assemble and appraise evidence and use this to examine population health and report back to government.

The data from the Survey of Fellows indicates that currently a small amount of total Public Health Physician workforce time is spent practising in the health promotion area (<5%). The expert group did not argue for a significant increase in general in the level of Public Health Physician input into health promotion, but rather that best practice (as applied in at least one jurisdiction) would foster a Public Health Physician input on a 'part-time basis'. [32] Thus it was argued that the Public Health Physician input to health promotion could be used strategically but not on a continuing basis; that is, it is valuable to have access to a Public Health Physician but it is not necessary for them to be dedicated to a health promotion service.

It is probable that the input of Public Health Physicians needs to be sought strategically and not in support of an intervention decision already taken for reasons of expedience or politics (Owusu, *et al*., 2016). In their staffing guidelines for UK public health services Allwood *et al.* (2012) noted six nominated functions in the 'health improvement' area (includes health promotion, prevention and community development) as follows:

- strategically assess health and wellbeing needs of communities
- commission health and well-being initiatives that will achieve better outcomes
- building strategic partnerships
- community engagement
- advocacy for health
- build sustainable capacity and resources for health improvement and the reduction of inequalities.

In all of these above functions except community engagement, Public Health Physicians were recommended. In the case of the function 'strategically assess health and wellbeing needs of communities', only Public Health Physicians were recommended along with 'public health intelligence officers'.

The expert group would support this perspective, noting that this use of Public Health Physicians in health promotion brings a clinical perspective, a critical appraisal that is evidence-based, and evaluation skills. One expert group member noted:

'The Public Health Physician is valuable for facilitating new frontiers of thought.'

Key finding:

Overall the expert group thought the growth in demand for Public Health Physicians in health promotion would be limited, perhaps at a similar growth rate as other areas of practice already canvassed. The caveat could be that government investment in health promotion type activities is growing faster than all public health activities, so a higher growth rate of 3% might be appropriate. In many respects though, the key issue will remain the availability of Public Health Physician workers for health promotion practice, at the right time, and for the right purposes.

[32] Of course, some jurisdictions reported that Public Health Physician input to health promotion is negligible and that this was not appropriate.

Integration of 'promoting health' areas of practice

As noted in the description of the four previous areas of practice, a common theme emerging through all four expert group discussions was that greater integration than is currently the case between these areas would be best practice.[33]. Suggestions for greater integration ranged from creating structures within public health services that supported organisation of work[34] according to a single 'department' (for which some experts offered the label 'promoting health') to mechanisms which allowed free movement of workforce (especially Public Health Physicians) across area of practice boundaries on a 'just in time' availability basis. While clearly some of the latter already occurs (see Figure 15 and accompanying discussion on page 48) the various expert groups were uncertain if the current degree of Public Health Physician workforce fluidity was sufficient and doubted, in the absence of appropriate structural mechanisms, whether such availability would be effective and achieve optimal outcomes. A recent study of a large Local Health District (LHD) population health service in NSW supports the view that areas of practice operate in silos and that the workforce tends to work only within the boundaries of internal organisational (sub-unit) divisions (Cowles, *et. al*.,2017). Active management effort is required to make workforce skills available across the organisational structural boundaries.

A UK model of public health organisation proposed by Griffiths, Jewell and Donnelly (2005) conceptualises just three domains of public health. Based on the historical importance of the control of communicable disease, health education and the role of hospital and community services, the set relationship between the three domains of public health practice is illustrated in the Venn diagram in Figure 16.

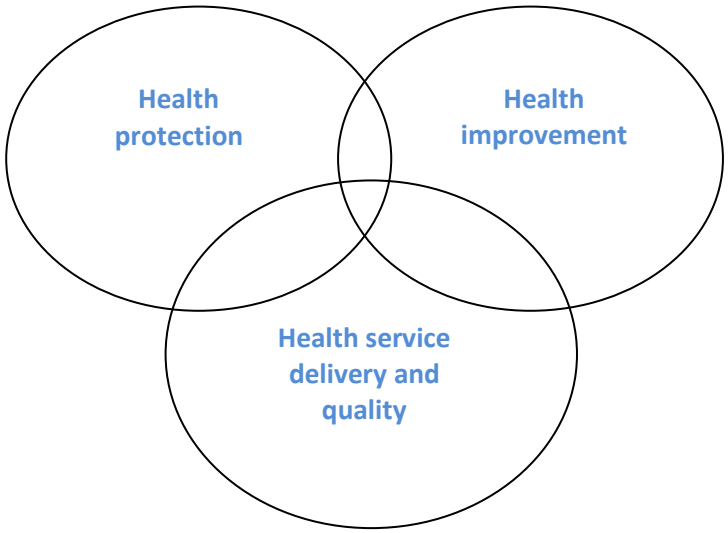

Figure 16: The three domains of public health practice proposed by Griffiths, *et al.* (2005)

[33] Significant expert group discussion occurred around the need for and past attempts to advocate for, a national CDC type structure along the lines of the USA and many other countries (IANPHI, 2007). Opinion generally favoured the establishment of such a structure, however, the broad consensus was that it probably would never happen, particularly in the projected timeframe for this study. Discussion of this option therefore has been excluded from projection considerations. In any case, it is difficult to know how such a structure might impact on demand for Public Health Physicians.

[34] Obviously, such structures would need to be accompanied by mechanisms of control and clear allocation of responsibility.

Griffiths *et al*. (2005) define the 'health improvement' domain as covering activity to reduce inequities and engaging with individuals and their families within communities to improve health through adopting healthier lifestyles. They define 'health protection' as prevention and control of infectious diseases, response to emergencies and dealing with environmental hazards. The health service delivery and quality is defined as including service delivery, promoting effective clinical practice, clinical governance, service planning and prioritising and appropriate research and evaluation. While this model does not align completely with the sentiment of expert groups in this study, it demonstrates a similar desire for integration of functions / areas of practice.

Instead of looking at areas of practice as a way to organise work to better support flexibility in Public Health Physician workforce deployment, some expert groups offered an alternative focus on the 'tools of trade' or technologies of public health — thus separating the conversation from discussion of the conditions being expressed. For instance, it was argued that most areas of practice employ technologies and tools such as immunisation, health education, legislation and regulation and screening; diabetes and heart disease have largely utilised health promotion as a tool of trade, whereas tobacco control has employed regulation more. One expert argued:

> *'It's the tools that you use that defines areas rather than the diseases, and areas of practice artificially separate workforce who are approaching interventions in the same or similar way.'*

This approach also has value for being more flexible in interventions. For example for cervical cancer, screening and then treatment of identified cases was the mainstay of past public health efforts, this approach is now superseded by immunisation as a new 'tool of trade'.

As well as horizontal integration (between areas of practice within public health services), there was discussion also of vertical integration between policy and implementation settings (national, state / territory, local). Best practice was considered to imply some sort of arrangement where work can be distributed to the level of government that can do it most effectively. While quite a lot of policy makers are keen on local health plans, expert groups argued that local government / local health service capacity to deal with many issues is not always adequate. For example, social determinants drive most chronic disease problems. Consequently, consideration is required of the level of government with the power to make a difference if legislation and regulatory practice needs to change to address the determinants of poor population health.

An example of appropriate allocation of work to the various levels of government identified was the area of tobacco control. Smoking legislation exists at the national level, one-to-one interventions and support tend to work at the state level, and inspections and licensing of premises are more local. Strong leadership is also required across all levels.

Key finding:

From a Public Health Physician workforce perspective the impact of more integrated service organisation was felt unlikely to be a significant growth in demand — any growth that might be the result of greater use of Public Health Physicians in addressing non communicable disease issues, would be balanced and potentially offset by higher levels of workforce productivity and more flexible deployment.

Health policy, planning and management

Many studies demonstrate that the provision of more (and better) healthcare services does not necessarily produce better population-level health. For instance, in the UK an improvement in the equity of delivery of healthcare has not translated into equivalent improvement in the equity of population-level health outcomes (Asaria, *et al.*, 2016).

This disparity of outcomes arises, the expert group argued, primarily because many of the measured determinants of population-level health often lie beyond healthcare provision – a point made in many other 'best practice' discussions. Accordingly, policy thinking that does not consider population-level health outcomes separately will favour investment in the provision of healthcare services. Policy decisions need to consider separately what is required to deliver population-level health and what is required to deliver better health care.

'Best practice' in the policy, planning and management area requires a greater commitment amongst population health practitioners to the science of population health and to basing policy more on solid evidence of efficacy rather than relying principally on emotion and empathy (which are necessary but not sufficient). One of the experts offered.[35]

> *'… the essential elements of a health system capable of delivering measurable improvements in population-level health and development outcomes must include:*
>
> - *Clear definition of the key health & development issues for the population along with their principal determinants.*
> - *Identification, or development, of programs or strategies utilising the best available evidence to address the identified determinants of the key health & development issues for the population.*
> - *Implementation and evaluation of the selected programs & strategies that address the identified determinants of the key health & development issues for the population.*
> - *Monitoring of the impact of the selected programs & strategies addressing the identified determinants of health & development of the population as implemented.'*

The expert group argued that Public Health Physicians can be an important part of the solution to delivering improved population-level health through application of 'implementation science' because they:

- have the training to identify the determinants of health and then identify those determinants contributing most to the sought-after population health outcomes
- are capable of understanding the importance of achieving the highest levels of population health for a given investment by government, and that may be beyond traditional healthcare delivery
- have the training to oversee the effective roll out of population-level interventions so that efficacy is better assured – through the delivery of highest possible coverage, along with fidelity to intervention principles and close program monitoring.

Key finding:

The expert group agreed that there would be value increasing the number of Public Health Physicians within the area of health policy, planning and management. While it was it was difficult to quantify the number required, it was agreed that the current proportion of the Public Health Physician workforce ,16.6%, in relation to the total Public Health Physician workforce should be maintained.

[35] Text was generously made available to the study from Victor Nossar from an unpublished manuscript the working title of which is, '*Principles and Practices of Population Health for Children & Young People: A Framework for a System to Deliver Improved Health & Development Outcomes at Population-level for Children & Young People'.*

Primary health care area

In the past in Australia there has been divided opinion on the involvement of public health resources, including Public Health Physicians, in the delivery of individual health care services (Wilson, 2000). On the other hand, in the UK, a sizeable proportion of the Public Health Physician workforce has always been expected to work within infrastructure that supports development, implementation and quality control of health care services (both primary health care and acute care) (Allwood, *et al.*, 2012, CfWI, 2016).

To some extent the prevailing UK stance has been a result of their interpretation of the principles of the Ottawa Charter, in particular action to 'Reorient Health Services' (WHO, 1986). In this principle, public health and other stakeholders:

> '*… must work together towards a health care system which contributes to the pursuit of health. The role of the health sector must move increasingly in a health promotion direction, beyond its responsibility for providing clinical and curative services. Health services need to embrace an expanded mandate which is sensitive and respects cultural needs. This mandate should support the needs of individuals and communities for a healthier life, and open channels between the health sector and broader social, political, economic and physical environmental components*.'

With some reservations, the expert group promoted the idea of health services generally 'making every contact count', citing, for instance, UK initiatives to make critical incidents (e.g. in emergency department services or in General Practice) as a point of departure for preventive health (or at least secondary intervention). [36] However, the expert group acknowledged the limitations to this approach, noting that primary health care does not equal primary prevention. That is, preventive health can take place within the primary health care setting, but it is not synonymous with primary health care as it generally lacks the population perspective and a capacity to deal with the social determinants of health.

The expert group argued that, because of its importance in terms of the health of the population, primary health care should receive a proportionate level of attention, response or contribution for public health investment in general, and from Public Health Physicians specifically. The contribution of Public Health Physicians should be to set the level of (PHC) 'entitlements' in a particular region, especially those that are least advantaged, identify if these entitlements are being satisfied, and develop and initiate a remediation plan if not. The expert group also noted the important service commissioning role that has recently been devolved to Primary Healthcare Networks (PHN) and the opportunity this presents to Public Health Physicians. In the UK the argument has been articulated by Allwood, *et al.* (2012) thus:

> *'Public Health specialists have a key role in advising GP commissioners on how best evidence based interventions can be offered in primary care. Public Health specialists are experienced at working across organisational boundaries and their skills offer an opportunity to ensure that commissioning decisions are made on the basis of getting value for money and getting the most out of a budget for the whole population, while ensuring the highest quality of care. By commissioning the 'right' health services and ensuring that they work properly and that they are accessed, this will lead to a gain in quality of life and life added.'*

Other roles advocated for the Public Health Physician in the primary health care (PHC) environment include:

- prioritisation of health and social care services
- equity of service provision

[36] Boyce, *et.al.* (2010). For an Australian perspective on the same issue see Porter, *et.al.* (2014)

- project management introducing new programs and changing systems.

Key finding:

It was agreed that at least one Public Health Physician at each 'local' level in the PHC setting would be sufficient to understand population characteristics and disease burden and plan population interventions accordingly. 'Local' was implied as being one Public Health Physician at every PHN in Australia (there are currently 31 PHNs). For some PHNs, depending on the health outcomes and other environmental and economic attributes related to health, it may be necessary to have more than one Public Health Physician at a PHN.

Funding of this measure was raised with solutions ranging from a national fund being created, to financing from non-traditional sources only indirectly linked with government, for instance social benefit bonds (Ward, 2012). Setting up these investment vehicles might need Public Health Physician expertise to design the intervention (with clinical and system knowledge) and frame appropriately to contract for realistic and appropriate outcomes.

Health system reform leadership and management

A small but significant proportion of the total Public Health Physician workforce indicated through the Fellows Survey that they work in this area of practice. In the UK, similar to PHC, engagement with the broader health system is considered a major part of the Public Health Physician's role. They call it 'healthcare public health', and Allwood, *et al*. (2012) assess the value of the role as follows:

> *'Public health specialists in the area of Healthcare Public Health have a unique vantage point. They have the skills, the bird's eye view, and the information to look beyond the individual patient to serve a population group of patients.'*

The expert group noted that health services clinical governance and quality improvement work is undertaken by some Public Health Physicians but generally it features quite low in public health, which was seen as a concern. Other areas of work that should be further considered included:

- healthcare audit, evaluation and research
- patient safety
- engagement and partnership working.

More generally, it was argued that the evidence is that for chronic diseases, treatment services play a big part in controlling the impact and potentially population outcomes.

Approaching the PHC discussion above from a reform perspective, most agreed on the need to seek a new way of structuring and delivering PHC. This is well articulated by Rothman and Wagner (2003) when they discuss significant variation in the outcomes of patients with chronic illness:

> *'… we believe that it [variation] is principally a function of the organization and orientation of practice. We and others have speculated that primary care systems were originally organized to react to acute illnesses and remain that way despite the increased prevalence of most major chronic diseases. In primary care, attention continues to focus on defining the problem; excluding more serious diagnoses; and initiating treatment, usually in the form of drug prescriptions.'*

They noted that healthcare services have been built around an acute episodic model of care that is no longer suited to the epidemiological circumstances. In an episodic care approach, for instance addressing an acute communicable disease condition, the patient's role is largely passive and as the full clinical course is often played out over days or weeks, there is little urgency to develop patient self-management skills or tracking programs. Wagner, *et al.* (2001) identified a number of principles for successful management of chronic disease conditions in a primary care setting which includes:

- population identification process
- placing the patient (and carers) at the centre of the process
- evidence based practice guidelines
- collaborative practice models
- patient self-management within a health promotion / prevention framework
- process and outcomes measurement
- routine reporting and feedback loops, especially to the patient, based on a shared care plan.

The expert group identified the need for further discussions in relation to using health services to achieve a public health end. For example, the high levels of morbidity related to high blood pressure can be minimised through environmental health and clinical responses. In fact, it was argued, a high blood pressure prevention program could be delivered in much the same way as an immunisation program.

Key finding:

In relation to *Health system reform leadership and management* a claim for one Public Health Physician in every PHN was argued. Similarly, the presence of a critical mass of Public Health Physicians in acute care services — identifying problems with equitable access, formulating policy and interventions to improve equity of access, leading health system reform, and managing health system reforms — was acknowledged.

Community engagement and partnerships

The expert group considering the community engagement area of practice focused on three main 'best practice' pathways to enhanced engagement:

1. Dual specialist practice combining person-centred clinical work in the community with public health specialist work to form a 'community diagnosis'. For example a community paediatrician, or a drug and alcohol and public health dual specialist role. This would involve working directly with populations that are marginalised and unlikely to be accessing health services equitably. By working in the clinical setting within the community, the expert group reasoned that the Public Health Physician could build credibility and have greater authenticity and integrity to advocate for change.
2. Providing a brokerage role, bridging the gap between populations at risk and health services. This might involve interventions that strengthen community capacity through better access to, and understanding of data that for instance compares communities, and then helping fashion a response.
3. Creating links with other human services (housing, criminal justice, disability, etc.) that find the health sector confronting and characterised by rigid and highly professionalised structures.

The expert group argued that the areas most needing engagement were:

- community paediatrics
- drug and alcohol

- mental health / suicide prevention
- Aboriginal health
- urban development and the new urban agenda

Key finding:

Similar to other expert groups, the 'Community engagement and partnerships' group advocated for the growth of the Public Health Physician workforce in PHN appointments, and appointments in local health networks and districts. Such appointments would not be in population health but rather working in areas such as HIV and sexual health, homelessness or public housing.

The Survey of Fellows indicated that 24% of Public Health Physicians working in the community engagement area of practice held another specialist qualification (primarily addition medicine, sexual health and community paediatrics). This compares with just over 30% for the overall Public Health Physician workforce (see Table 6), suggesting that at this point combining clinical practice with public health practice does not especially impact on activity levels in the community engagement area of practice.

Teaching and research

The Public Health Physician contribution to the medical course curriculum (undergraduate or postgraduate level) was a key focus of discussion. It appears to differ across the country between schools of medicine.

In theory, and as a proxy means of establishing best practice, the expert group identified the Australian Medical Council (2012) standards for assessing medical programs for accreditation as a starting point. The standards nominate 'Health and Society: the medical graduate as a health advocate' knowledge and skills as one of only four primary domains of expected outcomes for graduates. Staffing, curriculum development, teaching methods, assessment processes, and the learning environment should be adequate to delivering the outcomes — but there are no specific guidelines on what this implies for instance in specific staffing requirements.

The expert group argued that a minimum number of Public Health Physicians on staff would be required. One university has a guide of 0.5 FTE Public Health Physician to every 150 undergraduate students, which was thought to be too low. The group also believed that medical students respected most teachers who have been a clinician. Even greater credibility for specialists would be afforded teachers employed in government roles (or other areas of Public Health Physician practice) part-time and academia part-time – which is currently generally the case with just over 80% of respondents to the Fellows Survey who are contributing work hours to teaching are also working in other public health areas of practice.

One cause of concern in medical training, at both undergraduate and postgraduate levels, is providing opportunities for vocational practice/rotation in Public Health Medicine. Training of students and Resident Medical Officers (RMOs) can be challenging – it can take a number of months to bring them out of a clinical mind-set, therefore there is a need to think about how to fast-track the establishment phase so that they can work within a public health setting (Mak *et al.*, 2009). By comparison, Trainees learning in other areas of medicine and on a more standard *clinical* placement, even if the teacher is not very good, will still learn as they are exposed to a constant stream of patients entering the system. From a training perspective therefore, much work is required on the part of the Public Health Physician clinical supervisor to establish and supervise the placement. The

group argued for the need to focus on the skills of clinical educators through adequate investment in training programs. Additional resources may be required to teach Public Health Medicine practice.

