Perceptions in health and medical research careers: the Australian Society for Medical Research Workforce Survey

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ABSTRACT

Objective: To report on the sentiments of the Australian health and medical research (HMR) workforce on issues related to employment and funding opportunities.

Design, setting and participants: In August 2006, the Australian Society for Medical Research (ASMR) invited all of its members to participate in an online survey. The survey took the form of a structured questionnaire that focused on career aspirations, career development and training opportunities, attitudes toward moving overseas to work, and employment conditions for medical researchers.

Main outcome measures: Researchers' views on career opportunities, funding opportunities, salary and quality of the working environment; impact of these views on retaining a skilled medical research workforce in Australia.

Results: Of the 1258 ASMR members, 379 responded (30% response rate). Ninety-six per cent of respondents were currently based in Australia; 70% had a PhD or equivalent; and 58% were women. Most respondents worked at hospital research centres (37%), independent research institutes (28%) or university departments (24%). Sixty-nine per cent had funding from the National Health and Medical Research Council, with the remainder funded by other sources. Over the previous 5 years, 6% of respondents had left active research and 73% had considered leaving. Factors influencing decisions about whether to leave HMR included shortage of funding (91%), lack of career development opportunities (78%) and poor financial rewards (72%). Fifty-seven per cent of respondents were directly supported by grants or fellowships, with only 16% not reliant on grants for their continuing employment; 62% believed that funding had increased over the previous 5 years, yet only 30% perceived an increase in employment opportunities in HMR. Among the respondents, twice as many men as women held postgraduate qualifications and earned ⩾ $100 000 a year.

Conclusions: Employment insecurity and lack of funding are a cause of considerable anxiety among Australian health and medical researchers. This may have important implications for the recruitment and retention of researchers.

MJA 2008; 188: 520–524

Australian health and medical research (HMR) ranks highly compared with the international research community in terms of strong citation performance, with Australian publications in the top 1% of most-cited articles (30% more than the world average[1]), and in terms of the ability to attract United States dollars into Australia through competitive extramural grants from the US National Institutes of Health. In fact, Australia's level of funding is similar to that of the United Kingdom and increasing at about the same rate, notwithstanding our much smaller research base.[2] These impressive outcomes are achieved despite Australia spending significantly less in terms of gross domestic expenditure on health research and development than other countries such as the UK and the US.

A key factor in Australian scientific advances and achievements is its well trained, broadly skilled workforce. Australian researchers are keenly sought after by overseas research facilities. To ensure that the majority of our researchers who receive advanced training overseas return to Australia to carry out active research, we need to understand the factors that influence brain drain and gain.

An Access Economics report commissioned by the Australian Society for Medical Research (ASMR)[3] reviewed the value of investing in Australian health and medical research and development and found that the return on investment represented "exceptional value", with up to $5 return on each $1 invested in health research and development.

Over the past 9 years, Australian HMR has experienced a marked increase in federal government support administered by the National Health and Medical Research Council (NHMRC). Between 2000 and 2006, the NHMRC increased research and people support by 170%, from $169.7 million to $457.5 million. Australia differs from most Organisation for Economic Co-operation and Development countries in that it offers a highly competitive government-funded medical research career structure through the NHMRC fellowships scheme.

Limited information exists on the status of the Australian HMR workforce in terms of quantitative assessment of job satisfaction, workplace conditions, brain drain/gain and the sentiments of researchers. A survey conducted by the ASMR in 1999 identified important areas of concern for Australian health and medical researchers centring on lack of a career structure and limited career opportunities and funding in the HMR sector.[4] It was evident that some Australian researchers working overseas did not want to return.[4] In a national telephone poll conducted by Research Australia in 2003, funding and infrastructure support remained, overwhelmingly, the greatest concern for researchers.[5] Additionally, 80% of people supported by NHMRC awards from 1992 to 2002 did not feel that the Australian HMR environment provided a viable career path.[6]

We report here on a recent survey commissioned by the ASMR to obtain quantitative and qualitative data on its members' perceptions of and attitudes to workforce issues.

METHODS

In August 2006, a questionnaire designed by the University of Queensland Social Research Centre (UQSRC) in conjunction with the ASMR was sent to all members of the ASMR ($n = 1258$). The survey was administered online using ASMR member contact information. One reminder was issued during the collection phase of the study, with responses being accepted up to the end of October 2006.

