Are we serious about keeping women in science?

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Women continue to be outnumbered by men in science leadership in most OECD countries. While they are over-represented as PhD students in some science disciplines, there are few senior women scientists. In 2014 women accounted for 63 per cent of applications for the Australian National Health and Medical Research Council's (NHMRC's) early-career fellowships, but just 11 per cent of its most senior and experienced fellowships.

So what are the reasons for the absent women leaders in science? Research has identified how women experience both direct and indirect discrimination in science laboratories. Moreover, those who wish to combine children with careers face the 'rush hour' when career and family collide once they reach their early 30s. A further factor is that women can have difficulty being mobile and the perception is that mobility can accelerate research careers. As well, to become an independent researcher and move into science leadership requires strong networks and mentoring, and there can be gender differences. There is a belief that to become a leader requires ambitious scientists to publish 40 papers in high impact journals by the time they are 40 to be awarded a senior fellowship. If women have interrupted careers this is hard to achieve and begs the question of whether or not science research organisations in Australia are serious about keeping women in science.

To understand better the factors that impact on women's careers in science, I undertook a case study in collaboration with the Equality in Science Committee at the Florey Institute of Neuroscience and Mental Health in Melbourne, analysing the workforce profile over a five-year period and interviewing 40 research scientists at all levels. The four main findings of this research, *Keeping Women in Science,* were: a passion for 'doing science'; entrenched male leadership and its impact on women research scientists; generational change and gender; and new inclusive models that are emerging.

Research scientists are passionate and single-minded about what they do; this all-consuming focus on their work was almost akin to a religious vocation. Their job satisfaction came from the excitement of being at new frontiers of science, rather than financial reward. One researcher explained: 'This will be remembered as the golden era of neuroscience and genetics and a number of other areas of medical research. It is an incredibly exciting time'; while another described how: 'I wake up in the morning thinking how I can get my kids to school so I can get to work. But looking forward to going to work, very much so'. What emerged from their accounts of 'doing' science was a view of the 'ideal scientist' as a 'monastic male' with no other responsibility than their career; that is, the normative male model of a scientist (Moir, 2006). So where are women positioned in science given this ideal model? My book suggests that this has an impact on women scientists, who are generally perceived as outsiders.

A second finding was that the organisational culture was difficult for women. The leadership was overwhelmingly male, and the culture was entrenched and controlling.

Some even went as far as to describe it as nasty. Recent evidence that sexism persists in science organisational cultures includes a reviewer who rejected a paper by two young scientists, advising them 'to find one or two male biologists to work with' (Baitz, 2015) and the reported comments of the Nobel laureate Emeritus Professor Tim Hunt: 'Let me tell you about my trouble with girls ... Three things happen when they are in the lab. You fall in love with them, they fall in love with you, and when you criticise them they cry' (Beck, 2015).

The Florey Institute, like all research institutes, operates in a highly competitive environment, and this is linked to the funding model. Senior research fellows rely on three to five year funding from the NHMRC. If they do not secure this funding they cannot continue to run their laboratories and employ post-doctoral researchers, PhD students and research assistants. So the pressure to publish in high impact academic journals is intense as high research output determines who gets funded. NHMRC funding assumes that the recipients and their team will all work full-time, although some part-time fellowships have recently been introduced. My research indicated that the funding model therefore made it difficult to negotiate flexible working conditions. Another aspect of the organisational culture was a lack of transparency in policies and procedures, particularly the promotions policy. In fact, most junior researchers did not have much knowledge of the policy.

The third and most significant finding was that the construct of masculinity on which science excellence is based was out-dated and that more fluid roles for women and men were emerging. There was a fundamental difference in the attitudes of the current science leaders – the Baby Boomers – and the Gen X and Gen Ys. Both younger women and men rejected overt gender discrimination in the workplace. Younger women were challenging the gendered organisational culture/funding model in order to balance work/family/career progression; and some were delaying having children. Others asked that their decision to return to work part-time after maternity leave be respected.

Younger men were also challenging the organisational culture. They rejected the competitive funding model and job insecurity; and many were juggling work/dual careers/children. This generation needed to consider not only their career, but their partner's career, as well as parental responsibilities. Some of these men were working a compressed working week – that is four long days – so that they could have one day a week at home to look after young children. Even those who were currently single could envisage a time when they would wish to work less and/or more flexibly when they have children.