While the expert group believed there was too few Public Health Physicians currently teaching in medical schools, this notion was difficult to prove. Similarly, it was difficult to establish how many more Public Health Physicians would be required to teach.

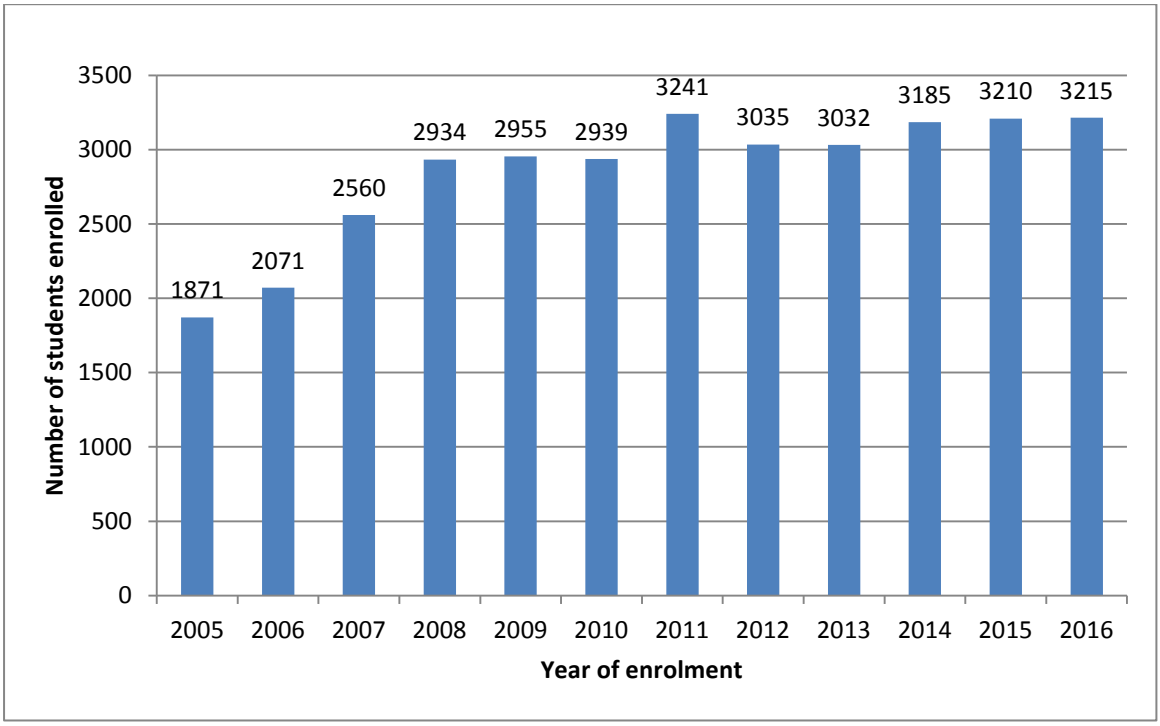

Figure 17: Commencing medical students in Australia (Domestic only) by year of enrolment

In 2016 new commencements in medical schools were 3215, an increase over the last decade of just over 25% (2.6% per annum), although in recent years growth in enrolments has stagnated. [37] In 2016 there were a total of 14,527 students in undergraduate training.

Key finding:

If the guide of 0.5 Public Health Physician FTE per 150 students is applied then the demand for Public Health Physician teachers should be 48.4 FTE. Currently it is estimated that there are 54.8 Public Health Physician FTE working in academia, but some of this workforce (an estimated 20% or 11FTE) are working exclusively in research, implying that the Public Health Physician staffing of medical schools is below the minimum.

[37] Medical Deans of Australia and New Zealand … http://www.medicaldeans.org.au/statistics/

International health

In the Australian context, 'International Public Health' is really still a niche area of practice and in the global health context Australia is not considered a big 'player' and is really only at the margins of global health when compared to other countries. While Australia is seen as a natural support country (in a geographic sense) for the Asia Pacific region, many of the countries in the region, such as China and India, are already quickly building their own capacity to respond to health issues and are becoming less reliant on external support for knowledge and expertise. In some cases their capacity and expertise has already surpassed that of Australia's.

One of the most important and in-demand Public Health skills is epidemiology. Unfortunately this is a skill in which Australian trained Public Health Physicians have no competitive advantage to well respected training institutes such as the London School of Hygiene and Tropical Medicine and Harvard. The expert group noted that training programs such as the Australian National University (ANU) Master of Applied Epidemiology (MAE) are well respected for international work and that it would be useful to do a MAE with AFPHM training.

Key finding:

The expert group felt there was little prospect of growth in this area in the short to medium term, and that at best the current proportion of the workforce working in International Health would stay constant. For more substantial growth to occur, AFPHM and the RACP would need to take a more proactive approach to its engagement in the Asia Pacific region.

Summary of best practice implications for demand projections

In Table 17 below, the best practice thinking explored in this chapter is summarised to provide the growth assumptions and the projected (best practice) demand outcomes.

Table 17: Summary of projected demand outcomes for Public Health Physician in Australia from a 'best practice' approach

Areas of practice	Current workforce size (FTE)[38]	Growth assumptions	Projected workforce size in 2026 (FTE)
Health monitoring and surveillance	22.3	Limited growth, keeping pace only with funding growth of 1.5% per annum	25.9
Disease prevention and control	44.4	Limited growth, keeping pace only with funding growth of 1.5% per annum Plus, additional Public Health Physicians placed in local districts / regions where insufficient current numbers[39]	86.8
Health promotion	10.7	Limited growth, but growing in line with funding trend at slightly higher than other areas of practice at 3% per annum	14.4
Health protection	14.3	Limited growth, keeping pace only with funding growth of 1.5% per annum Plus, additional Public Health Physicians placed in local districts / regions where insufficient current numbers[40]	51.9
Health policy, planning and management	40.5	Consistent proportion to the rest of the Public Health Physician workforce	73.6
Health system reform leadership and management	17.7	Target of one Public Health Physician in every local district / region appointed outside of the existing public health / population health infrastructure	65.7
Community engagement and partnerships	10.4	Growth in this area primarily covered by above area. Allowance for some additional growth in dual qualified specialists from the current 24% of the workforce to 34%	16.4
Academia (teaching & research)	54.8	Limited growth in student enrolments at 1.5% per annum. Fixed ratio of 0.5 Public Health Physician FTE per 150 enrolments. Research FTE fixed at 20% of teaching numbers	66.7
PHC	14.3	Placement of one FTE Public Health Physician in every Primary Healthcare Network	45.3
International Public Health Medicine	13.6	Limited growth of 1.5% per annum	15.8
Total	**243**		**462.5**

[38] 381 x FTE conversion factor (0.86) x Public Health Medicine participation factor (0.74) x proportional contribution in area of practice (Figure 9). For example, for health monitoring and surveillance, 381 x 0.86 x 0.74 x 0.92 = 22.3 FTE

[39] There are 66 distinct local health districts / regions / networks in Australia, and it is assumed half have no Public Health Physician presence.

[40] Similar assumption to above.

5. Supply projections

The supply of Public Health Physicians is examined and 10 year supply projections for the workforce provided. Data from the RACP, AIHW and AHPRA are analysed to obtain an estimate of new graduates or 'Fellows' of AFPHM, overseas supply, losses to the workforce such as through retirement, and also workforce gains such as 'inactive' Public Health Physicians re-entering the workforce.

Findings from the analysis of these data variables provide a description of workforce supply and provide the basis for calculating supply projections. Three possible projected Public Health Physician workforce supply scenarios were developed:

- *A 'Best guess' scenario – assumes total Trainee position numbers remains at the 2016 level of 68 per year, and that losses of Public Health Physicians from the workforce remain stable at 5% for the duration of the projection period.*
- *An 'Optimistic' scenario – assumes that total Trainee numbers increase after 2016 to the high water mark for the AFPHM Training Program identified in the MTRP reports as 81. Public Health Physician workforce losses in the first five years stay at 5% but after 2021 the rate of loss decreases to 3%.*
- *An 'Aspirational' scenario – assumes the number of Trainees entering the AFPHM Training Program continues to grow each year at the rate of optimistic funding growth in public health (5% per annum). Workforce losses are the same as for the 'optimistic' scenario.*

The three supply scenarios all begin with 242 FTE in 2016 and provide a range of supply endpoints in 2016 from a low of 289 FTE to 366 FTE, or compound growth rates of 1.6% per annum to 3.8% per annum.

Growth rates in Public Health Physician workforce supply, even the more modest 'best guess' scenario estimates, are driven by increased graduates from the AFPHM Training Program. For the last 10 years (2007 to 2016) the supply of Fellows admitted to AFPHM each year has been relatively stable at an average of 10 per year. But in the years from 2016 to 2026 the average number of new Fellows per year is projected to be closer to 20 for the 'best guess' scenario and more for the other scenarios.

New 'graduate' supply (from traineeships)

Public Health Medicine Advanced Training Program

The AFPHM Advanced Training Program of the RACP is delivered through AFPHM. The Training Program is comprised nominally of 36 months, or 3 years, of FTE training at accredited training sites.

As described on the RACP website (RACP, 2016) the eligibility criteria to start Advanced Training in Public Health Medicine are:

- general medical registration
- three years postgraduate medical experience
- completed or enrolled in a Masters of Public Health (or equivalent)
- appointment to an approved training position.

The last of the above eligibility criteria, finding an approved training position, has in the past limited the number of Trainees in the Training Program and as a consequence (see below) limited the output of new Fellows from the Training Program. In more recent years the number of training posts has been expanded by support for supernumerary positions created through the Commonwealth Government's Specialist Training Program (STP). Sites that successfully apply for an STP funded position receive $100,000 salary contribution. Sites have utilised this funding in different ways depending upon the circumstances: in some cases the $100,000 is combined with other funding sources to provide for a salary, and in other cases the position (and accordingly the salary) is only supported by STP funds.

The STP initiative is aimed at increasing training posts for specialists outside of traditional public teaching hospitals to enhance the workforce distribution of specialist registrars in rural areas and areas of workforce shortage. The program commenced in 2010 and in 2016 900 places were funded Australia wide (and across all specialty areas). Funding for these places has recently been extended for 2017.

The RACP currently administers over 400 STP posts for all physician advanced training positions including for Public Health Medicine. At the commencement of the initiative there were 22 STP posts available in Public Health Medicine. In 2013 the federal government expanded the STP program and by 2016 there were 36 STP posts available to Trainees. This increase in STP posts is depicted in Figure 18. The STP supported Public Health Physician training posts account for just over half of all AFPHM training posts.

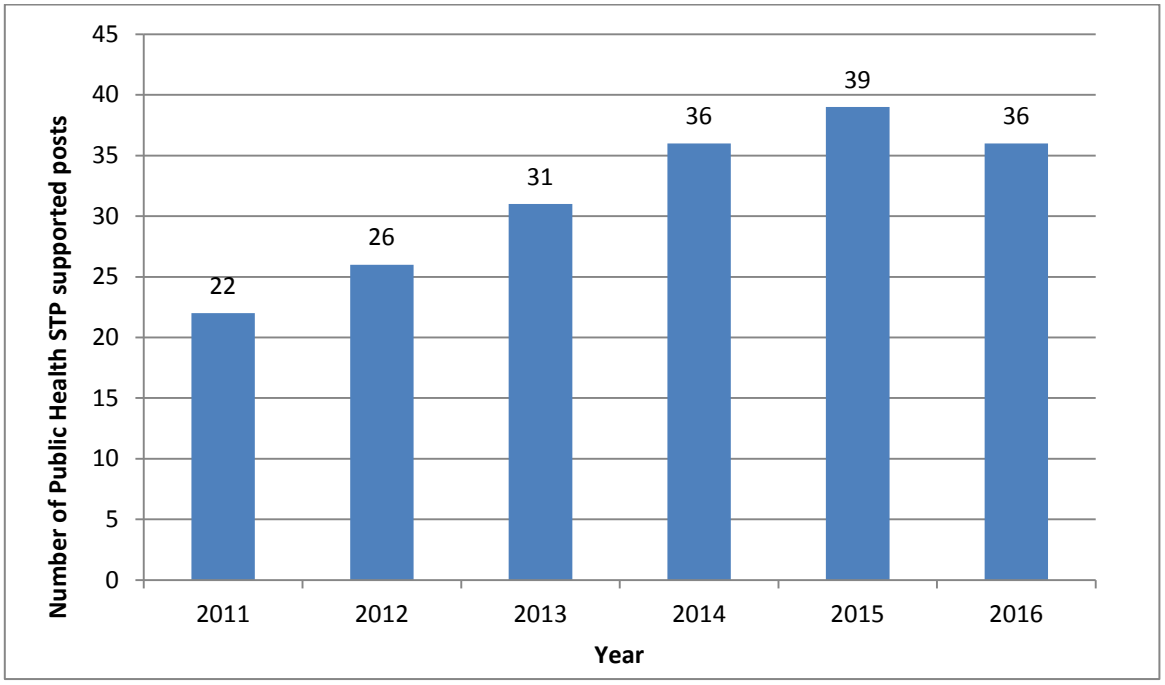

Figure 18: STP funded posts in Public Health Medicine in Australia 2011-2016 inclusive (*Source: RACP data, 2016*)

At times posts are vacant for a variety of reasons and, anecdotally, the vacancy rate across all specialties is approximately 12%. Funding is discontinued for posts that remain vacant for an extended period of time, which explains the decrease between 2015 and 2016 in AFPHM STP posts in Figure 18.

Past graduate supply trend

Based on RACP data (membership database), for the last 10 years (2007 to 2016) the number of Fellows admitted to AFPHM each year has been relatively stable at an average of 10 per year. Figure 19 illustrates that there was a slight decrease in numbers in 2011 (n=4), while 2015 experienced the highest number of Fellows (n=16) in the 10 year period.

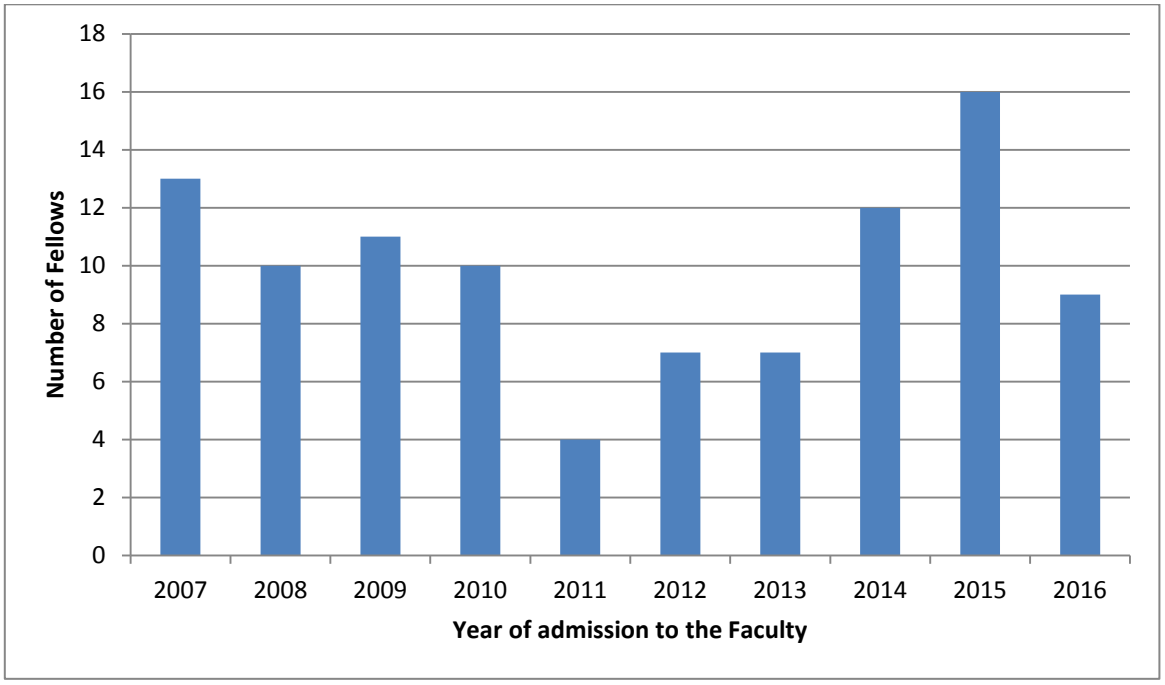

Figure 19: 10 year trend of AFPHM admissions in Australia, 2007-2016 (*Source: RACP data*)[41]

Analysis of data from the Survey of Trainees indicates that 35 Trainees (81% of respondents) intend to work in Public Health Medicine once they complete their training. On average, these Trainees indicated that their training would be completed in 4.1 years. Realistically training may take longer. For Trainees who intend to complete their training in 2016 (n=6), the average completion time was 5.6 years.

The survey data provides a small window of the Trainee to Fellow pathway. Data held by the RACP provides more in-depth information about Trainees and has therefore been analysed to calculate a 'best guess', 'optimistic' and 'aspirational' supply of graduates from the Training Program to the Public Health Physician workforce.

Snapshot of current Trainees

Trainee numbers

Trainees on the RACP Education database are required to satisfactorily complete a total of 36 units of FTE training as well as work-based assessments and teaching and learning requirements to become FAFPHM. Unlike advanced training programs for other physician specialties, where *all* training rotations generally commence in February of each year, there is no set starting point in the year for Trainees in the Faculty Program, and they are able to commence their training at any point.

[41] Derived from the number of current 'Active' Fellows working in Australia (n=104) who became Fellows from 2007 onwards.

Also unlike other specialist advanced training programs within the RACP, where a stable base of accredited training posts is the norm, AFPHM Program Trainees can find a position and are then required to apply for approval of the 'training position' within 4 weeks of commencement in the position. As part of the approval process, Trainees must submit a *Learning Contract Report* within six weeks of completion of the position to have the period within the position certified. Approval and certification decisions are made within a tight timeframe and the RACP database is updated as documentation of the decisions are received from the Supervising Committee.

Active Trainees are classified into one of two training categories, as created by AFPHM:

1. Advanced Trainee – In active training (can be at level 1, 2 or 3 reflecting number of units completed)
2. AT-interrupted training – Advanced Trainee who is not currently in active training and may have deferred for a period of time.[42]

Because of the different way and times Trainees can enter the AFPHM Training Program Trainee numbers can, and do, fluctuate throughout the year. This is demonstrated in Table 18 which provides two snapshots of AFPHM Trainee numbers for 2016 provided from the RACP database[43].

Table 18: Number of AFPHM Trainees by training category in Australia, 2016 (*Source: RACP data, 2016)*

Date of data extraction	Advanced Trainees	AT-interrupted Trainees	Total
23 November 2016	59	24	**83**
21 December 2016	67	18	**85**

Again, it is likely that the above figures will change after the publication of this report due to the nature of the AFPHM Training Program and fluctuating AFPHM Trainee numbers, illustrating the impact this can have on obtaining accurate training data.

