PEOPLE MAKE RESEARCH HAPPEN

Planning the Health and Medical Research Workforce 2010-2019

Prepared for

The Australian Society for Medical Research

by

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Contents

Acknowledgements 2

Foreward 3

Executive summary 4

Modelling the Health and Medical Research Workforce 5

1. Data used to model the Health and Medical Research Workforce 5

2. Health and Medical Research Workforce 5

Conclusions 10

References 12

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Foreward

Australia's vision, as enunciated by the Prime Minster, Mr Kevin Rudd, is "to create the best skilled, best trained and most highly educated workforce in the world", with talented health and medical researchers being part of that grand ambition.

Chartering a well planned workforce is essential to meet the needs of the nation and make the vision a reality. We need an ambitious, innovative investment programme. A program which creates a self sustaining and agile workforce able to meet head on, challenges in indigenous health, the overt diseases associated with the ageing population and the emerging covert health risks associated with climate change.

People make research happen and it is the health and medical research workforce which is and will be, the foundation for prevention and cures, now and in the future. Australia's health and medical research workforce has performed outstandingly on an international scale, and Australia can build upon the health and wealth returns the nation has come to expect and enjoy.

To meet Australia's future health and medical research workforce needs, the sector must be empowered to work better and smarter. This means policy reform in the area of investment mechanisms and it also means new and better international partnerships and collaborations. The European Union (27 countries), Framework 7 Program is an example of what can be achieved in science when governments and scientists co-operate and collaborate. Europe is positioned to eclipse America and Japan in science with a research culture building in momentum.

The creation of a regional Asia Pacific partnership, not unlike the European Union Framework 7 program, could stimulate growth, increase Australia's GDP and sustain investment in the sector at a level greater than that possible for Australia and other countries in the region individually.

This report highlights new opportunities for Australia, 'the clever country'. Investment in human capital is our key to the future.

Sarah Meachem PhD
ASMR President, 2009

Executive summary

Purpose

This study projects attrition from the health and medical research workforce over 40 years of age[1] in 2009 to 2019 and draws conclusions about the number of new staff required to replace the workforce lost. Estimates are also made of the number (and related cost) of additional PhDs who would need to enter the health and medical research workforce by 2019 to maintain the workforce as a constant proportion of the total workforce and also to match the level of comparable OECD nations.

The study uses recently collected demographic data (unpublished) from an ASMR survey of Health and Medical Research Workforce organisations which describes the 2009 health and medical research workforce.

Summary of findings

The ASMR survey data represent all staff in Medical Research Institutes and University Departments - 39,037 total staff, with 23,411 reported as research staff and 15,203 of the total staff holding a PhD.

In 2009, 58% of the health and medical research workforce was female and 42% male. The largest cohort was 30-39 years of age and female followed by the 40 to 49 year old male cohort.

Over the decade from 2009 to 2019, it was estimated that about 6,250 members of the health and medical research workforce over the age of 40 years in 2009 would leave the workforce by 2019, with the bulk of these leaving between the ages of 50-69 years of age.

It was estimated that 35% of females and 49% of males aged 40-49 years in 2009 would be retired by the age of 50-59 years, with 85% of women and 70% of men aged 50-59 years in 2009 also projected to retire over the next 10 years.

Of the 6,250 members of the health and medical research workforce over the age of 40 years who would leave the workforce by 2019, about 4,000 would have held a PhD. Replacing these PhD qualified staff would cost about $570 million in 2009 dollars (excluding the cost of scholarships and supervision).

If Australia were to maintain its current *PhD qualified persons in the health and medical research workforce: working population* ratio to 2019, another 1,700 persons with a PhD and willing to work in the health and medical research workforce would need to graduate to maintain the current workforce at a cost of about $240 million in 2009 dollars.

To reach comparable levels of PhD completions per 100,000 in the workforce, Australia would require about 5,700 additional health and medical research related PhD graduates to be comparable with US levels, about 22,800 to be comparable with German levels and about 38,000 to be comparable with Switzerland.

[1] The age group at which retirement typically commences being 40 to 50 years of age.

Modelling the health and medical research workforce

1. Data used to model the Health and Medical Research Workforce

The Health and Medical Research Workforce

In 2009, the ASMR conducted a survey of Health and Medical Research Workforce organisations including Medical Research Institutes and relevant University Departments. Of 61 Medical Research Institutes, 55 responded (a response rate of 90%) and of 34 University Departments, 15 responded (a response rate of 44%).