1 Employment factors having an impact on careers in health and medical research*

	Number of respondents	Very negative impact	Somewhat negative impact	No impact	Somewhat positive impact	Very positive impact	NA
Lack of security in employment	374	40%	36%	18%	1%	< 1%	4%
General lack of financial support for research	374	36%	50%	9%	1%	1%	4%
Shortness of funding time frames relative to project development needs	374	18%	50%	23%	1%	< 1%	8%
Inadequate infrastructure for research	375	13%	47%	32%	2%	1%	6%
Time required to prepare grant applications	375	12%	57%	18%	2%	< 1%	10%
Lack of managerial support	374	10%	44%	35%	2%	0	9%
Uncertainty about what funding agencies expect	372	9%	50%	31%	1%	1%	8%

NA = not applicable. * Respondents were asked "To what extent has each of the following had an impact on your career over the past 15 years?" ◆

The questionnaire elicited information about perceptions of the current situation for HMR in Australia and the factors at play in the movement of medical researchers between Australia and overseas. The questions were mainly in structured form, but some open-ended items were included for qualitative responses.

RESULTS

Demographics

From the 1258 ASMR members, 379 responses were received (a 30% response rate). We undertook tests to ensure that the respondents accurately represented the whole population, and concluded that the sample was closely representative of the ASMR membership on demographic variables such as sex and age (with an error margin of ±4.2% at the 95% confidence level). The respondents included 165 people who had worked or were currently working overseas, 176 people who had not worked overseas and 39 people who had migrated to Australia.

A higher proportion of respondents were women (58%); 25% of respondents were aged under 30 years, 56% were in the age range 30–49 years, and 19% were aged 50 years or over. Ninety-six per cent of respondents were currently based in Australia.

Respondents were broadly representative of people involved in HMR in Australia. Seventy-five per cent of those surveyed were currently employed, and most of the remainder were studying for postgraduate degrees; 70% held a doctorate (PhD) and 26% held honours or non-doctorate postgraduate qualifications; and 85% had earned their highest degree in Australia. Most respondents (80%) described their position as "Research Scientist". Almost all worked at university or hospital research centres (37%), independent research institutes (28%) or university departments (24%), with the remainder working in hospitals or government agencies. Research fields represented in the survey were cancer (27%), infection and immunity (17%), mind and brain (10%), reproduction and development (9%), cardiovascular research (8%), bone and muscle (8%), respiratory research (5%) and other areas (16%).

Current employment

Eighty-four per cent of the surveyed population worked over 40 h/wk in their primary appointment. In addition to their main job, 70% of respondents worked in other paid employment and 28% held honorary positions. Almost three-quarters of respondents (73%) were on fixed-term appointments, with the remaining 27% on continuing appointments. Fifty-four per cent of researchers had worked or were working overseas and a further 33% had considered working overseas.

Fifty-four per cent of respondents' salaries were in the range of $50 000–$99 000 a year and 26% earned less than $50 000 a year. Of respondents holding a PhD or equivalent, 22% earned $100 000 or more. A sex difference in salaries was evident, with twice as many men as women holding postgraduate qualifications and earning $100 000 or more.

Fifty-seven per cent of respondents who were directly supported by grants or fellowships stood to lose their jobs if the funding source was not renewed. A further 27% of respondents indicated that, although they were not directly funded by grants, the lack of grants would indirectly harm the stability of their employment. Only 16% of respondents did not rely on grants for continuing employment. A clear majority (62%) of respondents reported that they were aware of increased HMR funding in Australia over the past 5 years, but only 30% perceived that there had been an increase in employment opportunities during the same period.

Fifty-eight per cent of respondents considered that the NHMRC research fellowship structure was somewhat effective, and 15% rated it as very or extremely effective. Most respondents favoured a 5-year renewal period for NHMRC fellowship applications, but opinion was divided as to whether this should be through open competition (27%), as it currently is, or without open competition (29%).

Career issues facing medical researchers

Respondents were conscious of the impact of their employment circumstances on their ability to continue careers as medical researchers. Three-quarters reported that lack of security in employment had a negative impact on their career, and almost all considered that the lack of financial support for research was detrimental to their career (Box 1).