RACP data published in the annual reports of the MTRP (MTRP, 2016) provides an additional snapshot of AFPHM Trainee numbers. A summary of the data is presented in Figure 20.

Trainee pathways

Analysis of available data reveals a complex progression through training. Although the 36 unit AFPHM Training Program is designed to be completed in three years, as previously noted and for a variety of reasons, Trainees can expect to complete the training at an average of 5.6 years. The AFPHM Training Program has one of the highest female rates of participation amongst advanced training programs (MTRP 2016, 72.8% compared to the average of all programs of 52.6%) and also one of the highest rates of part-time training (28.4% compared with the average of 16.2%, MTRP, 2016). As a consequence, combined with the high rate of interrupted training, it is difficult to predict how quickly Trainees will progress through training.

[42] This appears to be a common occurrence in the AFPHM Training Program.
[43] A third set of 'snap shots' are provided in Figure 20.

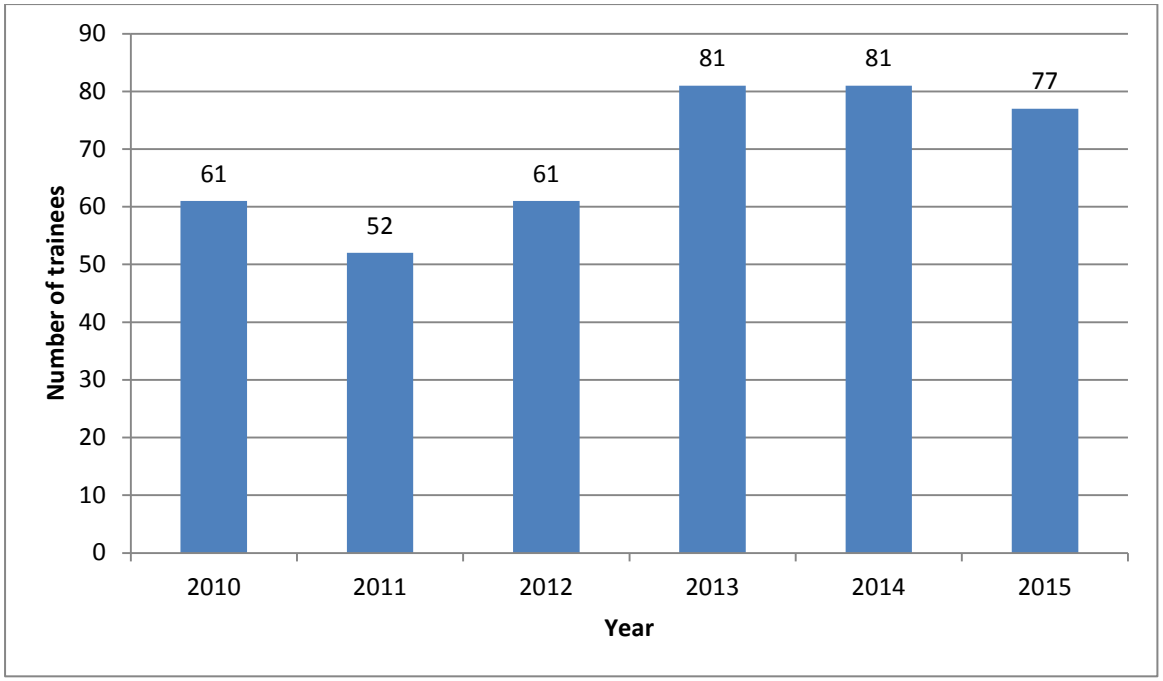

Figure 20: Estimated number of Active Trainees in the AFPHM Training Program in Australia 2010-2015 (*Source: MTRP Annual Reports*)

Projected graduate supply scenarios

Bearing these issues in mind, three graduate supply scenarios – 'best guess', 'optimistic' and 'aspirational' – have been calculated to estimate the number of new Fellows that can be expected for the next 10 years. In theory a 'worst case' or pessimistic estimate could also have been developed using the estimate of 59 current Trainees provided by the RACP, but this was not deemed in keeping with the approach taken to demand estimates.

Best guess graduate supply estimate

The following assumptions were used to calculate estimates of the graduate supply:

- 'Advanced Trainees' were defined as Trainees who have completed one or more accredited units
- Trainees only based in Australia were included
- a 10 % loss factor was assumed for level 1 Trainees transition to level 2
- a 5% loss factor for level 2 Trainees who transition to level 3
- a 1% loss factor for level 3 Trainees graduating to become Fellows.

Based on these assumptions, and the RACP database administrators' estimate that of a total of 68 Trainees are in training each year, a supply average of 19 graduates per year can realistically be expected from 2016. Of course, the actual number 'graduating' each year fluctuates because of the different numbers able to enter the program each year if the total training places is fixed. Figure 21 demonstrates that in the next 10 years the greatest number of new graduates can be expected in 2019 (n=27) while 2016 will see the lowest number of new Fellows (n=9).

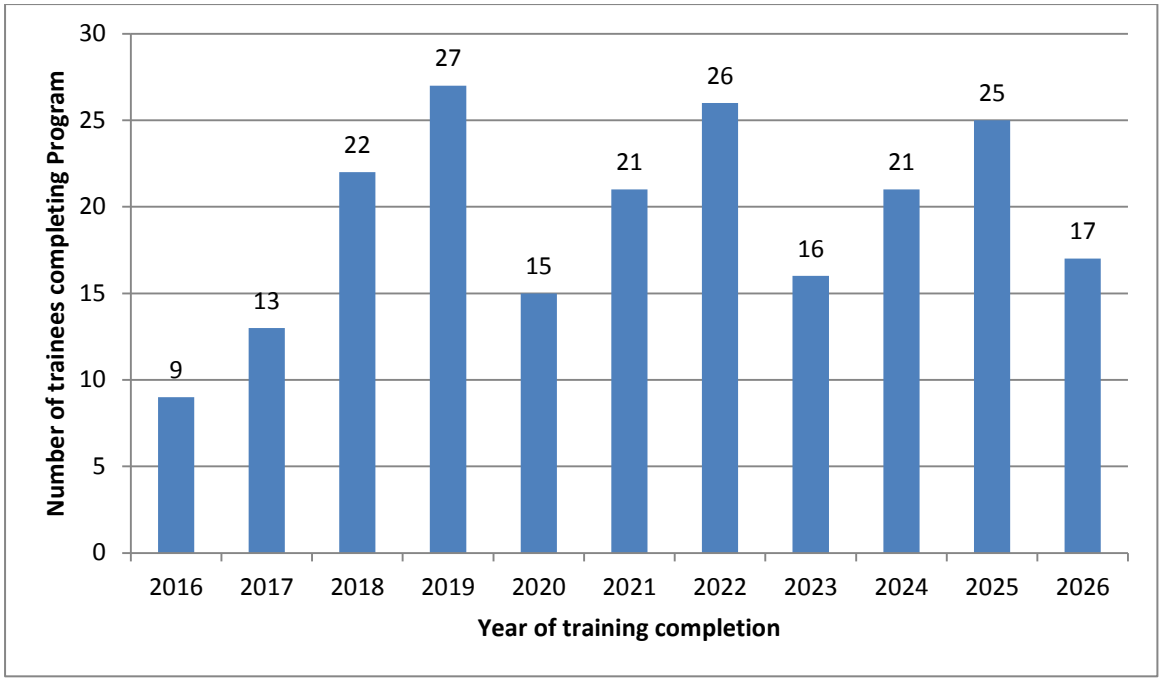

Figure 21: Best guess 10 year projection (2016-2026) of AFPHM Trainees in Australia who complete training by year of completion

Optimistic graduate supply estimate

An 'optimistic' scenario of the supply of graduates can be constructed by assuming that the number of Trainees in training at any one time will return to the 'high water' mark identified from RACP data published in the MTRP annual report of 81 in 2013/14. An increase to this total number of Trainees from 2017 would produce an average of 22 Trainee completions per year. As with the 'best guess' scenario, 2016 will see the lowest number of new Fellows (n=9) whereas the highest number of new Fellows can be expected in 2019 and 2022 (n=27). Due to a higher intake in 2017 the latter projection years of graduate supply fluctuate less. This scenario is summarised in Figure 22.

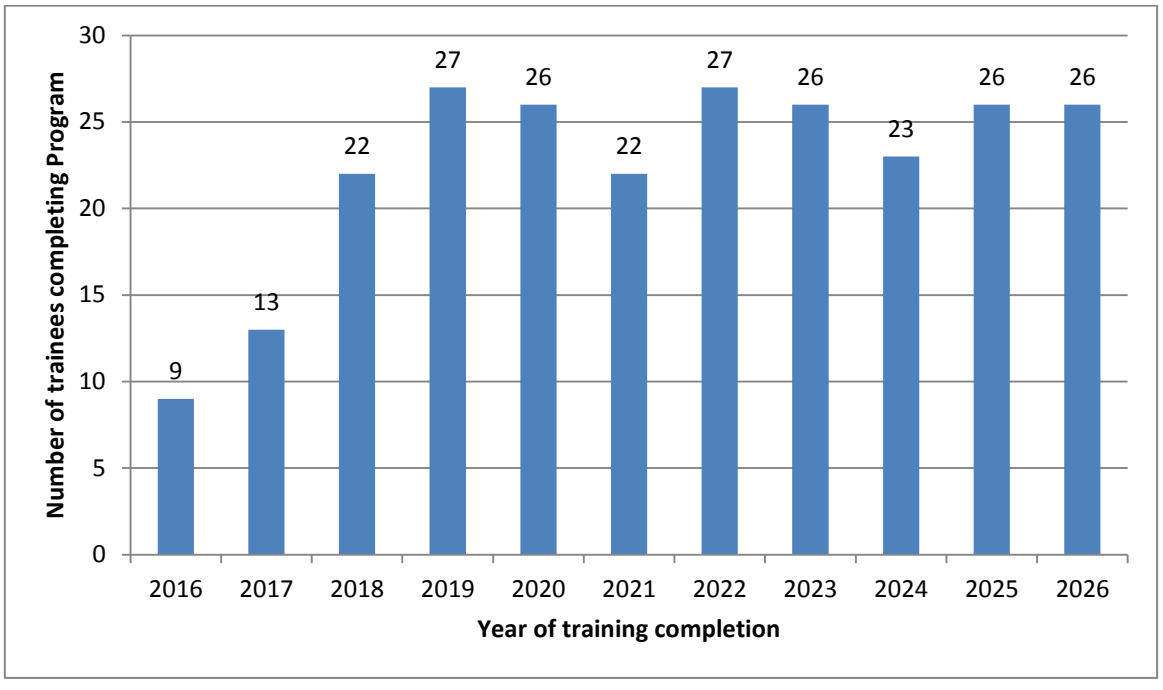

Figure 22: Optimistic 10 year projection (2016-2026) of Trainees who complete training in Australia

Aspirational graduate supply estimate

An 'aspirational' scenario of the supply of graduates can be constructed by assuming that the number of new Trainees whom commence training each year continues to grow rather than be constrained within a fixed total number of training positions. The projected intake of Trainees in 2017 based on the 'best guess' estimate is 30. An 'aspirational' projection would consider a 5% annum increase in supply in keeping with an aspirational growth in demand for public health services. Such an increase on the 2017 intake would produce an average of 25 Trainee completions per year. As with the 'best guess' scenario, 2016 will see the lowest number of new Fellows (n=9), but in this scenario graduate supply essentially continues to grow to a high point of 34 in 2026. This scenario is summarised in Figure 23.

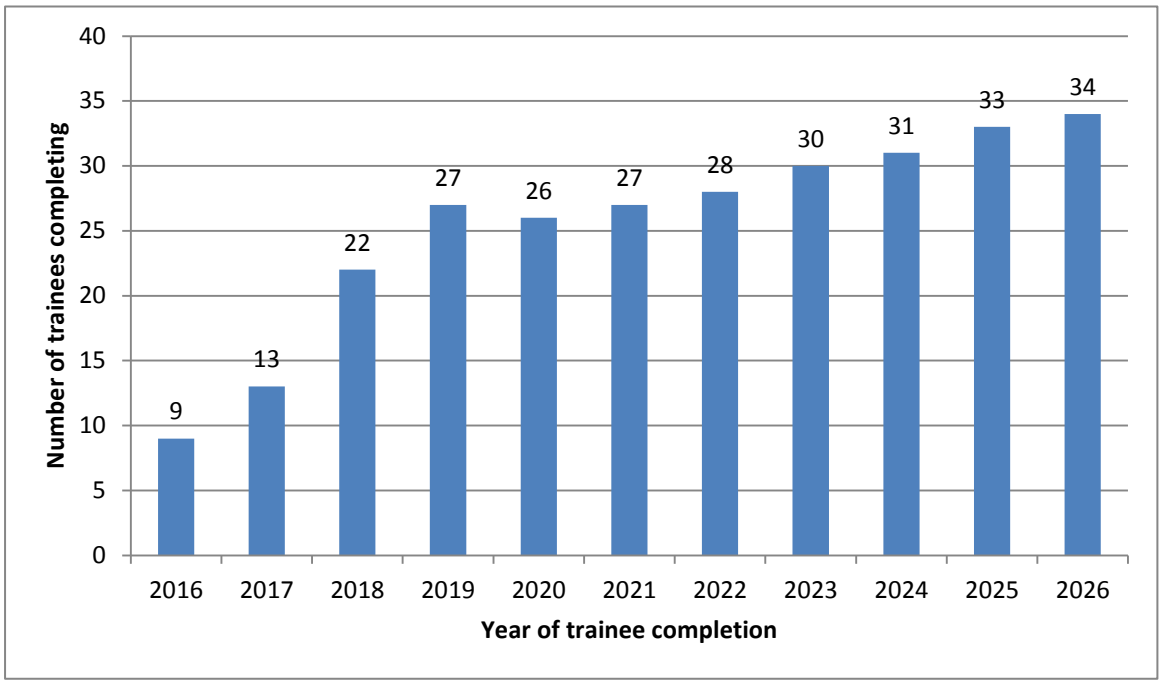

Figure 23: Aspirational 10 year projection (2016-2026) of Trainees who complete training in Australia

The workforce contribution of trainees

Trainees receive direct supervision, work in buddy type arrangements with Fellows, observe others perform work and participate more structured training sessions. However, when they are performing work independently and it is work that a Public Health Physician Fellow would have otherwise had to perform, it can be implied that Trainees, for at least some of their time, are contributing to the total supply of Public Health Physician workforce. Like all 'apprentice-type' training approaches, and similar to all other specialist medical training programs, the AFPHM Training Program is based on a 'learning by doing' method.

A number of supervisors of trainees were consulted to provide an estimate of the trainee contribution. They estimated between 50% and 85% of a trainee's work hours could be counted as a direct contribution to total Public Health Physician supply. Some estimates indicated that this estimate was the same for all three years of the Training Program, others that the contribution of the trainee would naturally increase as their experience and capacity developed. These estimates add a potential 30 to 60 FTE supply each year to the total Public Health Physician workforce.

It was decided for modelling purposes to ignore the contribution of trainees.

First, workforce planning classically only counts graduate supply, that is, after trainees have graduated and formally entered the workforce. New graduates contribute to the compound growth of the workforce in a way that trainees in theory do not.

Second, any attempt to account for the supply contribution of trainees would require a similar effort to understand how trainees are meeting the demand for workforce. This assumes that the work that trainees perform is work that a Public Health Physician Fellow would ordinarily have been required to perform. This assumption is difficult to sustain; while some work undertaken by trainees might be deemed integral to the demands of a public health service, other work might not be of a high priority and be allocated primarily for its valued learning outcomes.

Overseas supply

The RACP data for Overseas Trained Physicians (OTPs) was unfortunately incomplete in relation to country of origin and country of primary practice. Similarly it was not possible to obtain such data from AHPRA as it is not publicly released according to specialist training.

Instead the data from the Survey of Fellows is the more reliable of the data sources. While it only represents approximately 50% of the current workforce it was used as the basis of a 'best guess' scenario.

176 respondents to the survey are currently working in some form of Public Health Medicine in Australia. Of these, 31 respondents indicated that they were trained overseas which represents 18% of the survey respondents. Fellows have trained in countries such as Canada, Fiji, France, Ireland, Netherlands, New Zealand, Philippines, Taiwan, UK and the United States of America. By way of comparison, 33% of all medical practitioners working in Australia in 2015 (n=88,040) obtained their qualification overseas (AIHW, 2016b).

Additional useful data that can be used to calculate a best guess overseas migration supply ratio is the length of time Fellows have worked in Public Health Medicine. A summary of the length of time worked by overseas trained Fellows is provided in Figure 24 which indicates that most of these Fellows have been in the workforce for over 20 years. These Fellows represent 32% of the total overseas trained Fellows.

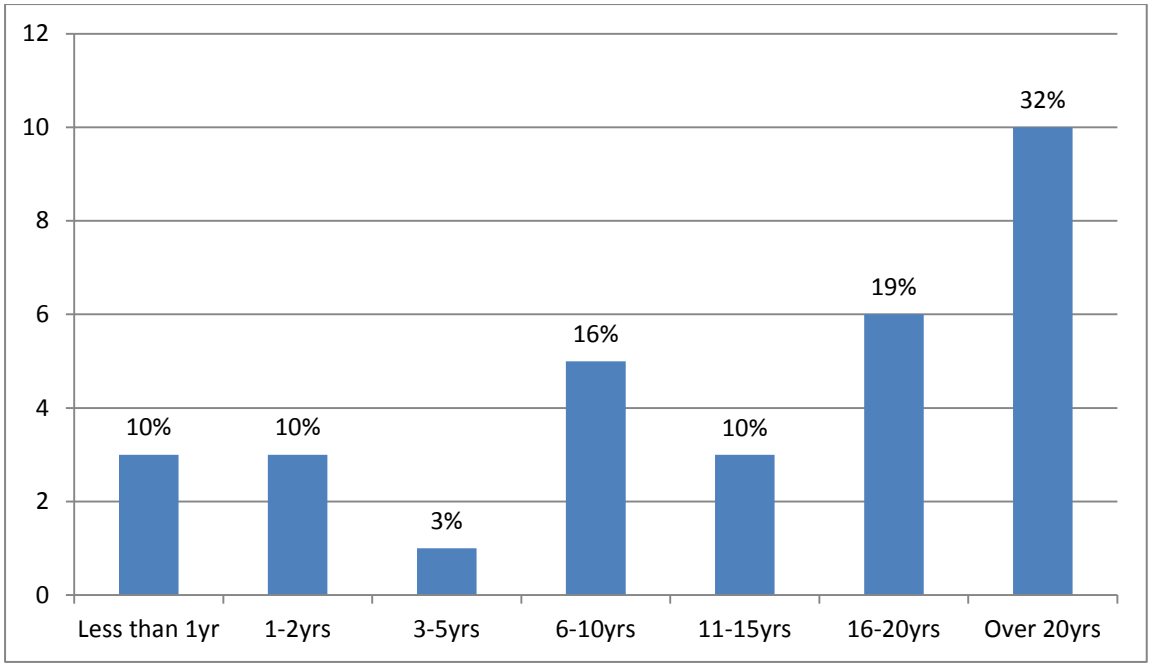

Figure 24: Number of overseas trained AFPHM Fellows (currently working in Australia) by number of years worked as a Public Health Physician (n=31) (*Source: Survey of Fellows, 2016)*

Comparing this with all respondents to the survey who are Active Fellows a similar pattern of years in the workforce is found. As illustrated in Figure 25, most Fellows (39%) have been in the workforce for over 20 years.