Of those who responded, Medical Research Institutes reported a total of 11, 220 staff of those 4,263 held a PhD (38%), with 8,763 of the total engaged in research. University Departments reported a total of 11,626 staff engaged in the health and medical workforce, 4,582 of those held a PhD (39%) and 5,958 engaged in research (51%).

Grossed up to represent all staff in Medical Research Institutes and University Departments, this represents 39,037 total staff (excluding students), with 23,411 reported as research staff (60%) and 15,203 holding a PhD (39% of total staff).

In the latter half of 2006, ASMR invited its members (n=1258) to participate in an online survey. Of these members, 379 completed the survey which constituted a response rate of 30 percent. The questionnaire, designed by University of Queensland Social Research Centre in conjunction with the ASMR, gathered information regarding workforce demographics and perceptions of the current situation of health and medical research in Australia and the factors at play in the movement of medical researchers between Australia and overseas (see Kavallaris et al 2008)[i].

ABS Population Projections

The Australian Bureau of Statistics provides projections of the Australian population[ii]. The ABS produces 3 population projection series with high, medium and low growth. The medium growth series (Series B) was used for this study. Series B assumes medium population growth resulting from lower migration, life expectancy and fertility than the higher growth series (Series A).

This data source was used for population projections of Australians of workforce age to 2019.

2. Health and Medical Research Workforce

In 2009, there was 23,411 research staff (excluding administration staff) in total in the health and medical research workforce. Based on ASMR survey data, the age and sex distribution was estimated (Table 1) and these ratios were applied to the total research staff figure to estimate the age and sex profile of the total health and medical research workforce (Table 2). The ASMR data grouped respondents aged 60 and over together.

The age group 60-64 years was disaggregated from the 65 and over age group based on the ratio of all academic staff in this age group as reported by Hugo (2008)[iii].

Based on the 2006 ASMR member survey, 58% of the health and medical research workforce was female and 42% male. However, for those aged 50 years and over there were more men than women, while the younger age groups were predominantly female. This is important for considering the long term future of the health and medical research workforce as women, on average, spend more time out of the workforce, are more likely to work part-time and retire earlier.

There was a small cohort of the health and medical research workforce who continued to work beyond Australia's traditional retirement age of 65 years.

The largest cohort was 30-39 years of age and female followed by the 40 to 49 year old male cohort.

Table 1: Age and Sex Distribution of the Health and Medical Research Workforce, ASMR survey, Australia, 2006

	<25	25-29	30-39	40-49	50-59	60-64	65+	Total
Ratio of total (sex)								
Female	0.09	0.21	0.36	0.19	0.12	0.02	0.00	1.00
Male	0.06	0.12	0.22	0.35	0.18	0.05	0.02	1.00
All	0.08	0.17	0.31	0.26	0.15	0.03	0.01	1.00
Ratio within age group								
Female	0.67	0.7	0.69	0.43	0.49	0.33	0.23	0.58
Male	0.33	0.30	0.31	0.57	0.51	0.67	0.77	0.42
Number of persons								
Female	20	45	79	42	27	4	1	218
Male	10	19	36	55	28	8	3	159
Total	30	64	115	97	55	12	4	377

Source: ASMR 2006 survey of the Health and Medical Research Workforce (i)

Table 2: Health and Medical Research Workforce, Australia, 2009

	<25	25-29	30-39	40-49	50-59	60-64	65+	Total
Female	1,248	2,782	4,927	2,590	1,674	257	51	13,529
Male	615	1,192	2,214	3,433	1,742	514	171	9,882
Total	1,863	3,974	7,141	6,024	3,415	771	223	23,411

Sources: ASMR 2006 and 2009 surveys of the Health and Medical Research Workforce (i)

Ideally attrition would be estimated from longitudinal data. As this was not available for the health and medical research workforce, estimates were made from the cross-sectional ASMR data. It was assumed that the 40-49, 50-59 and 60-69 year old cohorts were approximately the same size prior to retirements commencing. There is some evidence that this is approximately accurate, with data from Hugo (2008)[iii] indicating that for all academic staff male cohorts in these age groups were of a similar size in 1991.

The younger female cohorts tended to be larger in 1991 as rapid feminisation of the health and medical research workforce began to occur, but this effect was much less evident by 2006. As a check, the rates of retirement were compared with those for nurses, a primarily female workforce, and found to be lower, which is expected as the health and medical research workforce has a higher proportion of males and on average would have more years of education, two factors associated with later retirement (Schofield and Beard (2005))[iv].

Attrition from the workforce was projected for persons aged 40 years and over in 2009. Loosely referred to as retirement, this attrition may be a result of permanently leaving the workforce, moving out of the workforce for other reasons including to take up another profession, illness or death. The figures represent net attrition, that is, the balance of exits minus any entrants returning to the health and medical research workforce.