The Gen X's and Gen Y's argued that more diversity in the workplace led to better science outcomes. One respondent explained: 'we want a number of different perspectives to solve issues. So you want to recruit from a variety of different locations around the world or experiences, and you want to recruit a variety of genders. So then you can get the best triangulation and ideas to solve problems. So it is in an institute's interest to have diversity'.

There was evidence that new inclusive models were in fact emerging. There is a strong political imperative to keep young women and men in science research to increase Australian competitiveness/innovation. This is an issue with which other OECD countries are also grappling. But in order to make the country more competitive, the funding model needs to be reformed. Moreover the culture of science research institutes needs to change in order to keep younger women and men in science and to foster world-class research innovation. There was evidence that the Florey Institute supported more flexible work models for women and men, and that leadership from supervisors was critical in developing these new models for 'doing science'. Hence, this institute has been prepared to implement strategies to retain its young scientists.

So how does Australia move forward and demonstrate that it is serious about keeping women in science? First, research institutes must stop considering work-life balance as a personal rather than institutional issue, and positioning female scientists as outsiders. Second, they need to re-construct definitions of a 'successful scientist', because younger women and men are not 'monastic males'. Third, they need to look more closely at the careers of women in science research across the life course, particularly during the 'rush hour' when career and family collide and how better to support women at that critical stage; and finally, they need to promote best practice models of supervisors and researchers negotiating how to continue with research before and after the birth of a child, and when transitioning back to work.

The Australian government has a critical role in ensuring that we keep women in science. It needs to change the NHMRC funding model because it does not encourage flexible work options for research scientists. The NHMRC's recently introduced gender equity policy (NHMRC, 2015) recognises the need to change the culture of science research. It aims to address the underrepresentation of women in senior research positions and applies to all institutions that receive NHMRC funding which must

submit their gender equity policies to the NHMRC by the end of 2015. These policies must include: a strategy that addresses the underrepresentation of women in senior positions in health and medical research; mentoring and skills training strategies that promote and seek to increase women's representation; provision of parental/maternity leave and carer's leave, and transitional support to encourage return to work; working arrangements that cater for individuals with caring responsibilities; remuneration equity between men and women with the same responsibilities; employment strategies that encourage the recruitment, retention and progression of women in health and medical research; and strategies to address the need for the provision of support for childcare.

If Australia is to remain innovative, it cannot afford to invest in educating women to PhD level and then see them exit science. The UK already recognises that one compelling reason to tackle the problem of the under-representation of women at senior levels in science, technology, engineering and mathematics (STEM) 'is that the UK economy needs more STEM workers and we cannot meet the demand without increasing the numbers of women in STEM' (House of Commons, 2014, p. 3), and that universities must accept responsibility for the high attrition of scientists. The Equality Challenge Unit in the UK established the Athena SWAN Charter in 2005 to encourage and recognise commitment to advancing the careers of women in science, technology, engineering, mathematics and medicine (STEMM) employment in higher education and research.

In May 2015 the charter was expanded to recognise work undertaken in arts, humanities, social sciences, business and law, and in professional and support roles, and for trans staff and students. The charter now recognises work undertaken to address gender equality more broadly, and not just barriers to progression that affect women. From 2017 science funding will be aligned to an institution's performance in improving gender representation, especially at senior levels. The program has therefore become a catalyst for institutional change. Meanwhile, the US Office of Science and Technology Policy argues that 'supporting women STEM students and researchers is not only an essential part of America's strategy to out-innovate, out-educate, and out-build the rest of the world; it is also important to women themselves'.

A recently released report by Bell and Yates (2014, p. 5) argued that despite the fact that outstanding women in Australia are increasingly seen to be achieving at the highest levels and taking key roles in science, their participation in the science research workforce "continues to be characterised by low levels of retention and success beyond the post-doctoral career stage for a large number of individuals with scientific advanced qualifications". Moreover, they argue that while the causes of inequality in science are known, little progress has been made at a national level over the past 30 years (Bell & Yates, 2014, p. 9).

The Australian Academy of Science has announced that it will conduct a pilot of the UK Athena SWAN program. While this and the NHMRC equality policy are a start, there is much more to be done (Hare, 2015).

If we are serious about keeping women in science research in Australia, we need a strong indication from the federal government that it understands the risk to its innovation agenda of fewer women in science, and that it can demonstrate a strong commitment to a raft of new measures that are needed to ensure women are valued and can have rewarding science careers.

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