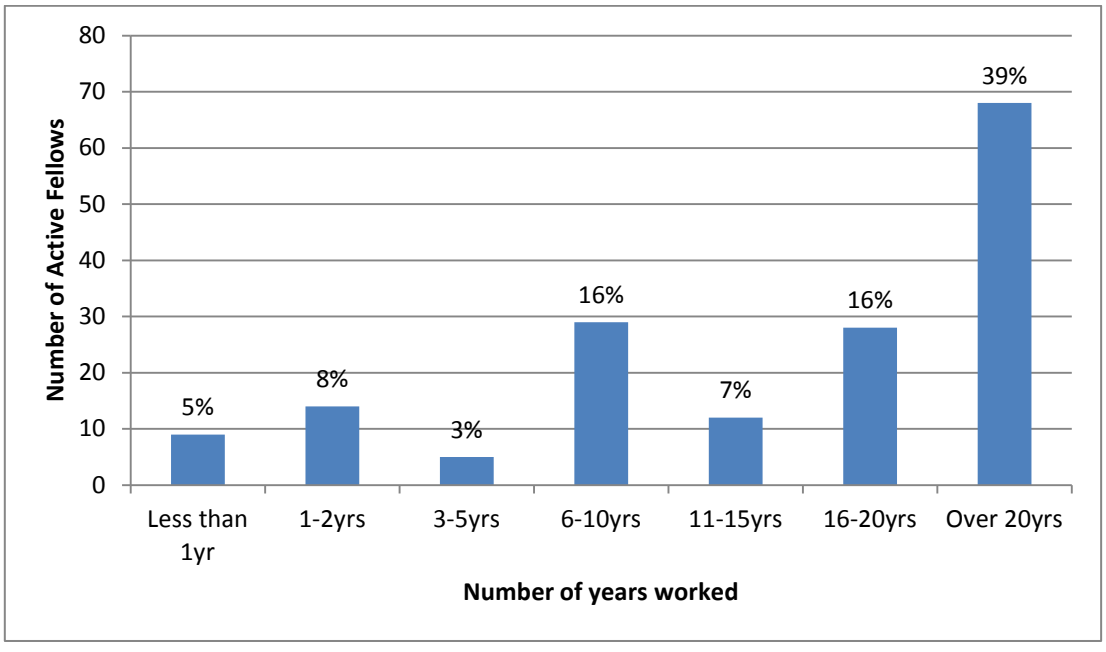

Figure 25: Number of years Active AFPHM Fellows (currently working in Australia) have been in the workforce (n=176) (*Source: Survey of Fellows, 2016)*

Based on the numbers presented in Figure 25, for the last 10 years approximately one overseas trained Fellow per year has entered the Australian Public Health Medicine workforce. Of the Active Fellows (n = 176) this represents an overseas supply ratio of 0.5% per year.

In lieu of available data for the annual supply of overseas trained Fellows to the Public Health Medicine workforce the supply ratio of 0.5% will be applied to calculate future workforce projections.

Workforce losses

Loss to the workforce may be experienced for a variety of reasons – for example retirement, change in career path or migration (see Table 19). Data from the Survey of Fellows found that 17.5% (n=38) of all respondents are not currently working in Public Health Medicine, the primary reason being that they are working in another area of medicine (42% of those not working and 7.3% of all survey respondents).

Table 19: Reasons AFPHM Fellows are not working in Public Health Medicine in Australia (*Source: Survey of Fellows, 2016)*

Reason for not working in Public Health Medicine?	Number of Fellows	% of those not working	% of all survey respondents
Working in other area of medicine	16	42%	7.3%
Public Health Physicians overseas	9	24%	4.1%
Retired from regular work	8	21%	3.7%
Not in paid work	3	8%	1.4%
OS in other medicine	1	3%	0.5%
Studying	1	3%	0.5%
Total	38	100%	17.5%

From the Survey of Fellows, 24% of Fellows (n=42) also indicated that they intend to leave the Public Health Physician workforce in the next five years. As illustrated in Figure 26, retirement is the primary reason for leaving the workforce (83% or n=35) while other Fellows are leaving the workforce because they intend to work outside of Public Health Medicine.

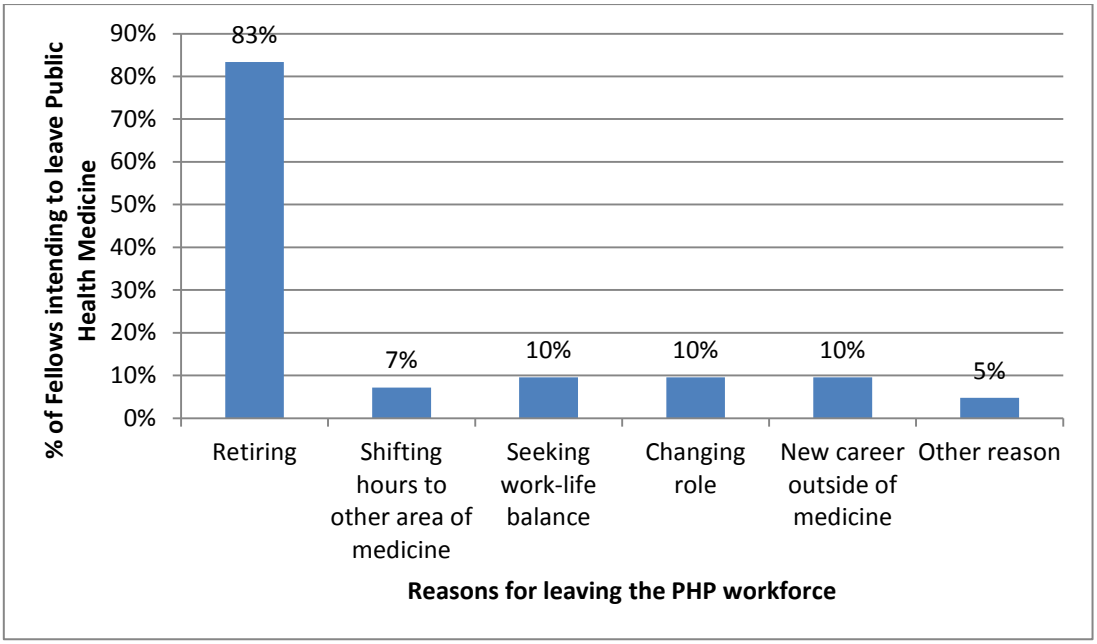

Figure 26: Reasons Active AFPHM Fellows (currently working in Australia) intend to leave Public Health Medicine in the next five years (n=42) (*Source: Survey of Fellows, 2016)*

Best guess estimate of workforce loss

Data collected through the Survey of Fellows can be used to obtain a workforce loss ratio for workforce projections. As previously mentioned, 219 responses were received for the survey conducted in July. Of these 176 Fellows identified that they were currently working in Public Health Medicine. 42 (24%) of these intend to leave the workforce in the next 5 years. The age groups of these Fellows is summarised in Figure 27.

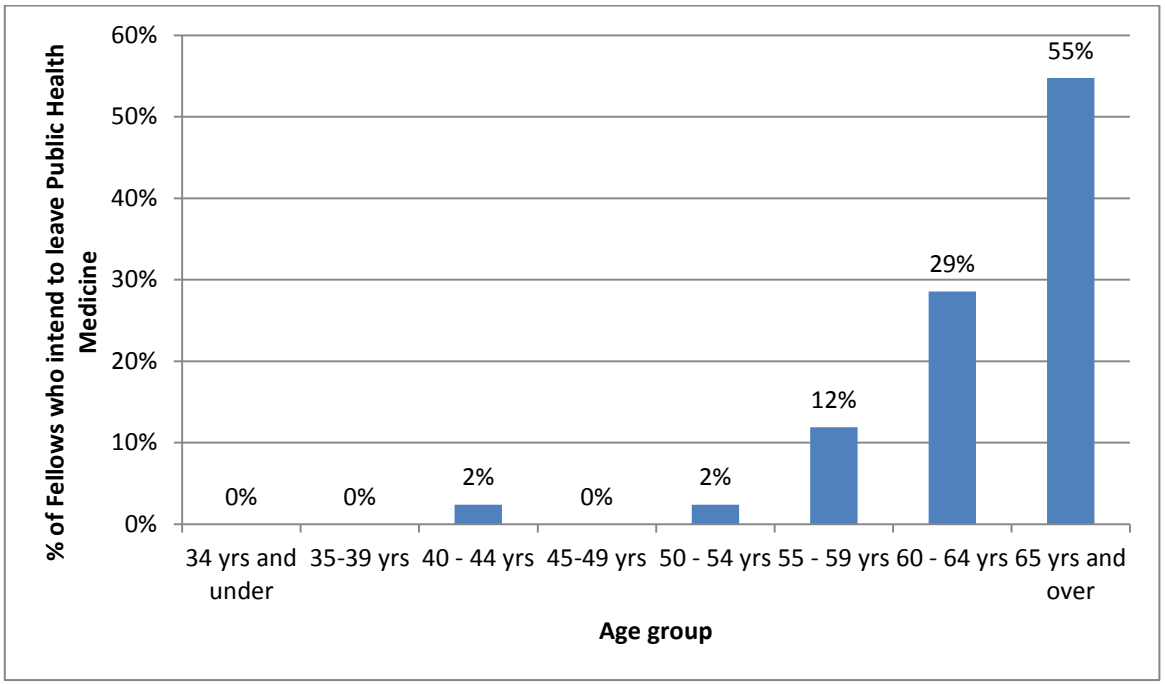

Figure 27: Age group of Active AFPHM Fellows (currently working in Australia) who intend to leave in the next five years (n=42) (*Source: Survey of Fellows, 2016*)

By looking at the Fellows who intend to leave in terms of all Active Fellows by age group, Figure 28 emphasises from which age group losses are most likely to occur.

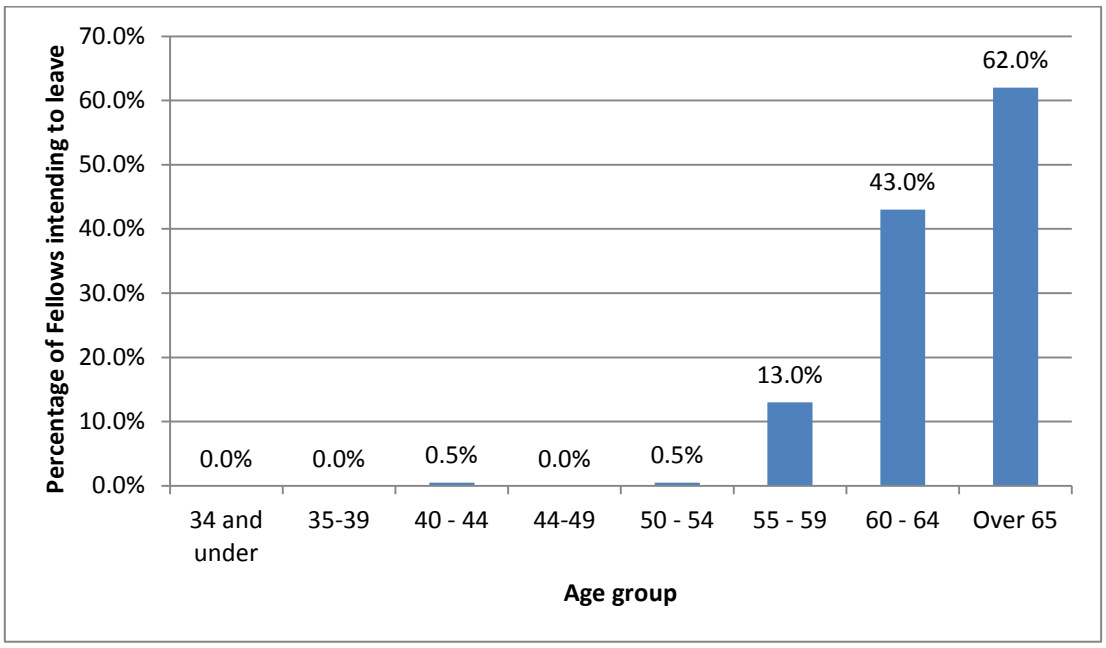

Figure 28: Age group of AFPHM Fellows (currently working in Australia) who intend to leave Public Health Medicine (n=42) in the next five years versus Active AFPHM Fellows (n=176) (*Source: Survey of Fellows, 2016)*

The above analysis indicates that 62% of current Active Fellows who responded to the survey aged over 65 years will leave in the next five years. This finding correlates with the data in Figure 26 that indicates retirement is the primary reason for 83% of Active Fellows aged 65 years and over who intend to leave Public Health Medicine.

From the survey data 42 Fellows (24% of all Active Fellows respondents) were identified to be leaving the workforce at some point over the next five years. Assuming they will leave the workforce at a constant rate of approximately 8.4 Fellows per year, based on the survey data (that is, 176 Active Fellows) this represents a loss ratio of 4.7% per year.

The RACP data provides more detailed information that can be used to calculate a loss ratio. Retirement from the workforce is one of the primary reasons Fellows leave the workforce. As the current workforce is predominantly comprised of physicians aged 55 years and over, equivalent to the age of retirement, significant losses, as indicated in Figure 29, could be expected in the near future.

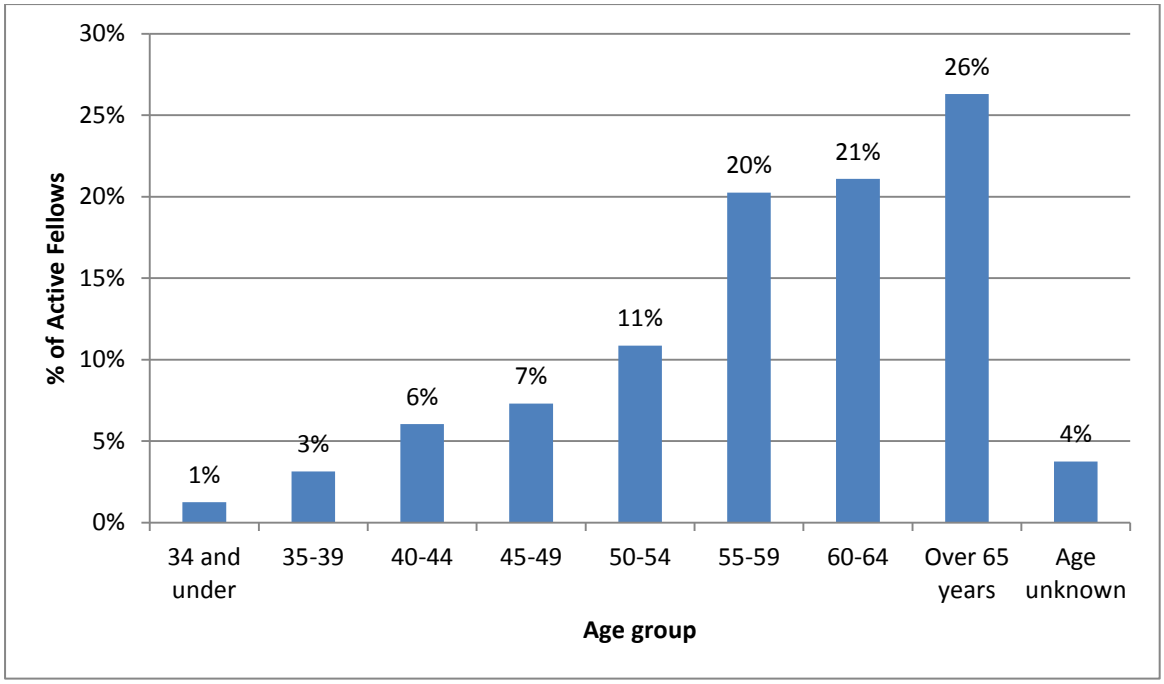

Figure 29: Active AFPHM Fellows by age group currently working in Australia (n=479) (*Source: RACP data, 2016*)[44]

There are other reasons physicians may leave the workforce at any stage of life as noted in Figure 26. Detailed data in relation to number of resignations is available from the RACP which can also be used to estimate an annual rate of loss. Additionally, the RACP data includes a third useful category, 'Terminated' Fellows, which includes Fellows who have ceased paying membership fees for a variety of reasons. For the purpose of this study, and due to no other available information, it has been assumed that these Fellows have probably retired but in any case are also no longer working in Public Health Medicine.

To calculate a loss ratio the following rules were applied to the RACP data:

- Fellows categorised as 'Resigned', 'Retired' or 'Terminated' from AFPHM Fellowship were assumed to have left the workforce[45]
- Fellows were identified who had left AFPHM between 2001 and 2014[46]
- Only Fellows who had worked in Australia were included.

Retirement dates were only available for 11 records; therefore the loss rates per year for 'Resigned' Fellows was used to obtain a figure for 'Retired' Fellows. The maximum age of 'Resigned' Fellows was also used to obtain an approximate sample of 'Resigned' Fellows.

[44] The data for the category 'Age unknown' relates to 18 incomplete records.
[45] RACP membership categories are defined as follows: Active - any Fellow (excluding Honorary Fellows) who has not retired, resigned or been terminated by the RACP; Retired - a Fellow who is no longer practising in their speciality; Resigned - a Fellow who has resigned from their RACP membership; Terminated – a Fellow whose membership has been terminated by the RACP for various reasons. Further definitions can be found in the College Constitution on the RACP website here file:///C:/Users/carla.cowles/Downloads/RACPConstitution-2012clean.pdf.
[46] This time period has been selected based on the AIHW data available in Figure 10.

Based on these rules for exclusion and inclusion a total of 280 records were used to calculate a loss ratio (116 'Resigned'; 100 'Retired'; 64 'Terminated'). The combined total loss for each year against the total number of Fellows is summarised in Table 20.

Table 20: Workforce loss compared to AFPHM Fellows in Australia between 2001 and 2014 (Source: RACP data, 2016)

Year	Active workforce	Total loss	% of total loss
2001	374	7	2%
2002	393	6	2%
2003	485	13	3%
2004	420	42	10%
2005	464	9	2%
2006	366	27	7%
2007	416	2	1%
2008	345	18	5%
2009	324	51	16%
2010	343	40	12%
2011	397	42	11%
2012	407	10	2%
2013	390	4	1%
2014	381	9	2%

Across this 14 year period the average percentage of loss is 5%. This average is equivalent to the loss ratio obtained using the survey data and provides confidence that this is a sound estimation.

Therefore a best guess estimate is that a loss of 5% per year can be expected from the workforce, which will be applied to calculations for workforce projections.

Optimistic estimate of workforce loss

An 'optimistic' estimate of workforce loss would be that the rate of loss does not go above 5% each year. While the workforce is predominantly comprised of an older workforce, this pattern is set to change in the future with a younger cohort of Fellows coming into the workforce. Patterns of retirement are also changing in Australia with older workers increasingly remaining in the workforce beyond traditional retirement age.

Considering these factors, and considering there is no data available to predict the future workforce losses, a more 'optimistic' estimate can be assumed where the rate of loss will decrease as the projections get closer to 2025. Accordingly, in an 'optimistic' scenario an estimate of 5% loss per year will be applied to the first 5 years of projections (2016 to 2020) and a 3% per year loss will be applied for the remaining 5 years of projections (2021 to 2025).