It was estimated that there was net attrition of 35% of the female and 45% of the male health and medical research workforce between the ages of 40-49 and 50-59 over a 10 year period (Table 3). As expected, the rate of attrition was higher for the older age groups, with 85% of women and 70% of men leaving the workforce between the ages of 50-59 and 60-69 years of age. The data grouped all age groups beyond the age of 65 years and it was assumed that all of the health and medical research workforce in this age group retired by 70 years of age and over. While there may be some of the health and medical research workforce working beyond the age of 70, the numbers will represent a very small proportion of the workforce with less than 1% of the health and medical research workforce aged 65 years or more in 2009.

Table 3: Attrition estimates for the health and medical research workforce from 2009

		40-49	50-59	60-64	65+
Females	2019	0.35	0.85	1.00	1.00
Males	2019	0.49	0.70	1.00	1.00
All	2019	0.43	0.77	1.00	1.00

Based on the age/sex-specific attrition rates in Table 3, it was estimated that over the ten years from 2009 to 2019, just over 6,250 members of the health and medical research workforce over the age of 40 years in 2009 would leave the workforce. The bulk of these would leave the workforce between the ages of 50-69 years of age. Of these, about 4,000 would have held a PhD based on the proportion of persons with a PhD in the total health and medical research workforce. Replacing these PhD qualified staff to maintain the current size of the workforce would cost about $570 million in 2009 dollars based on an estimated $140,000 (+/- $57,000) per 4 year PhD (excluding the cost of scholarships and supervision) based on the ASMR survey, 2009.

Table 4. Attrition from the health and medical research workforce by 2019

Age at 2009	<25	25-29	30-39	40-49	50-59	60-64	65+	Total
Female								
2009	1,248	2,782	4,927	2,590	1,674	257	51	13,529
retirements by 2019	0	0	0	917	1,417	257	51	2,641
Male								
2009	615	1,192	2,214	3,433	1,742	514	171	9,882
retirements by 2019	0	0	0	1,692	1,228	514	171	3,605
All								
2009	1,863	3,974	7,141	6,024	3,415	771	223	23,411
retirements by 2019				2,608	2,645	771	223	6,246
Number of PhDs retired (a)								4,056
Cost of PhDs ($mill) (a)								570

a) Based on ASMR survey data of proportion of research staff with PhDs - $140,457 per PhD (based on 4 years to completion) excluding scholarships and supervisor time

If Australia were to maintain its current *PhD qualified persons in the health and medical research workforce: working population* ratio to 2019, another 1,700 persons with a PhD and willing to work in the health and medical research workforce would need to be graduated (at a cost of about $240 million in 2009 dollars for PhD graduates who entered the health and medical research workforce).

Australia has a relatively low rate of PhD completions in the workforce compared to a number of comparable OECD nations — 8 persons with a PhD per 100,000 in the workforce in Australia compared to 11 persons with a PhD per 100,000 in the workforce in the US (38% higher), 20 persons with a PhD per 100,000 in the workforce in Germany (150% higher) and 28 persons with a PhD per 100,000 in the workforce in Switzerland (250% higher).

If these differences in the rate of PhD completions per 100,000 in the 2009 workforce are reflected in the health and medical research workforce, then Australia requires about 5,700 additional health and medical research related PhD graduates to reach current US levels (at a cost of about $800 million), about 22,800 to reach German levels (at a cost of about $3 billion), and about 38,000 to reach the level of Switzerland (at a cost of about $5.3 billion) (see figure 1 and 2). This is in addition to the approximately 1,700 persons required to maintain Australia's current *PhD qualified persons in the health and medical research workforce: working population* ratio to 2019 due to population growth.

Based on the current ratio of *support staff: research staff*, approximately an additional 1,100 support staff would be needed to support the additional 1,700 persons with a PhD in 2019 to maintain Australia's current *PhD* qualified persons in the health and medical research workforce: working population ratio. Approximately a further 3,800 support staff would be needed if Australia had the same proportion of PhD graduates per 100,000 persons of workforce age as the US, about 15,200 if we had the same proportion as Germany and about 25,400 if we had the same proportion as Switzerland.