Respondents expressed dissatisfaction with career opportunities in HMR. Indeed, many had either considered leaving HMR for another career (73%) or had already left (6%). Of respondents who had left or had

2 Factors regarded as important by researchers who had left or had considered leaving health and medical research (HMR)*

	Number of respondents	Not important	Mildly important	Somewhat important	Very important
The shortage of funding in HMR	279	3%	7%	23%	68%
The lack of career development opportunities	278	10%	12%	27%	51%
Poor financial rewards as a health and medical researcher	280	13%	15%	25%	47%
The shortage of work opportunities in HMR	280	11%	18%	33%	38%
The availability of better employment opportunities elsewhere	278	14%	16%	34%	36%
Needed time off due to family responsibilities	276	45%	16%	18%	21%
The changed nature of HMR	279	39%	28%	21%	12%

* Respondents were asked "If you have left, or have considered leaving, how important in your decision were the following factors?" ◆

considered leaving HMR, the most important factors contributing to this sentiment were a perceived shortage of funding, lack of career opportunities, poor financial rewards, shortage of work opportunities and better availability of employment elsewhere (Box 2).

Reasons for working overseas or in Australia

Of the 379 respondents, 203 (54%) were working or had worked overseas. Of the 176 respondents who had not worked overseas, 149 (85%) believed that working overseas would be beneficial for their career.

The top five reasons for going overseas given by the 165 respondents who had left Australia and returned were (in order of importance): broadening scientific experience, collaboration with other researchers, researching new techniques, having greater opportunities to do research, and having a better quality working environment (Box 3).

Among respondents with a PhD or equivalent, there were differences between men and women regarding reasons for leaving Australia to work overseas. Men were more likely than women to cite access to equipment and physical infrastructure; better project funding; opportunities for greater pay; researching new techniques; and greater employment stability. Women were more likely than men to report that helping their partner's career was an important factor.

Among the 176 respondents who had never worked overseas, 76% said that "family reasons" were the main factor influencing their decision to stay in Australia.

Of the 39 respondents who were immigrants, their reasons for relocating to Australia, in order of importance, were: lifestyle (67%), broadening scientific experience (59%), collaborations (54%), better work conditions (42%), researching new techniques (41%), greater opportunities for children (41%) and greater opportunities to do research (34%).

Respondents who were working overseas at the time of the survey or who had returned to Australia after working overseas were asked what factors would influence, or had influenced, their decision to return to Australia. The top four factors cited were the relative shortage of career opportunities in HMR in Australia, the smaller number of university positions in Australia, and lower pay and less job security in Australia (Box 4).

DISCUSSION

In 1998, the federal government commissioned a review of the position of HMR in Australia. The report of the Health and Medical Research Strategic Review (the "Wills report") made significant recommendations on a range of aspects of HMR in order to strengthen Australian research capacity and ensure a dynamic and responsive research culture for the future.[1] Of interest to our study were the recommendations to ensure that Australia has an effective and efficient HMR sector built on high-impact fundamental research and strengthened support for researchers and research careers.

The increases in funding following the implementation of the Wills report have already resulted in deliverable outcomes.[7] Full-time research positions funded by the

3 Reasons for health and medical researchers seeking employment overseas*

	No response	Not at all important	Not important	Neither important nor unimportant	Important	Very important
Broadening your scientific experience	4%	2%	1%	1%	25%	68%
Collaborating with other researchers	4%	1%	1%	11%	32%	51%
Researching new techniques	4%	1%	2%	11%	36%	46%
Greater opportunities to do research	5%	1%	4%	15%	33%	41%
Better project funding	5%	10%	10%	18%	36%	21%
Access to equipment and physical infrastructure	4%	5%	7%	19%	46%	19%
Personal interest in living outside Australia	4%	10%	7%	19%	42%	18%
Increased quality of working environment (eg, quality of research, collaborative gain)	5%	3%	8%	18%	50%	16%

* This table relates to the 165 respondents who indicated that they had worked or were currently working overseas. They were asked to indicate "to what extent the following reasons had an impact on your decision to leave Australia". ◆

4 Considerations influencing health and medical researchers' decision to return to Australia*

	No response	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not currently overseas
There are fewer career opportunities (eg, good jobs, advancement in health and medical research [HMR]) in Australia than in my current country	7%	2%	8%	12%	30%	16%	25%
There are fewer university positions in Australia than in my current country	7%	1%	4%	22%	23%	18%	26%
Medical and health researchers generally get paid less in Australia than in my current country	7%	2%	5%	21%	27%	13%	25%
Job security (ie, consistency and stability of employment) in the HMR field is not as good in Australia as in my current country	7%	4%	8%	19%	27%	10%	25%
I would like to share my expertise with researchers and industry inside Australia	7%	0	2%	28%	27%	10%	25%
The field of HMR in Australia is not as supportive (positive, encouraging) as in my current country	7%	2%	9%	22%	27%	8%	25%