Workforce gains

At any time there are segments of the workforce that are 'inactive', that is, temporarily on leave from the workforce. The reasons for this, as detailed in Table 20, can include working overseas, study or not being in paid work due to a variety of life circumstances such as parental leave or

health-related issues. Unfortunately data related to these potential workforce gains from the inactive workforce is not available for the Public Health Physician workforce in any of the datasets reviewed.

Data from comparative medical workforces, such as Occupational and Environmental medicine or Rehabilitation medicine, is not currently available.

Broadening the search to all health workforces a rate of 're-entry' of 1% was identified. Using AIHW data from Nursing Labour Force census, this rate was calculated and applied to nursing workforce modelling by the Northern Territory Government (Malyon, Zhao & Guthridge, 2010). Similarly, a re-entry rate of approximately 1% was found for the Victorian Allied Health workforce (Kendall, Ridoutt & Schoo, 2008). Based on these rates, a rate of 1% in workforce gains will thus be applied in the labour market calculations for this study.

6. Labour market analysis

A number of labour market scenarios (comparison between projected supply and demand) are presented by comparing various supply and demand possibilities.

The various demand and supply possibilities, described in Chapter 1 to 2 and calculated in Chapter 3 and 4, are summarised in two Figures. Various labour market scenarios are also explored, ranging from most likely ('best guess') to least likely ('aspirational').

A comparison of the two 'best guess' scenarios for supply and demand for Public Health Physician workforce indicates both supply and demand of the Public Health Physician workforce is projected to grow very incrementally, much less than most of the other professions in the health system.

Even so, in this labour market supply will grow quicker than demand for public health physicians leading to an oversupply of physicians in 2026 of approximately 8 FTE, or 2.8% of demand. It is possible in this situation that a greater availability of public health physicians would stimulate employers to use the 'surplus' supply in novel ways, but this is not guaranteed and 'excess' supply of public health physicians may end up being under-employed (diverted to other areas of medicine).

Over-supply could be alleviated by any of the three optimistic demand projection scenarios. In these labour markets, even an 'optimistic' supply projection scenario will deliver a shortfall in supply in 2026 against the demand projections. The demand projections calculated on the basis of funding trends, the Public Health Physician to total public health workforce and best practice were, respectively, of 5.6%, 20.6% and 24.9%.

Demand scenarios

Five possible demand scenarios were developed from this study:

1. A 'best guess' scenario – this scenario is based on a conservative estimate of the trend in the funding by Commonwealth and State/Territory Governments of public health services. The estimate assumes the trend from the last few years (lower growth than for the decade) will hold, and that demand for the Public Health Physician workforce will grow at the same rate as all public health services.
2. Three 'optimistic' scenarios –
    - the first scenario (A) is based on an estimate of the public health services funding trend over the whole decade which has sustained a higher growth rate. Similar to above, the estimate assumes that demand for the Public Health Physician workforce will grow at the same rate as all public health services.
    - the second scenario (B) estimates growth in demand for Public Health Physician workforce based on a fixed ratio of Public Health Physicians to the total public health workforce and assuming growth in the public health workforce consistent with an optimistic growth rate based on trends in public health services funding.

- the third scenario (C) is based on an assumption of best practice use of public health physicians, as determined by groups of expert judges, across 10 areas of public health practice. Different growth in demand assumptions apply to each area of practice based on the expert judgements.

3. An 'aspirational' scenario – this scenario applies a simple public health practitioner to population ratio in which growth in demand is driven entirely by projected growth in the Australian population (with an allowance for adjustment to cover existing unmet demand).

The five scenarios are shown in Figure 30 with the three 'optimistic' scenarios separately labelled (A, B and C). The three 'optimistic' scenarios produce a total demand in 2026 of similar size, with an average of 417 FTE and a range in projected 2026 demand estimates from 388 FTE to 467 FTE. Scenario A and B are particularly close with estimates of 395 and 388 FTE respectively.

The difference from the 'best guess' estimate of the average 'optimistic' scenarios is 48%. The 'aspirational' scenario, based on a comparatively unsophisticated practitioner to population ratio, appears unrealistic and represents over 150% greater demand for Public Health Physician workforce than the 'best guess' scenario.

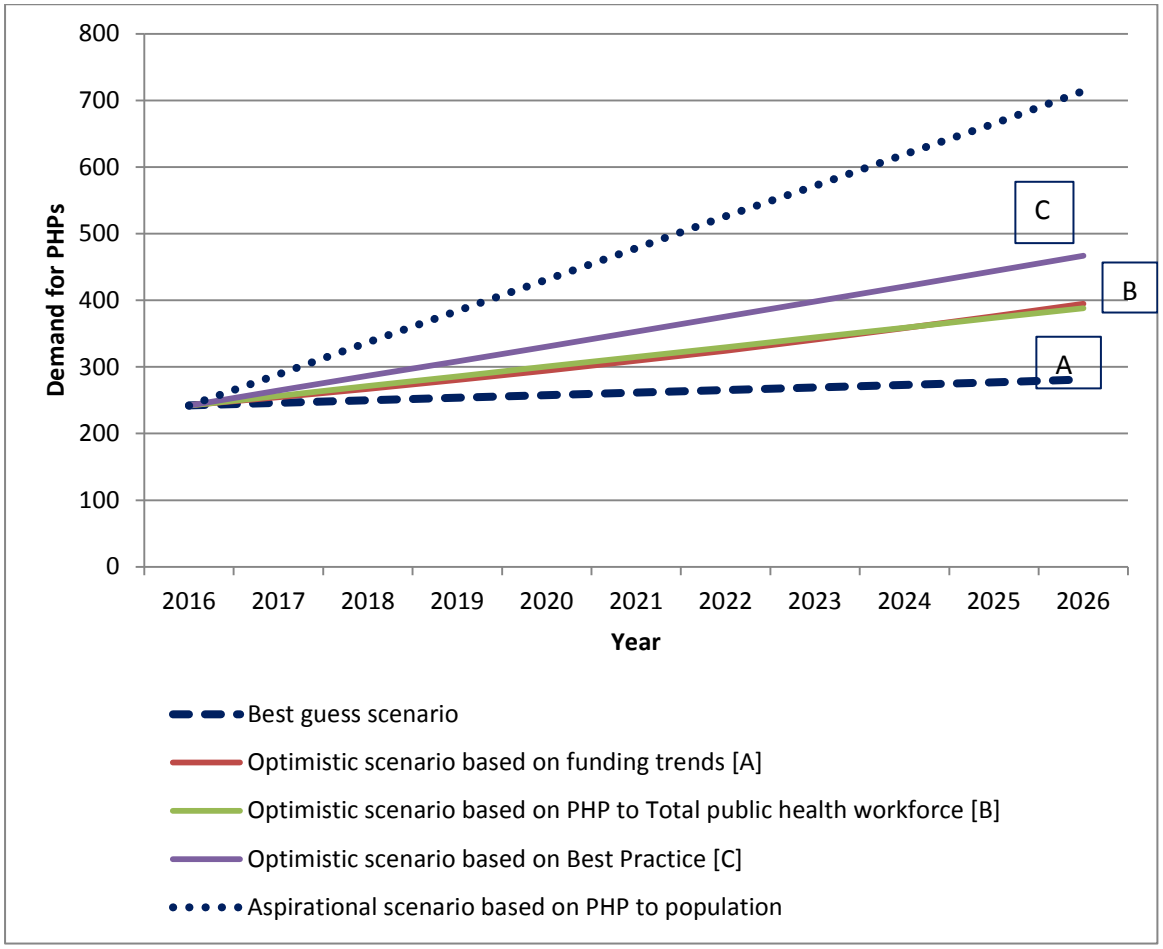

Figure 30: Best guess, optimistic and aspirational growth in demand scenarios for Public Health Physician workforce in Australia

Supply scenarios

Three possible supply scenarios were developed from this study:

1. A 'best guess' scenario – this scenario assumes total Trainee position numbers remains at the 2016 level of 68 per year and that losses of Public Health Physicians from the workforce remain stable at 5% for the duration of the projection period.
2. An 'optimistic' scenario – this scenario assumes that total Trainee numbers increase after 2016 to the high water mark for the AFPHM Training Program identified in the MTRP reports as 81 (in 2013/14). Public health physician workforce losses in the first five years stay at 5% but after 2021 the rate of loss decreases to 3%.
3. An 'aspirational' scenario – this scenario assumes the number of Trainees entering the AFPHM Training Program continues to grow each year at the rate of optimistic funding growth in public health (5% per annum). Similar to the 'optimistic' scenario, workforce loss in the first five years remains at 5% per annum, but decreases to 3% loss in the final 5 years of projections.

The three scenarios are depicted in Figure 31. The supply scenarios range from a low of 318.1 FTE to 404.5 FTE, a difference of just over 27%. Compared with the growth in demand scenarios, the variation in supply growth projections is significantly less.

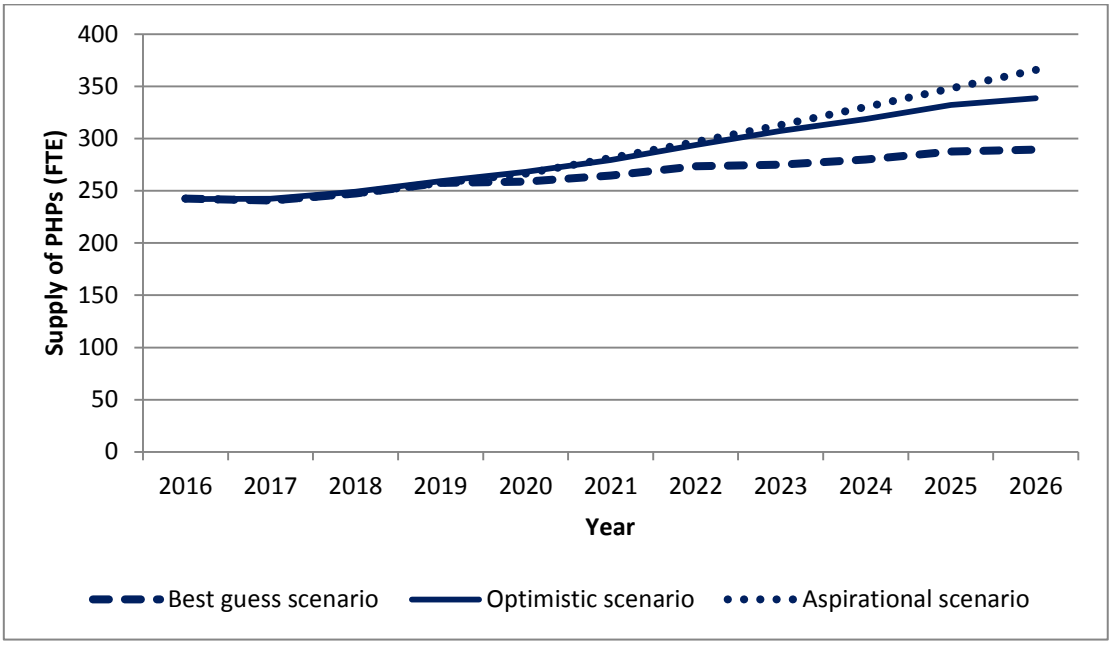

Figure 31: Best guess, optimistic and aspirational Public Health Physician supply scenarios for Australia (Workforce in FTE)

Labour market scenarios

Best guess supply and demand

Figure 32 shows a comparison of the two 'best guess' scenarios for supply and demand for Public Health Physician workforce. In this scenario, if the market is left to follow its own course, supply will grow quicker than demand for public health physicians leading to an oversupply of physicians in 2026 of approximately 8 FTE, or 2.8% of demand.

It is possible in this situation that a greater availability of public health physicians would stimulate employers to use the 'surplus' supply in novel ways, but this is not guaranteed and 'excess' supply of public health physicians may end up being under-employed (diverted to other areas of medicine).

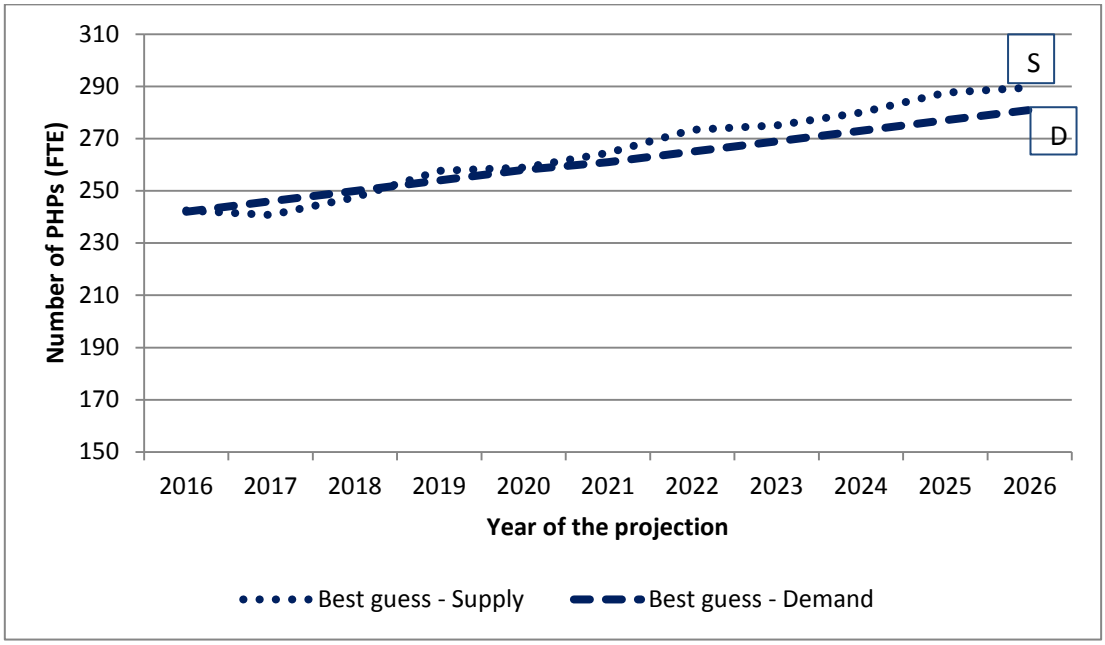

Figure 32: Best guess supply versus best guess demand for public health physicians in Australia

Optimistic supply and demand

Figure 33 shows a comparison of the 'optimistic' supply scenario with all three optimistic demand scenarios. In this labour market, supply is less than demand for all demand scenarios, delivering a shortfall in supply in 2026 against the demand projections calculated on the basis of funding trends, the Public Health Physician to total public health workforce and best practice of 16.5%, 14.5% and 37.7% respectively.

In these scenarios, even the 'optimistic' supply based on the high water mark in the number of total training positions (and assuming all the positions are filled) will be likely to restrain achievement of demand outcomes. In this event even if demand is generated (for instance funding is allocated to employ a Public Health Physician in each PHN) supply will not support employment to these positions.

This situation on the whole remains even if an 'aspirational' supply projection is considered (see Figure 34). An 'aspirational' supply achieves a balance with an 'optimistic' funding trend scenario, but still provides for an undersupply against the best practice and Public Health Physician to total public health workforce ratio demand projection scenarios. In order to achieve balance, for instance against the best practice demand projections (which might be considered a defining aim of the AFPHM), the rate of loss from the workforce would have to be lowered by at least 1% per annum and the number of Public Health Physicians entering the workforce with overseas qualifications would have to rise significantly from approximately 7 per year to between 10 and 12.

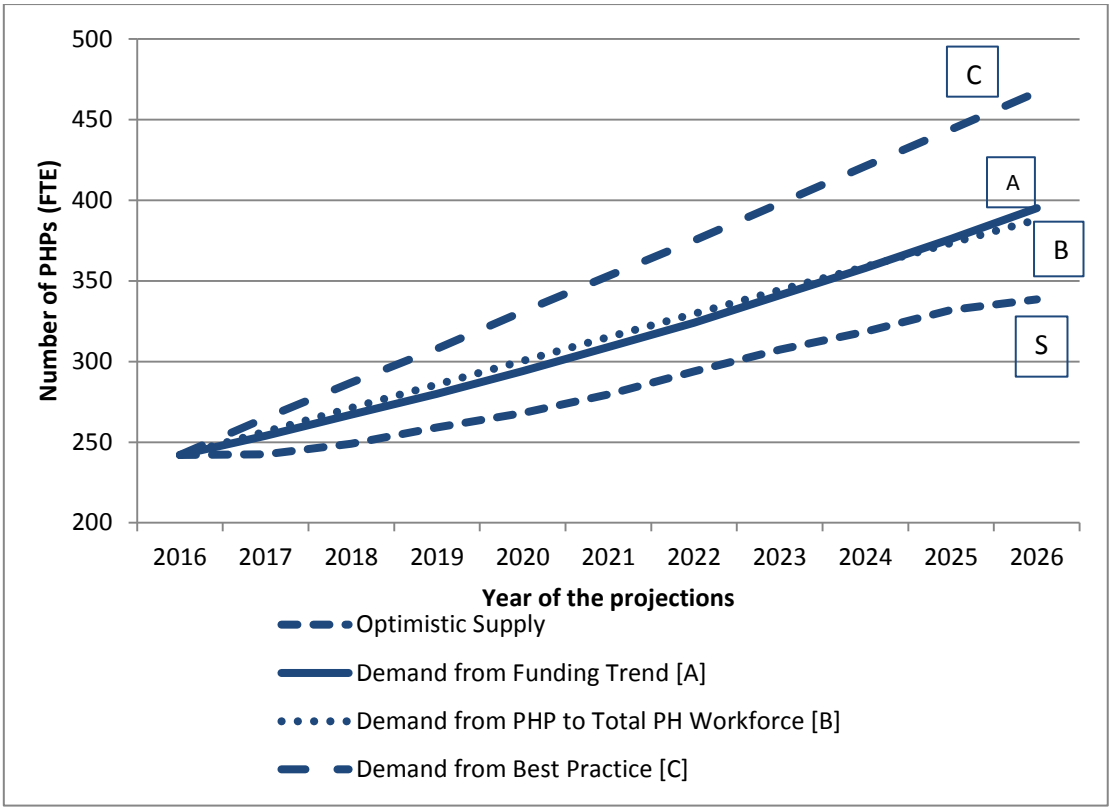

Figure 33: Comparison of the optimistic projection of supply with optimistic protections of demand for public health physicians in Australia

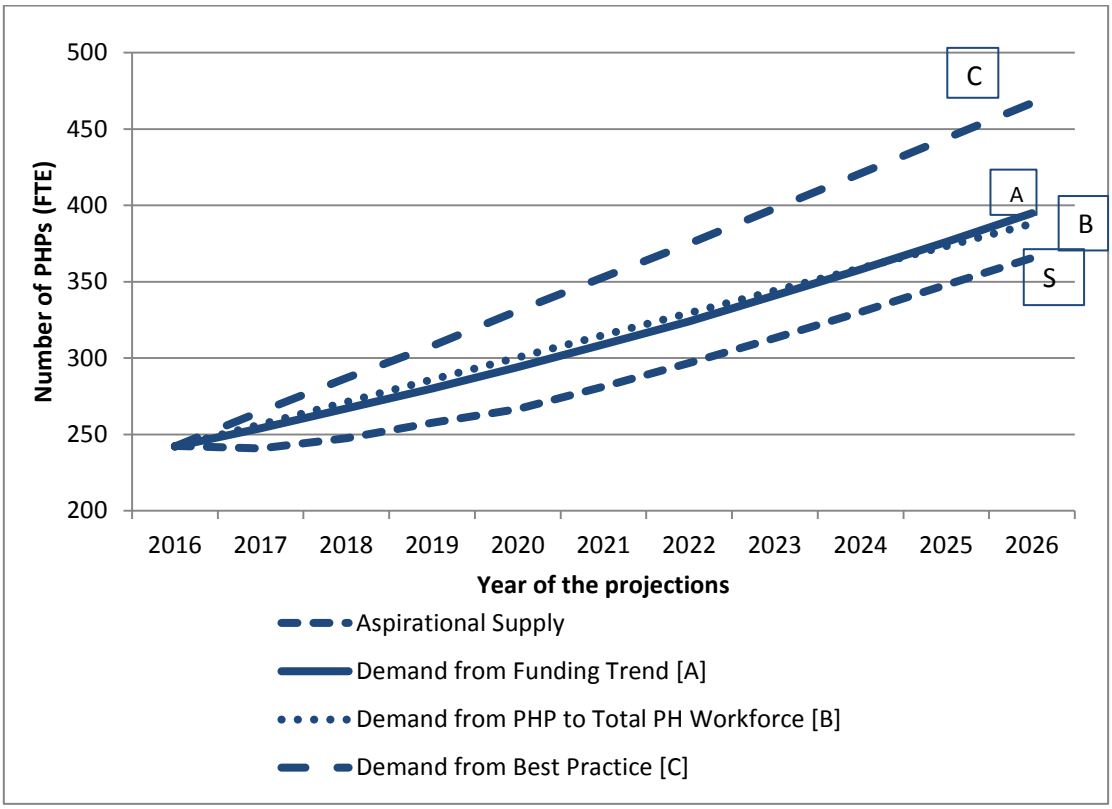

Figure 34: Comparison of the aspirational projection of supply with optimistic projections of demand for public health physicians in Australia

A more efficient way to significantly increase the available supply of public health physicians is to improve the workforce participation rate. The different supply scenarios are all based on a FTE conversion factor of 0.86 (that is, every worker on average only works 86% of a 38 hour week). Additionally, it is assumed that on average only 74% of the available Public Health Physician workforce is engaged in public health work. Changing the FTE conversion factor would be difficult (if anything over time with an increasing female proportion of the workforce it might decrease slightly), but increasing the participation of public health physicians in the performance of public health work could be feasible. A shift from the current average participation from 74% to 82%, even without changing the immigration and rate of loss variables, would deliver a future projected supply sufficient to achieve balance even with the highest optimistic demand projection (best practice).