Table 5: Estimate of required growth in the health and medical research workforce with a PhD for population growth and international levels

Australian health and medical research workforce with PhDs 2009	15,203
Australian population of workforce age (000s) 2009 (a)	14,601,914
Australian population of workforce age (000s) 2019 (a)	16,223,106
PhDs required after workforce age population growth	**16,891**
% per 100,000 population in the workforce with PhD Australia 2009 (b)	8
% per 100,000 population in the workforce with PhD US 2009 (b)	11
% per 100,000 population in the workforce with PhD Germany 2009 (b)	20
% per 100,000 population in the workforce with PhD Switzerland 2009 (b)	28
Growth in PhD per 100,000 population to reach US levels 2009	38%
Growth in PhD per 100,000 population to reach German levels 2009	150%
Growth in PhD per 100,000 population to reach Switzerland levels 2009	250%
Additional Health and Medical PhD completions to reach US levels 2009	**5,702**
Additional Health and Medical PhD completions to reach German levels 2009	**22,806**
Additional Health and Medical PhD completions to reach Switzerland levels 2009	**38,009**

a) ABS population forecasts (series B) : Australian Bureau of Statistics (2008) Population Projections Australia 3222.0. ABS: Canberra. Source: **http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3222.02006%20to%202101?OpenDocument**

b) Data provided by ASMR 2009: Senator the Hon Kim Carr, Address to ANU Luncheon with Victorian Business Leaders, 26 March 2008. Cited in a Submission to the House of Representatives Industry, Science and Innovation Committee. Inquiry into research training and research workforce issues in Australian universities.
Source: **http://www.irua.edu.au/news_archive/2008/InquiryIntoResearchTraining.pdf**

Conclusions

If Australia is to have the most highly educated, best skilled and highly trained health and medical research sector in the world, the number of qualified researchers (PhD or equivalent) would need to expand 2.5 fold to be on par with knowledge based workforces such as the European workforce.

A recruitment of human capital is needed to maintain our world class health and medical research workforce over the next 10 years. Specifically the sector must attract 30% more PhD or equivalently qualified researchers with a proportionate increase in support staff.

The projected attrition over the ten year period 2009-2019 is approximately 6250 members of the health and medical research workforce with around 4000 of this number having a PhD (based on the proportion of persons with a PhD in the total health and medical research workforce)

In addition to replacing these 4000 retirees, for Australia to maintain its health and medical research capacity as a proportion of the population of workforce age, another 1700 PhD qualified persons willing to work in the health and medical research workforce, would be needed in 2019.

If Australia were to keep pace with the level of PhD graduates in the workforce of comparable OECD nations, it would require approximately 5,700 additional health and medical research related PhD graduates to reach current US levels, around 22,800 to reach German levels, and about 38,000 to reach the level of Switzerland (see figure 1 for the total health and medical research PhD completions in Australia to reach levels of similar to OECD countries in 2009).

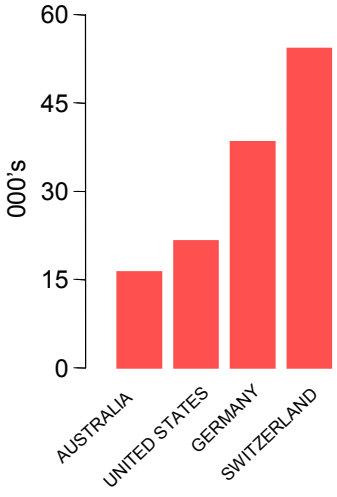

Figure 1. Total health & medical research PhD completions in Australia to reach levels of similar to OECD countries in 2009.

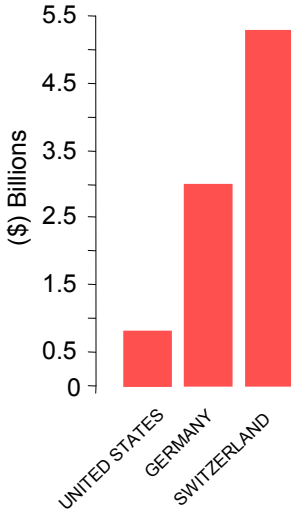

Figure 2. The cost (in 2009 dollars) associated with the additional number of PhD completions to reach levels of similar to OECD countries in 2009.

A number of matters are key to the successful maintenance and expansion of the health and medical research workforce:

- Understand that HMR is a long term commitment requiring long term, sustainable investment guided by informed, innovative and visionary policy reform.

- Understand workforce dynamics - develop, design and implement a viable 'long lasting' career structure which will attract and retain our best, brightest, most productive human capital.

- Expand international partnerships and enhance capacity through development of a regional union. For example, Asia-Pacific.

- Move quickly, building on the current highly skilled workforce so as not to lose the momentum of discovery.

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iv Schofield, D and Beard J (2005) Baby boomer doctors and nurses: demographic change and transitions to retirement. The Medical Journal of Australia 183 (2):80-83.