* This table relates to the 165 respondents who indicated that they had worked or were currently working overseas. They were asked "Please indicate your agreement with the following statements in terms of their influence on whether you will return to Australia (or, if you have already returned, their influence on your decision to return)." ◆

NHMRC from project grants, program grants, strategic research awards and people support awards have risen from 3400 in 2003 to 5088 in 2006.[8]

Despite these increases, our study revealed that there remains a high level of employment uncertainty and discontinuity in Australia's HMR workforce and a perceived shortage of funding for HMR. Most respondents were employed on fixed-term contracts, and over half reported that they would lose their job if grant funding was discontinued. Nearly three-quarters of respondents had considered leaving HMR and 6% had already left active research over the previous 5 years, with many citing limited work opportunities, poor financial rewards and a shortage of funding in HMR. As only active members of the ASMR were surveyed, this loss (and potential further loss) in workforce capacity is likely to be an underestimate.

Our results concur with an earlier analysis of NHMRC-funded research, in which 81% of respondents cited lack of continuing employment as a major barrier to effective medical research and 80% felt that Australian HMR did not provide a long-term career path.[9] In the same study, researchers expressed a strong belief that overseas research positions were better funded and provided greater access to resources and facilities. This belief could have important implications for maintaining a skilled HMR workforce in Australia. Over half the respondents in our study were aged between 30 and 49 years, with many of these likely to be early-to-mid-career scientists who rely on grant funding for their primary income. Financial burdens (including mortgage/rent payments and the costs of raising children) are often high for people in this age group, increasing the anxiety surrounding employment security.

The findings of our study may reflect the changing trends in biomedical career paths over the past 30 years. Although the number of postgraduate students being trained has increased, the number of tenured academic positions has fallen.[10] Over half of our respondents were supported by fixed-term grants or fellowships, with job insecurity being a major concern. It was felt that the bar to secure funding is set unreasonably high. For example:

- Researchers have only a one in five chance of obtaining an NHMRC project grant;
- The average age at entry level into the highly competitive NHMRC fellowship scheme that supports excellent to outstanding scientists was 44 years in 2006;
- Researchers ranked as excellent on an international scale had a one in two chance of being awarded an NHMRC fellowship in 2006;
- For NHMRC career development awards (CDAs), the average age of entry in 2006 was 38 years, yet most researchers are awarded PhDs in their early 20s. An NHMRC postdoctoral training award may provide funding for a further 4 years, but, beyond those 4 years, researchers in their mid 20s to mid 30s are likely to have reduced funding opportunities for salary support. In 2008, the NHMRC took steps to rectify this difficulty by creating a two-tiered CDA scheme spanning the 3–12-year postdoctoral period.

We acknowledge the limitations of our study. The response rate (30%) was low, and the population surveyed was limited to ASMR members, whose views may be different from those of the broader medical research population. The study population was chosen for the fact that it represents diverse disciplines within the HMR workforce. As might have been expected, there was under-representation of certain subgroups, such as people who had left the HMR sector or Australian researchers who had permanently relocated overseas, as such groups are less likely to remain members of the ASMR. Issues influencing brain drain or leaving the sector may thus be understated because of the survey population. We should also stress that the survey was undertaken before the implementation of the CDA second tier and other opportunities in 2007 arising from increased HMR funding in the 2006 federal budget.

The strength of feeling about perceived non-sustainability of a career in HMR revealed by our survey suggests that a review of current policies affecting research careers and HMR people support in broader terms may be timely if Australia is to retain its reputation for research excellence and leadership. The fact that a large proportion of respondents have considered leaving active HMR in Australia highlights the need

for a coordinated multistreamed approach to ensure the long-term viability of the sector. Any significant loss of Australia's highly trained HMR workforce represents a potential erosion of its intellectual capacity and future preparedness. To maintain Australia's competitive edge, it will be necessary to provide a career path that captures, nurtures and retains talented minds and provides fertile career opportunities.

ACKNOWLEDGEMENTS

We would like to thank Dr Moira Clay, Professor Phillip Robinson and Professor Judith Whitworth for helpful suggestions regarding our survey.

COMPETING INTERESTS

Catherine West is currently an employee of the Australian Society for Medical Research.

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(Received 27 Nov 2007, accepted 6 Mar 2008) ❑