Aspirational supply and demand

The 'aspirational' projected demand estimates are based on a practitioner to population ratio, largely influenced by a ratio promoted in the UK (Wanless, 2002). The ratio employed in this study was that provided in the UK FPH staffing guidelines of 25 public health specialists per million of population (FPH, 2004). Comparing this 'aspirational' demand with the 'aspirational' supply projections delivers a supply shortfall by 2026 of 309 FTE, or 76% of the workforce supply.

The aspirational demand projection is considered unrealistic and, as the CfWI (2016a) point out:

> *'The 2004 FPH guidelines were designed to be illustrative rather than prescriptive, and to take into account variation among employers and local areas. Over time it has become less common for organisations and bodies to make specific recommendations in terms of workforce numbers as a proportion of the population … with current service recommendations instead focusing on outcomes*.'

Even in the UK, where the ratio of public health specialists to population is much higher than Australia, the required increases in supply to reach the projected demand targets (from 17% to 28% increases) are considered prohibitive (CfWI, 2016a).

7. Discussion

Future thinking

Demand issues

The 'best guess' scenario is that growth in demand for Public Health Physicians over the next 10 years will be insufficient to support employment of projected ('best guess') supply from the AFPHM Training Program. This scenario will result in either hastened retirements of older current Fellows, a number of which are likely to occur in the next 5-10 years, or lead to unemployment or under-employment of new Fellows.

It is possible that some supply in excess of demand could itself generate more demand.[47], Prospective employers could take advantage of this excess supply by creating jobs and filling those jobs probably at a discounted price (that is, a lower salary);the likely outcome of this scenario, however, is a reduced level of training intensity. As training positions, particularly those funded by STP, begin to lie vacant, they will gradually be transferred to other areas of medical training and lost to Public Health Medicine. Eventually pre-STP funding levels of Trainee numbers will return.

This, effectively, is the very scenario forecast in the earlier study in *The Unique Contribution of Public Health Physicians* (Ridoutt, *et.al.* 2010). Subsequent studies including this study were thus initiated to investigate the slow but inexorable decline of the Public Health Physician workforce in absolute and relative terms (to other parts of the medical and the total public health workforce). Consequently this study explored more scenarios, in which growth in demand for Public Health Physician services would lead to a more vibrant and influential picture of the Public Health Physician workforce.

Three 'optimistic' and one 'aspirational' (probably unrealistic) demand growth scenarios were developed, all of which provided for growth in demand that significantly exceeds even 'optimistic' projections for future supply.

Identifying the most appropriate of these scenarios should be based on:

1. an expert examination of best practice public health service delivery
2. the most appropriate role of public health physicians in the delivery process.

The method used to derive the best practice scenario demand growth estimates has not been published before; not for public health workforce calculations and maybe not for any other type of health workforce. The best practice method identified highest growth in demand in one area of traditional practice for public health physicians (Disease prevention and control), one closely allied area of practice but where public health physicians have not been previously prevalent (health protection), two areas of well advocated expansion (Health policy, planning and management, and Health system reform leadership and management), and one area of limited past engagement (PHC).

The outcomes of the optimistic demand projections provide the basis for advocacy with health policy, service delivery and funding decision makers, an exercise that will need to be engaged if any of the optimistic demand scenarios are to come to even partial fruition. In the absence of

[47] This is not a form of 'supply induced demand' frequently discussed in regard to clinical practice where it is hypothesised that individual clinician behaviour changes to protect income levels by offering or ordering more patient services.

advocacy/lobbying, little if any realisation of the optimistic demand growth scenarios could be expected.

It is important to note that any degree of achievement of optimistic demand growth will make the current training rate of new AFPHM Fellows more supportable, and put the AFPHM Training Program on a more sustainable footing.

As has been noted elsewhere, distribution of the Public Health Physician workforce according to population size is not necessarily appropriate (Ridoutt, *et al.*, 2002), however, there is likely to be a minimum level of infrastructure in each State and Territory (irrespective of population size), unless cross jurisdictional support is provided.

Supply issues

Training of new Fellows

Three projected supply scenarios were generated, the 'best guess' scenario being that with the lowest growth rates. In all the supply projections the key variable is graduate supply, that is, the supply of persons completing the AFPHM Training Program and becoming new Fellows and consequently entering the Public Health Physician workforce. The strongest driver of growth in supply in the 'optimistic' and 'aspirational' projected supply scenarios is the growth in Trainees.

Despite the 'best guess' scenario being that which generated the lowest supply projections, even these projections of Trainee numbers are vulnerable to a shift in STP funding support. The Commonwealth Government, in an environment of budget restraint, may decide to decrease or even withdraw funding of the STP altogether. Even in the event of a decrease, the AFPHM Training Program could fare proportionately poorer, and lose a significant number of training positions. This 'worst case scenario' possibility, in keeping with the broad tenor of the study to identify positive pathways, has not been modelled. This does not imply that it is not possible.

While there is no way of preventing or predicting government policy decisions, the Training Program, and training 'positions', need to be protected, 'brick-walled', as much as possible against future loss of support. One option would be to integrate positions into a broader conceptualisation of the Training Program (at least within each jurisdiction if not nationally) so that positions become interdependent. That is, Trainees are rotated through certain positions in such a way that without doing so would undermine the integrity of the total program learning experience, leaving Trainees on completion with incomplete skill sets.

To achieve this level of integration will require a higher level of intervention in, and control of, the Training Program than has been possible in the past. It would likely require greater assessment of positions by the Faculty in terms of the learning experience possibilities, the level and quality of 'clinical' supervision (see below discussion) and the financial sustainability. More formal relationships between the employers and the Faculty will also need to be developed. From a broader perspective, it will allow educators within AFPHM greater scope to fashion learning experiences so they both satisfy the minimum competency requirements of new Fellows but also allow for individual interests to be pursued.

In this regard, and given the high level of dual specialist possession by Fellows of AFPHM, a more structured and proactive approach to dual specialist training might be beneficial to individual Trainees and the Faculty. First, in regard to the above described option, certain positions could be earmarked for dual training programs with specific specialty areas (thus further enhancing a position's resistance). Second, it might enhance the attractiveness of the AFPHM Training Program to prospective participants if they could, for instance, obtain two specialist qualifications (for instance Public Health Medicine and Medical Administration) with 4-5 years duration of training

instead of a minimum 6 years, if required to undertake training programs 'back to back'. Third, this might further enhance the relative influence of public health within medicine, and provide a greater potential pool of qualified workforce upon which to draw for public health work (including, for example, in response to public health emergencies).

All of the above positions are, however, based on conjecture. The discussion acknowledges that, of the current Trainee population, 41% of survey respondents indicated they held an additional specialist qualification (most, 28%, Trainees have a General Practice qualification). There is clearly an alternative, less attractive, supply position to be considered that promoting more dual qualifications might *reduce* the overall Public Health Physician workforce supply if demand in non Public Health Physician work is stronger and more financially rewarding. A closer examination of the decision making, behaviour and motivations of the current population of dual qualified specialists might help inform future policy in this area.

Other supply variables

While growth in supply is largely driven in the three scenarios by supply from the Training Program, two other variables also impact considerably on the growth in supply — the net wastage rate (losses to the workforce minus gains) and the participation rate.

The **net wastage rate** was calculated in the 'best guess' scenario as 4% per annum (5% loss and 1% gain). This is a significant wastage rate for a comparatively highly paid professional workforce, and a lot higher than that used in the HWA future workforce supply projections, which was generally less than 4%. However, a better comparison, CfWI (2016) estimated the 'workforce attrition' of public health specialists in the UK to be 3.5% per annum (this is not net wastage rate since the workforce gains have not been included — the wastage rate is not clear but it could be assumed to be less than 3.5%).

The high wastage rate is the result of a high proportion of the current workforce being 65 years old or more, and of this cohort according to the Survey of Fellows findings, 62% are intending to leave the workforce in the next five years (and a further 43% of the next age cohort, 60 to 64 years old). As these cohorts leave the workforce and are effectively replaced by new Fellow cohorts of a much younger average age, the wastage rate can be expected to decrease. This possibility has been modelled in the 'optimistic' and 'aspirational' supply projections.

By way of illustration of the effect, a 1% per annum reduction in the wastage rate would deliver an approximate increase in the workforce size in 2026 of 6-7%. If a more rapid growth in supply was desired, then strategies aimed at retaining the older public health physicians for a few more years would be helpful.

In regards to **workforce participation**, participation is made up of two components, actual participation (hours worked) and the proportion of those hours performing Public Health Physician work. The FTE conversion factor of 0.86 is fairly consistent with other medical workforces but a little lower than the UK specialist public health workforce of 0.90. Some commentators have highlighted that with the workforce composition becoming more female dominated, the workforce participation would reduce (more part-time workers), but the effective difference between the male and female worker participation based on findings of the Survey of Fellows in the workforce is negligible (2.4%). It is noted that in reference to the UK workforce CfWI (2016) assumed equal levels of gender participation in the workforce. There is no reason to assume that the overall participation rate (hours worked) will significantly rise or fall in the next 10 years.

The participation of qualified public health physicians in the Public Health Physician workforce is more open to conjecture. At a participation rate of 0.74, the scope for potentially influencing this level of participation appears high. Again, by way of illustration of the effect, if the participation rate is increased to 0.84, then the workforce size in 2026 would be 8.2% larger. It is difficult to know in

which way increased participation might evolve. If dual specialist training were to be encouraged (see above), this might actually reduce levels of participation (even though the workforce headcount will likely rise), but the best practice demand scenario with its emphasis on growth of demand in areas such as policy and planning, system reform and general practice, might tend to encourage greater participation levels.

Training Program considerations

Administration and data collection

Due to the unique characteristics of the AFPHM Training Program, the number of Trainees fluctuates at any given time. It was noted that within the space of two 'snap shot' data extracts the number of Active Trainees in the program changed from 59 to 67, a change of nearly 14%. Snap shots from other times in the year can deliver even more significant variations, and thus can be provide a misleading picture of the true status of participation in the AFPHM Training Program.

The Training Program is core business for AFPHM. An instantly available number and progress status of Trainees in the program that provides appropriate support for decision-making is a minimum requirement for Faculty decision makers. Thus, accurate reporting of Trainee data held by the RACP (the primary source of data on AFPHM Trainees) can be achieved in the following ways:

a. Current data extracts always being supplied within a context. Thus, current numbers of Trainees for instance would always be provided in the context of a rolling 12 month report (for instance the number of Active Trainees at the 1st of each of the previous 12 months) or an average number for the last 12 months.

b. Reports only ever including 'Active Trainees' and 'AT – Interrupted' (properly designated) so as not to confuse the numbers with potential Trainees 'queuing' to enter the Program.

c. Reports to include all accredited training positions, and unless properly specified and defined, not to be restricted to STP funded positions.

Learning in growing demand areas of practice

Findings from the Survey of Trainees indicate that the Trainees are obtaining learning experiences through the Training Program which are more varied and comprehensive than where Public Health Physician Fellows are distributed between areas of practice for work (see Figure 35 to examine the differences). Similar to the way the Public Health Physician workforce is distributed across areas of practice, the distribution of Trainee learning experiences across areas of practice reflects a bias towards disease prevention, health policy and planning, and teaching/research. In addition, monitoring and surveillance are significant parts of the Trainee experience (much more so than for the work hours of the average Fellow) and health promotion and health protection are prominent in teaching (or at least clinical practice placements).

However, some potential areas of practice identified for growth in demand through the 'best practice' expert group consultations, notably PHC and systems reform, are not well covered by the current volume of Trainee learning experiences.

This may simply reflect where Trainees are able to find practice opportunities and mentors/supervisors, but it implies that the current workforce composition (in terms of areas where public health physicians practice) is being replicated through the Training Program. Analysis of the primary choices of Trainees as to what areas of practice they desire to work upon becoming Fellows confirms this process of replication, with nearly half of the Trainees indicating disease prevention, policy and planning, and teaching and research as the areas they wish to work.

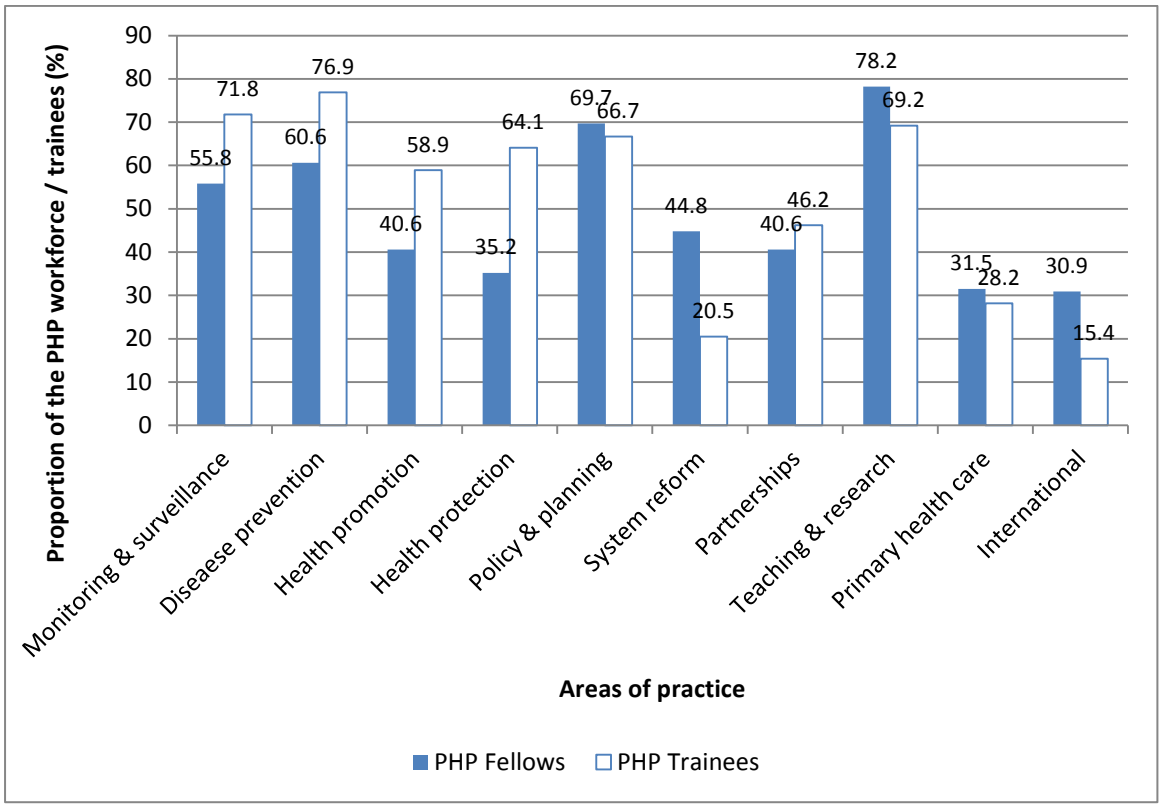

Figure 35: Comparison of AFPHM Training Program Trainee learning experiences and the workplace experiences of AFPHM Fellows distributed across areas of practice in Australia

Predicting the future for AFPHM?

The 'best guess' labour market scenario projects an excess of Public Health Physician workforce supply over the next decade to growth in demand. This is primarily because projected demand growth is weak. As noted, this scenario is likely to lead ultimately to a stagnation of growth in workforce numbers, an outcome foreshadowed by *The Unique Contribution of Public Health Physicians to the Public Health Workforce* study (Ridoutt, *et al.* 2010).

In contrast to this scenario an 'optimistic' set of demand (best practice) and supply projections is presented in Figure 36. This set of projections is almost the exact opposite of the 'best guess' projections; demand grows significantly faster than supply such that by 2026 the difference between demand and supply is nearly 40%.

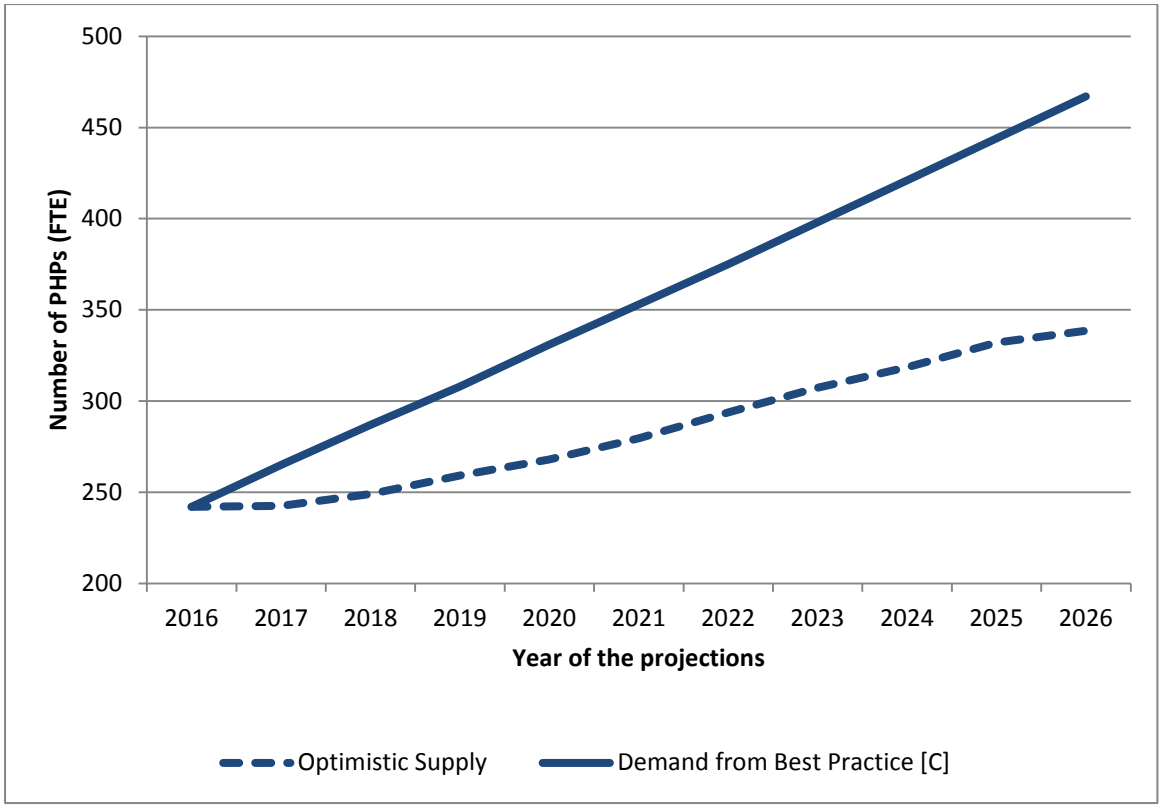

Figure 36: Optimistic labour market projections using the 'best practice' demand modelling scenario in Australia

In some ways these two scenarios, 'best guess' and 'optimistic', represent the pathways in the future AFPHM can take.

Neither of these scenarios is predetermined. If no intervention to influence the labour market is undertaken, then the likelihood is that the 'best guess' scenario will come to pass. The 'optimistic' scenario projections are only likely to be realised through concerted advocacy and action in several areas including:

- locking in the current training numbers in the AFPHM Training Program and if possible expanding its capacity through greater national coordination and integration of the Program, stronger relationships with training position funders (including employers) and by providing ever more efficient and effective Trainee learning experiences
- advocating government funding in new areas of work for Public Health Physicians consistent with both government priorities and population health objectives to significantly grow demand for Public Health Physician workforce
- re-orienting where necessary the direction of the Faculty Training Program and individual Trainee learning plans to reflect more closely the future areas of demand for Public Health Physician workforce
- increase participation of Public Health Physician workforce in public health work through a range of strategies including dual specialist training programs.

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Appendix A: Guide to consultations determining 'best practice' demand for Public Health Physicians

Step 1 — For each separate area of public health practice, create a picture or vision of what 'best practice' looks like. There are no rules for creating this vision, but it could consider population needs, public health infrastructure needs, the services to be provided, or a combination of these considerations.

Step 2 — Test and possibly refine the vision against:

(1) a *geographic / jurisdiction* dimension (Federal Government / National level, State Government level, Local Government level, 'Floating' or broader support level)

(2) a *work organisation* dimension (taking into account services which may be part of public health basic capacity and that must be performed irrespective almost of population size; Public Health programs which tend to be longer term possibly even permanent areas of service delivery that are population dependent in scale, for instance immunisation programs, screening programs, sexual health interventions; and Projects which are more short term and often tenuously funded and most often target health improvement outcomes through changes in population lifestyle and behaviours.

(3) a *sector dimension* (which considers work in a best practice vision across the public, private [research groups], not for profit [e.g. Cancer Council] and primary care [e.g. PHNs] sectors)

Step 3 — Identify the role of Public Health Physicians in the best practice vision. This consideration should not be constrained by cost considerations. The objective is only to obtain best practice in terms of public health outcomes. The last step of the process will need to deliver a means of quantifying the Public Health Physician contribution so that a total demand estimate for Public Health Physician workforce can be constructed.

Appendix B: Expert group participants

The following AFPHM Fellows, in alphabetical order, contributed to the expert panel discussions:

	First Name	Surname		First Name	Surname
1	Mike	Ackland	**22**	Jacqueline	Mein
2	Rosemary	Aldrich	**23**	Lillian	Mwanri
3	Susy	Benjamin	**24**	Victor	Nossar
4	Sonya	Bennett	**25**	Andrew	Old
5	Richard	Broome	**26**	Katie	Panaretto
6	Marion	Carey	**27**	Finn	Romanes
7	Christine	Connors	**28**	Finn	Romanes
8	Charles	Gilks	**29**	Peter	Sainsbury
9	Tony	Gill	**30**	Ben	Scalley
10	Robert	Hall	**31**	Wendy	Scheil
11	James	Harrison	**32**	Linda	Selvey
12	William	Hart	**33**	Doug	Shaw
13	Peter	Hill	**34**	Vicky	Shepherd
14	Stephen	Lambert	**35**	Simon	Slota-Kan
15	Stephen	Leeder	**36**	Nicola	Spurrier
16	Michael	Levy	**37**	Greg	Stewart
17	Robyn	Lucas	**38**	Susan	Vlack
18	Rania	Macintyre	**39**	Jeanette	Ward
19	Lynne	Madden	**40**	Ian	Webster
20	Donna	Mak	**41**	Margaret	Young
21	Kushani	Marshall	**42**	Megan	Young

Appendix C: Survey of Fellows

Public Health Physician Workforce Study - Survey of Fellows

Section A: About You

In Section A we would like to know about you and your background in medicine. Information collected here will help with describing the profile of the Public Health Physician Fellows. This in turn will assist with estimating from where and when Fellows enter Public Health Medicine.

Public Health Physician Workforce Study - Survey of Fellows

Section A: About You

* Question 1 - Please provide your MIN number (please note that this is for the sole purpose of following up non-respondents, which will be conducted by AFPHM staff).

* Question 2 - Please indicate your age range?

- ◯ 34 or under
- ◯ 35 - 39
- ◯ 40 - 44
- ◯ 45 - 49
- ◯ 50 - 54
- ◯ 55 - 59
- ◯ 60 - 64
- ◯ Over 65

* Question 3 - Please indicate your gender

- ◯ Female
- ◯ Male

* Question 4 - In which country did you obtain your medical degree?

* Question 5 - Besides your Fellowship of AFPHM, do you have a registered area of specialisation with any other College or Faculty or Society within the RACP?

- ◯ Yes
- ◯ No

Public Health Physician Workforce Study - Survey of Fellows

Section A: About You

* Question 6 - Please choose from the Australian Health Practitioners Regulation Agency (AHPRA) list of specialty fields below (as many as applicable) the other areas of specialist practice for which you are registered.

- ☐ 1 Cardiology
- ☐ 2 Clinical genetics
- ☐ 3 Clinical pharmacology
- ☐ 4 Endocrinology
- ☐ 5 Gastroenterology and hepatology
- ☐ 6 General medicine
- ☐ 7 Geriatric medicine
- ☐ 8 Haematology
- ☐ 9 Immunology and allergy
- ☐ 10 Infectious diseases
- ☐ 11 Medical oncology
- ☐ 12 Nephrology
- ☐ 13 Neurology
- ☐ 14 Nuclear medicine
- ☐ 15 Respiratory and sleep medicine
- ☐ 16 Rheumatology
- ☐ 17 Specialist physician
- ☐ 18 Cardio-thoracic surgery
- ☐ 19 General surgery
- ☐ 20 Neurosurgery
- ☐ 29 Diagnostic radiology
- ☐ 30 Diagnostic ultrasound
- ☐ 31 Nuclear medicine
- ☐ 32 Gynaecological oncology
- ☐ 33 Maternal-foetal medicine
- ☐ 34 Obstetrics and gynaecological ultrasound
- ☐ 35 Reproductive endocrinology and infertility
- ☐ 36 Urogynaecology
- ☐ 37 Specialist obstetrician and gynaecologist
- ☐ 38 Clinical genetics
- ☐ 39 Community and child health
- ☐ 40 General paediatrics
- ☐ 41 Neonatal and perinatal medicine
- ☐ 42 Paediatric cardiology
- ☐ 43 Paediatric clinical pharmacology
- ☐ 44 Paediatric emergency medicine
- ☐ 45 Paediatric endocrinology
- ☐ 46 Paediatric gastroenterology and hepatology
- ☐ 57 Paediatric respiratory and sleep medicine
- ☐ 58 Paediatric rheumatology
- ☐ 59 Specialist paediatrician
- ☐ 60 General pathology
- ☐ 61 Anatomical pathology (including cytopathology)
- ☐ 62 Chemical pathology
- ☐ 63 Haematology
- ☐ 64 Immunology
- ☐ 65 Microbiology
- ☐ 66 Forensic pathology
- ☐ 67 Specialist pathologist
- ☐ 68 General practice
- ☐ 69 Anaesthesia
- ☐ 70 Psychiatry
- ☐ 71 Emergency medicine
- ☐ 72 Ophthalmology
- ☐ 73 Dermatology
- ☐ 74 Intensive care medicine
- ☐ 75 Rehabilitation medicine

- ☐ 21 Orthopaedic surgery
- ☐ 22 Otolaryngology – head and neck surgery
- ☐ 23 Oral and maxillofacial surgery
- ☐ 24 Paediatric surgery
- ☐ 25 Plastic surgery
- ☐ 26 Urology
- ☐ 27 Vascular surgery
- ☐ 28 Specialist surgeon
- ☐ 47 Paediatric haematology
- ☐ 48 Paediatric immunology and allergy
- ☐ 49 Paediatric infectious diseases
- ☐ 50 Paediatric intensive care medicine
- ☐ 51 Paediatric medical oncology
- ☐ 52 Paediatric nephrology
- ☐ 53 Paediatric neurology
- ☐ 54 Paediatric nuclear medicine
- ☐ 55 Paediatric palliative medicine
- ☐ 56 Paediatric rehabilitation medicine
- ☐ 76 Radiation oncology
- ☐ 77 Public health medicine
- ☐ 78 Occupational and environmental medicine
- ☐ 79 Medical administration
- ☐ 80 Palliative medicine
- ☐ 81 Sport and exercise medicine
- ☐ 82 Sexual health medicine
- ☐ 83 Addiction medicine
- ☐ 84 Pain medicine

Public Health Physician Workforce Study - Survey of Fellows

Section B: Responses to the 2014 Medical Workforce Survey attached to registration renewal

The purpose of the questions in Section B is to explore how you completed questions in the 2014 Medical Workforce Survey. A review of the data from that survey suggests that this survey underestimates the size of the Public Health Physician workforce. Therefore your responses will help us to interpret that survey data and also assist us to obtain a more accurate estimation of the current Public Health Physician workforce.

* Question 7 - Did you complete the Medical Workforce Survey in 2014 when you renewed your registration?

- ○ Yes
- ○ No - could you please explain why?

* Question 8 - In the 2014 survey did you indicate that you have specialist registration in medicine in Public Health Medicine in the survey response?

- ○ Yes
- ○ No - could you please explain why?

* Question 9 - When you indicated that you have a specialty in Public Health Medicine in the 2014 survey, did you indicate Public Health Medicine as your primary or secondary area of specialty? Please choose one only.

- ◯ Primary
- ◯ Secondary
- ◯ Can not recall

* Question 10 - If you can recall, what did you indicate was your principal role in your main job? Please choose one only.

- ◯ Clinician
- ◯ Administrator
- ◯ Teacher or educator
- ◯ Other (please specify)
- ◯ Researcher
- ◯ Can not recall

* Question 11 - What did you indicate as the principal area of your main job in medicine? Please choose one only.

- ◯ General practitioner (GP) (excluding AGPT program trainees)
- ◯ Specialist (other than GP)
- ◯ Specialist-in-training (including AGPT program trainees)
- ◯ Hospital non-specialist (including pre-vocational doctors)
- ◯ Other clinician
- ◯ Non-clinician
- ◯ Can not recall

* Question 12 - What did you say was the principal work setting of your main job in medicine? Please choose one only.

- ◯ Solo Private Practice
- ◯ Other community health care service
- ◯ Tertiary educational facility
- ◯ Group Private Practice
- ◯ Hospital (excluding outpatient service)
- ◯ School
- ◯ Locum Private Practice
- ◯ Outpatient service
- ◯ Other educational facility
- ◯ Aboriginal health service
- ◯ Residential mental health care service
- ◯ Correctional service
- ◯ Community mental health service
- ◯ Residential aged care facility
- ◯ Defence force
- ◯ Solo Private Practice
- ◯ Commercial/business service
- ◯ Other government department or agency
- ◯ Community drug and alcohol service
- ◯ Can not recall.

Public Health Physician Workforce Study - Survey of Fellows

Section C: About your current employment

In Section C we want to collect information about whether you are currently working, where you work and what you do. This will help with accurately describing where Public Health Physicians work, the work performed and the areas of practice in Australia.

* Question 13 - Are you currently working, on average at least some part of the week, in Public Health Medicine in Australia? Please choose one option only.

- ◯ Yes - including on leave for less than three months
- ◯ Yes - but currently on leave for three months or more
- ◯ No

* Question 14 - Why are you not working in Public Health Medicine in Australia? Please choose one option only.

- ◯ Working in some other area of medicine
- ◯ Working in Public Health Medicine overseas
- ◯ Working in some other area of medicine overseas
- ◯ Working in an occupation other than medicine
- ◯ Currently studying full time
- ◯ Not working in paid employment at all
- ◯ Retired from regular work

* Question 15 - In which States or Territories do you currently do Public Health Medicine work? Please choose all that apply.

- ☐ NSW
- ☐ VIC
- ☐ WA
- ☐ QLD
- ☐ NT
- ☐ ACT
- ☐ TAS
- ☐ SA

* Question 16 - In what type of geographic areas in Australia are you performing PHM work? Please choose all that apply.

- ☐ Metropolitan (major capital cities and surrounding areas)
- ☐ Regional area (e.g. Newcastle, Geelong)
- ☐ Rural
- ☐ Remote

In the next set of questions of Section C, we ask you about the 'areas of practice' in which you work. These Public Health Medicine areas of practice were synthesised from the literature and then validated and elaborated upon through workshops with the AFPHM Council. This section may seem repetitive but shouldn't take too long unless your current role is quite varied.

This section is extremely important to understanding current and future workforce demand.

* Question 17 - How many hours of paid work do you work in total in medicine each week? Many doctors, perhaps most, work each week in non paid roles (e.g. on professional association committees, volunteering for not for profit organisations, performing unpaid administration). We are only interested in hours for which you are remunerated.

Public Health Medicine	
Clinical – primary health care / community health	
Clinical – acute hospital care (including managers and supervisors also providing clinical services)	
Clinical – occupational medicine	
Non clinical – medical administration	
Non clinical – teaching / research	
Non clinical – health administration (in government department, LHD, etc.)	
Non-clinical - other	
Total	

* Question 20 - Within the area of practice 'Health monitoring and surveillance', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

alia

- [ ] Analyse the quality of findings from a surveillance or screening program
- [ ] Monitor & evaluate population health data or indicators
- [ ] Other (please specify)

* Question 21 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Disease prevention and control' area of practice

- ( ) Yes
- ( ) No

* Question 22 - Within the area of practice 'Disease prevention and control ', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Plan a disease prevention/control strategy
- [ ] Implement a disease prevention/control strategy
- [ ] Formulate a response to a public health emergency
- [ ] Implement a response to a public health emergency
- [ ] Lead or contribute to disaster preparedness and response
- [ ] Other (please specify)

* Question 23 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Health promotion' area of practice?

- ( ) Yes
- ( ) No

* Question 24 - Within the area of practice 'Health promotion', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Prioritise population health needs
- [ ] Plan and evaluate evidence-based health promotion initiatives
- [ ] Implement health promotion initiatives
- [ ] Other (please specify)

* Question 25 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Health protection' area of practice?

- ◯ Yes
- ◯ No

* Question 26 - Within the area of practice 'Health protection', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- ☐ Establish environmental health safety standards and related management procedures
- ☐ Map and analyse the environmental determinants that contribute to disease in a given community or population
- ☐ Design an environmental health intervention in a given community or population
- ☐ Other (please specify)

* Question 27 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Health policy, planning and management' area of practice?

- ◯ Yes
- ◯ No

* Question 28 - Within the area of practice 'Health policy, planning and management', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- ☐ Develop an advocacy strategy and provide leadership regarding a population health issue to influence public policy
- ☐ Articulate key funding mechanisms and finance sources
- ☐ Distinguish costs and benefits in relation to specific population health programs
- ☐ Analyse a government population health policy
- ☐ Analyse /evaluate the management of a population health program
- ☐ Other (please specify)

* Question 29 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Health system reform leadership & management' area of practice

- ◯ Yes
- ◯ No

* Question 30 - Within the area of practice 'Health system reform leadership & management', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Identify problems with equitable access to personal health services
- [ ] Formulate policy and interventions to improve equity of access to personal health services
- [ ] Lead health system reform and development
- [ ] Manage health system reforms
- [ ] Other (please specify)

* Question 31 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Community engagement and partnerships' area of practice

- ( ) Yes
- ( ) No

* Question 31 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Community engagement and partnerships' area of practice

- ( ) Yes
- ( ) No

* Question 32 - Within the area of practice 'Community engagement and partnerships', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Engage with the general community and more specifically the clinical community to identify gaps in capacity and services
- [ ] Engage and motivate communities broadly and the clinical community in public health solutions
- [ ] Provide and develop leadership in communities broadly and the clinical community to respond to public health issues
- [ ] Other (please specify)

* Question 33 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Teaching and research' area of practice

- ( ) Yes
- ( ) No

* Question 34 - Within the area of practice 'Teaching and research', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Academic leadership and management
- [ ] Research into public health issues
- [ ] Teaching role in medical MPH or university-based medical degree program
- [ ] Other (please specify)

* Question 35 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'Primary health care' area of practice

- ( ) Yes
- ( ) No

* Question 36 - Within the area of practice 'Primary health care', in which of the sub areas below do you perform work? Please choose one or more of the options from the list below.

- [ ] Apply a public health approach in a primary care setting
- [ ] Promote health within personal care services in primary care setting
- [ ] Other (please specify)

* Question 37 - Did you indicate in Question 18 that you work a proportion of your Public Health Medicine hours in the 'International Public Health Medicine' area of practice

- ( ) Yes
- ( ) No

* Question 38 - Within the area of practice 'International Public Health Medicine', please describe the type of work you perform.

Question 39 - Are there other areas of Public Health Medicine, which are either emerging or not covered by the items in the previous list, in to which your Public Health Medicine skills could potentially contribute?

Public Health Physician Workforce Study - Survey of Fellows

Section D: About your work intentions

In this section of the survey we want to know how long you have been working in Public Health Medicine and how long you intend to remain in the workforce. This will help with estimating the average duration of Public Health Physicians in the workforce.

* Question 40 - How many years have you worked as a Public Health Medicine specialist?

- ◯ Less than 1yr
- ◯ 1-2yrs
- ◯ 3-5yrs
- ◯ 6-10yrs
- ◯ 11-15yrs
- ◯ 16-20yrs
- ◯ Over 20yrs

* Question 41 - Are you intending to leave the Public Health Medicine area within the next 5 years, with little or no prospect of returning to Public Health Medicine work?

- ◯ Yes
- ◯ No
- ◯ Unsure

* Question 42 - If you answered yes or unsure, please choose one of the following reasons for your answer. You may choose one or more option.

- ☐ I am retiring
- ☐ I am having health issues
- ☐ I am shifting my work hours to another area of medicine
- ☐ I am looking for a better work-life balance
- ☐ My role is changing and will not be Public Health Medicine
- ☐ I am looking to explore new career opportunities
- ☐ Other (please specify)

* Question 43 - If you are intending to continue to work, even if no longer in Public Health Medicine, will your Public Health Medicine skills still be relevant to the work you will be performing?

- ◯ Yes
- ◯ No
- ◯ Unsure

Please explain your response

Public Health Physician Workforce Study - Survey of Fellows

Section E: Developing the Public Health Medicine workforce

In this section we are seeking to understand how the Public Health Medicine workforce can be further developed based on your experience and perspective.

Public Health Physician Workforce Study - Survey of Fellows

Section E: Developing the Public Health Medicine workforce

Question 44 - What are the reasons that you decided to pursue a specialist career in Public Health Medicine?

* Question 45 - Would you recommend a career in Public Health Medicine to your friends and family?

- ◯ Yes
- ◯ No
- ◯ Unsure

Please explain your response.

* Question 46 - What do you think would encourage new applicants to apply for Public Health Medicine specialty training? Please choose all that apply.

- ☐ Ensuring there is a clear vision and understanding of Public Health Medicine
- ☐ Having a clearly defined career pathway
- ☐ Having an opportunity to work across a variety of settings
- ☐ Providing a greater range of training opportunities
- ☐ Improving communication of the wide range of opportunities Public Health Medicine can offer
- ☐ Greater prominence of Public Health Medicine in graduate and postgraduate training
- ☐ Favourable terms and conditions (e.g. tenure of role, supportive environment)
- ☐ Other (please specify)

END OF SURVEY

Appendix D: Survey of Trainees

Public Health Physician Workforce Study - Survey of TRAINEES

Section A: About You

In Section A we would like to know about you and your background in medicine. Information collected here will help with describing the profile of the Public Health Physician Trainees. This in turn will assist with estimating from where and when Trainees enter Public Health Medicine.

* 1. Question 1 - Are you currently a Trainee with AFPHM?

- ◯ Yes
- ◯ No

* 2. Please indicate your age range?

- ◯ 34 or under
- ◯ 35 - 39
- ◯ 40 - 44
- ◯ 45 - 49
- ◯ 50 - 54
- ◯ 55 - 59
- ◯ 60 - 64
- ◯ Over 65

* 3. Please indicate your gender

- ◯ Female
- ◯ Male

* 4. Do you have a registered area of specialisation with any other Faculty or Society within the RACP or any other area of specialisation including General Practice?

- ◯ Yes
- ◯ No

The ethical aspects of this study have been approved by the Human Research Ethics Committee (HREC) of Concord Repatriation General Hospital (CH62/6/2016-2019).

If you would like more information about this project or you have any concerns about participating in the survey please contact:

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* 5. Please choose from the Australian Health Practitioners Regulation Agency (AHPRA) list of specialty fields below (as many as applicable) the other areas of specialist practice for which you are registered.

- ☐ 1 Cardiology
- ☐ 2 Clinical genetics
- ☐ 3 Clinical pharmacology
- ☐ 4 Endocrinology
- ☐ 5 Gastroenterology and hepatology
- ☐ 6 General medicine
- ☐ 7 Geriatric medicine
- ☐ 8 Haematology
- ☐ 9 Immunology and allergy
- ☐ 10 Infectious diseases
- ☐ 11 Medical oncology
- ☐ 12 Nephrology
- ☐ 13 Neurology
- ☐ 14 Nuclear medicine
- ☐ 15 Respiratory and sleep medicine
- ☐ 16 Rheumatology
- ☐ 17 Specialist physician
- ☐ 18 Cardio-thoracic surgery
- ☐ 19 General surgery
- ☐ 20 Neurosurgery
- ☐ 21 Orthopaedic surgery
- ☐ 22 Otolaryngology – head and neck surgery
- ☐ 23 Oral and maxillofacial surgery
- ☐ 24 Paediatric surgery
- ☐ 25 Plastic surgery
- ☐ 26 Urology
- ☐ 27 Vascular surgery
- ☐ 28 Specialist surgeon
- ☐ 29 Diagnostic radiology
- ☐ 30 Diagnostic ultrasound
- ☐ 31 Nuclear medicine
- ☐ 32 Gynaecological oncology
- ☐ 33 Maternal-foetal medicine
- ☐ 34 Obstetrics and gynaecological ultrasound
- ☐ 35 Reproductive endocrinology and infertility
- ☐ 36 Urogynaecology
- ☐ 37 Specialist obstetrician and gynaecologist
- ☐ 38 Clinical genetics
- ☐ 39 Community and child health
- ☐ 40 General paediatrics
- ☐ 41 Neonatal and perinatal medicine
- ☐ 42 Paediatric cardiology
- ☐ 43 Paediatric clinical pharmacology
- ☐ 44 Paediatric emergency medicine
- ☐ 45 Paediatric endocrinology
- ☐ 46 Paediatric gastroenterology and hepatology
- ☐ 47 Paediatric haematology
- ☐ 48 Paediatric immunology and allergy
- ☐ 49 Paediatric infectious diseases
- ☐ 50 Paediatric intensive care medicine
- ☐ 51 Paediatric medical oncology
- ☐ 52 Paediatric nephrology
- ☐ 53 Paediatric neurology
- ☐ 54 Paediatric nuclear medicine
- ☐ 55 Paediatric palliative medicine
- ☐ 56 Paediatric rehabilitation medicine
- ☐ 57 Paediatric respiratory and sleep medicine
- ☐ 58 Paediatric rheumatology
- ☐ 59 Specialist paediatrician
- ☐ 60 General pathology
- ☐ 61 Anatomical pathology (including cytopathology)
- ☐ 62 Chemical pathology
- ☐ 63 Haematology
- ☐ 64 Immunology
- ☐ 65 Microbiology
- ☐ 66 Forensic pathology
- ☐ 67 Specialist pathologist
- ☐ 68 General practice
- ☐ 69 Anaesthesia
- ☐ 70 Psychiatry
- ☐ 71 Emergency medicine
- ☐ 72 Ophthalmology
- ☐ 73 Dermatology
- ☐ 74 Intensive care medicine
- ☐ 75 Rehabilitation medicine
- ☐ 76 Radiation oncology
- ☐ 77 Public health medicine
- ☐ 78 Occupational and environmental medicine
- ☐ 79 Medical administration
- ☐ 80 Palliative medicine
- ☐ 81 Sport and exercise medicine
- ☐ 82 Sexual health medicine
- ☐ 83 Addiction medicine
- ☐ 84 Pain medicine

Section B: Specialist training

The purpose of the questions in Section B is to explore your current training with the Faculty.

* 6. Which one of the following categories best describes your current training status?

- ◯ In active training
- ◯ On interruption to active training
- ◯ At entry to training but not yet started active training

* 7. If you are in active training, how many units have you completed?

- ◯ up to and including 12
- ◯ up to and including 24
- ◯ up to and including 36

* 8. How many units do you expect to complete in your current placement?

- ◯ 0-6
- ◯ 7-12
- ◯ I have completed all of my units

* 9. If you are on interrupted training, how many units have you completed?

- ◯ up to and including 12
- ◯ up to and including 24
- ◯ up to and including 36

* 10. In which year did you commence your training with the Faculty?

- ◯ Earlier than 2010
- ◯ 2010
- ◯ 2011
- ◯ 2012
- ◯ 2013
- ◯ 2014
- ◯ 2015
- ◯ 2016

* 11. In which year do you anticipate completing your training with the Faculty?

- ◯ 2016
- ◯ 2017
- ◯ 2018
- ◯ 2019
- ◯ 2020
- ◯ After 2020

* 12. Which of the following work settings have you worked in as part of your training with the Faculty? Please choose as many options that apply.

- ☐ Solo Private Practice
- ☐ Other community health care service
- ☐ Tertiary educational facility
- ☐ Group Private Practice
- ☐ Hospital (excluding outpatient service)
- ☐ School
- ☐ Locum Private Practice
- ☐ Outpatient service
- ☐ Other educational facility
- ☐ Other (please specify)
- ☐ Aboriginal health service
- ☐ Residential mental health care service
- ☐ Correctional service
- ☐ Community mental health service
- ☐ Residential aged care facility
- ☐ Defence force
- ☐ Commercial/business service
- ☐ Other government department or agency
- ☐ Community drug and alcohol service

* 13. Which of the following Public Health Medicine 'areas of practice' have you worked in as part of your training with the Faculty? Please choose as many options that apply.

- ☐ Health monitoring & surveillance
- ☐ Disease prevention & control
- ☐ Health promotion
- ☐ Health protection
- ☐ Health policy, planning & management
- ☐ Health system reform leadership & management
- ☐ Community engagement & partnerships
- ☐ Teaching & research
- ☐ Primary health care
- ☐ International public health medicine

* 14. In which State or Territory have you primarily undertaken your training? Please choose only one option.

- ○ NSW
- ○ VIC
- ○ WA
- ○ QLD
- ○ Other (please specify)
- ○ NT
- ○ ACT
- ○ TAS
- ○ SA

* 15. In which types of geographical areas of Australia have you undertaken terms during your training program? You may choose more than one option.

- ☐ Metropolitan (major capital cities and surrounding areas)
- ☐ Regional area (e.g. Newcastle, Geelong)
- ☐ Rural
- ☐ Remote
- ☐ Outside of Australia

Section C: About your work intentions

In this section of the survey we want to know about your work intentions in Public Health Medicine and how long you intend to remain in the workforce. This will help with estimating the average duration of Public Health Physicians in the workforce.

* 16. Are you intending to work in Public Health Medicine once you complete your training with the Faculty?

- ◯ Yes
- ◯ No
- ◯ Unsure

* 17. If you answered no or unsure, please choose one of the following reasons for your answer. You may choose one or more option.

- ☐ I am having health issues
- ☐ I want to work in another area of medicine
- ☐ I intend to work in my other area of registered specialist practice
- ☐ I am not clear where the career pathway will take me
- ☐ My role is changing and will not be in Public Health Medicine
- ☐ I am looking to explore new career opportunities outside of medicine
- ☐ Other (please specify)

* 18. Which of the following Public Health Medicine 'areas of practice' do you intend to work in once you complete your training? Please choose up to *three* of the most likely areas.

- ☐ Health monitoring & surveillance
- ☐ Disease prevention & control
- ☐ Health promotion
- ☐ Health protection
- ☐ Health policy, planning & management
- ☐ Health system reform leadership & management
- ☐ Community engagement & partnerships
- ☐ Teaching & research
- ☐ Primary health care
- ☐ International public health medicine
- ☐ Other (please specify)

END OF SURVEY

Appendix E: Government expenditure on public health

Year	Constant prices ($ million)			$ per person (constant prices)		
Jurisdiction	Australia	State / Territory	Total		Australia	State / Territory
1995-96	305	763	1068		17	43
1996-97	263	857	1120	4.9	15	47
1997-98	409	645	1054	-5.9	22	35
1998-99	429	705	1134	7.6	23	38
1999-00	559	566	1125	-0.8	30	30
2000-01	704	720	1424	26.6	37	38
2001-02	827	705	1532	7.6	43	37
2002-03	844	760	1604	4.7	44	39
2003-04	1,013	706	1,719	7.2	52	36
2004-05	909	745	1654	-3.8	46	38
2005-06	1,168	695	1,863	12.6	58	35
2006-07	1,027	802	1,829	-1.8	51	40
2007-08	1,235	849	2,084	13.9	60	41
2008-09	1,640	913	2,553	22.5	78	43
2009-10	1,352	1,110	2,462	-3.6	63	52
2010-11	1,054	1,053	2,107	-14.4	48	48
2011-12	1,177	934	2,111	0.2	53	42
2012-13	1,643	719	2,362	11.8	73	32
2013-14	1,210	931	2,141	-9.4	53	41
2014-15	1,281	857	2,138	-0.1	55	37

Appendix F: Expected population growth

The ABS has developed three series of population projections—labelled A, B and C. The series are high, medium and low growth scenarios, respectively. They are based on plausible assumptions about fertility, migration and mortality that use values for these variables that were observed in the Australian population at various times over the last few decades.

The percentage growth associated with these three estimates of the future Australian population to 2025 is shown in Figure 37.1 starting with a base of 100 in 2006. The three series A, B and C correspond to annual growth rates of 1.66%, 1.39% and 1.15% respectively. These annual growth rates translate into overall population increases of 36.6%, 30.0% and 24.4% respectively between 2006 and 2025.

As a basis for comparison with recent experience, Figure 25 also shows the growth in the Australian population between 1989 and 2008.

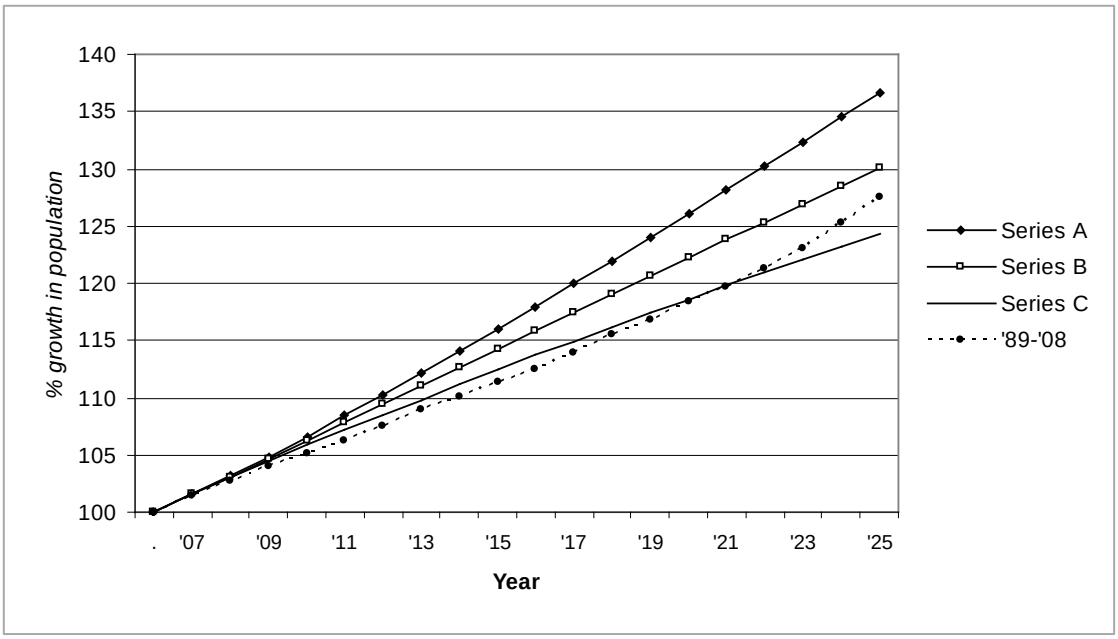

Figure I:Projected population growth 2006 to 2025 (*Source. Adapted from ABS, Population Projections, Australia, 2006 to 2101, 3222.0 and ABS, Population by Age and Sex, Australian States and Territories, 3201.0, Table 9.)*

The three series of population projections are not predictions—they reflect the arithmetic consequences of their underlying assumptions coupled with the age and gender structure of the initial population. The actual population for 2008, for instance, exceeded the highest projected value for 2008 because of high migration and rising fertility rates. More recently, however, in the context of rising unemployment, the Australian Government has reduced migration quotas somewhat and higher unemployment may also reduce fertility.

The age distribution for the three projection scenarios are provided in Table I. These are not used in any workforce projection estimates, since unlike with many areas of clinical practice, the age and

gender composition of the population is not thought to influence service (and therefore workforce) demand[48].

For all projections using population in this report Series B projections only are employed.

Table I:: The age distribution of the Australian population in 2006 and projected values in 2025

Population	**Actual**	**Series A**	**Series B**	**Series C**
Year/	2006	2025	2025	2025
Age	%	%	%	%
0-9	12.8	13.1	12.0	10.9
10-19	13.6	12.2	12.1	11.8
20-29	13.9	12.8	12.8	12.7
30-39	14.6	14.1	14.1	14.0
40-49	14.6	12.8	13.0	13.1
50-59	12.7	11.7	12.0	12.4
60-69	8.6	10.5	10.9	11.3
70-79	5.7	8.1	8.3	8.7
80-89	3.0	3.9	3.9	4.1
90+	0.5	1.0	1.0	1.0
Total	100.0	100.0	100.0	100.0

Source. Adapted from ABS, **Population Projections, Australia***, 2006 to 2101, 3222.0* **and *ABS,* Population by Age and Sex, Australian States and Territories, 3201.0, *Table 9.***

[48] At least not in any way that might be known.

Appendix G: Areas of practice of Public Health Medicine

1. Health monitoring and surveillance
Monitor and evaluate population health data or indicators
Analyse the quality of findings from a surveillance or screening program
2. Disease prevention and control
Plan a disease prevention/control strategy
Implement a disease prevention/control strategy
Formulate a response to a public health emergency
Implement a response to a public health emergency
Lead or contribute to disaster preparedness and response
3. Health promotion
Prioritise population health needs
Plan and evaluate evidence based health promotion initiatives
Implement health promotion initiatives
4. Health protection
Establish environmental health safety standards and related management procedures
Map and analyse the environmental determinants that contribute to disease in a given community or population
Design an environmental health intervention in a given community or population
5. Health policy, planning and management
Develop an advocacy strategy and provide leadership regarding a population health issue to influence public policy
Articulate key funding mechanisms and finance sources
Distinguish costs and benefits in relation to specific population health programs
Analyse a government population health policy
Analyse /evaluate the management of a population health program
6. Health system reform leadership and management
Identify problems with equitable access to personal health services
Formulate policy and interventions to improve equity of access to personal health services
Lead health system reform and development
Manage health system reforms

7. Community engagement and partnerships
Engage with the general community and more specifically the clinical community to identify gaps in capacity and services
Engage and motivate communities broadly and the clinical community in public health solutions
Provide and develop leadership in communities broadly and the clinical community to respond to public health issues
8. Academia
Academic leadership and management
Research into public health issues
Teaching role in medical MPH or university-based medical degree program
9. Primary health care
Apply a public health approach in a primary care setting
Promote health within personal care services in primary care setting
10. International Public Health Medicine
Performing any of the above areas of practice in an international setting

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- understanding and acting upon client needs through a strategic rather than operational research approach; and
- employing the best possible (within budget constraints) research methodology to find answers that meet unique client needs.

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