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- Downs JA, Reif LK, Hokororo A, Fitzgerald DW. Increasing women in leadership in global health. *Acad Med* 2014; **89**: 1103–07.
- HRH Global Resource Center. Resource spotlight: gender and health workforce statistics. [https://www.hrresourcecenter.org/gender\\_stats](https://www.hrresourcecenter.org/gender_stats) (accessed Feb 22, 2018).
- Beaman L, Duflo E, Pande R, Topalova P. Female leadership raises aspirations and educational attainment for girls: a policy experiment in India. *Science* 2012; **335**: 582–86.
- Smith JA, Flower P, Larkin M. Interpretative phenomenological analysis: theory, method and research. London: SAGE Publications, 2009.
- Dennehy T, Dasgupta N. Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proc Natl Acad Sci USA* 2017; **114**: 5964–69.
- Kwedi Nolna SK, Essama Mekongo PE, Leke RGF. Mentoring for early-career women in health research: the HIGHER Women Consortium approach. *Glob Health Epidemiol Genom* 2017; **2**: e3.
- Glimcher LH, Lieberman J. Harvard's women four years later. *Nat Immunol* 2009; **10**: 559–61.
- Devine PG, Forscher PS, Cox WTL, Kaatz A, Sheridan J, Carnes M. A gender bias habit-breaking intervention led to increased hiring of female faculty in STEM departments. *J Exp Soc Psychol* 2017; **73**: 211–15.

- Russell C. Confronting sexual harassment in science. *Sci Am*. Oct 27, 2017. <https://www.scientificamerican.com/article/confronting-sexual-harassment-in-science/> (accessed Jan 10, 2018).
- Clancy KB, Nelson RG, Rutherford JN, Hinde K. Survey of academic field experiences (SAFE): trainees report harassment and assault. *PLoS One* 2014; **9**: e102172.

## Increasing women's leadership in science in Ho Chi Minh City

Increasing initiatives to advance women's careers in science are almost exclusively based on data from high-income countries.<sup>1,2</sup> To improve inclusion and diversity in science, data from low and middle-income countries (LMICs) are urgently needed to inform the debate and enable effective change. A literature search using the terms “women” and “science” or “research” revealed a scarcity of relevant publications from LMICs in peer-reviewed journals.<sup>3–5</sup>

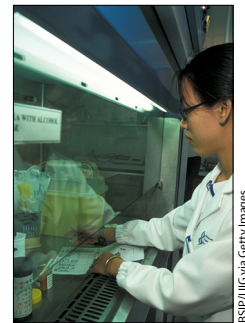
The Oxford University Clinical Research Unit in Ho Chi Minh City is a multinational research organisation with approximately 120 scientific staff. It is in a unique position to examine issues faced by female scientists working within a LMIC in an international environment. We aimed to explore and address gender issues in our research institute and herein present findings and the actions we have implemented. The research was done between December, 2017, and February, 2018. Background data were accessed from institutional personnel, publications, and grant application records. Online anonymous structured questionnaires were sent to and completed by 18 female and 20 male faculty staff (100% response). The faculty is comprised of senior academic staff and a director of operations. A follow-up survey conducted with the same methodology was sent to 79 female scientists (grades research assistants, postdoctoral students and all faculty members who completed

the initial survey) and completed by 42 staff.

The majority of scientists (79 [65%] of 121) in our institution are women. In junior posts, 53 (78%) of 68 are research assistants and 11 (50%) of 22 are PhD students. At senior level, women comprise nine (45%) of 20 postdoctoral scientists and five (45%) of 11 research group heads; additionally, only one (14%) of seven full or associate professors are female. On examination of grant applications from years 2011 to 2017, female researchers had slightly lower success rates than males: 58 (54%) of 108 versus 116 (65%) of 179, but only 117 (37%) of 318 applications had female principal investigators. Eight (20%) of 40 grants awarded to female scientists were for more than US\$500 000 versus 29 (33%) of 87 grants to male scientists. In 2016–17, 63 (55%) of 115 institutional first author publications had a female first author, and 20 (20%) of 99 last author publications a female last author. In higher impact journals with impact factors more than 20, three (50%) of six first authors and no of eight last authors were female. Therefore, despite balanced numbers of women and men in senior posts, there is gender imbalance in other measures of scientific leadership.

Career breaks have been postulated as barriers for women's career progression,<sup>6,7</sup> and in our faculty level survey, ten (56%) of 18 female staff reported having taken a career downshift (being demoted, reduced hours and responsibilities) or break compared with only four (15%) of 20 men. Furthermore, 14 (77%) of 18 women felt gender had sometimes or often influenced their career, compared with five (25%) of 20 men.

In addition to downshifts and career breaks, the variable societal roles of female scientists could also negatively influence career progression. In Ho Chi Minh City and other areas of Vietnam, many female



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scientists live within the context of extended families with additional responsibilities of caring for elderly relatives. 24 (57%) of 42 female respondents reported dependent relatives requiring care and spent a median 10–20 h per week on caring duties and a further 10–20 h per week on other domestic duties. These duties might have an effect on networking possibilities and travel. 15 (83%) of 18 female faculty members reported difficulty attending out-of-hours events or work-related travel sometimes or often, compared with 12 (60%) of 20 men. 21 (50%) of 42 women said that caring responsibilities had affected decisions regarding career-related long-term travel.

Flexible ways of working were considered advantageous, and 30 (71%) of 42 female scientists reported they would like to work from home. Nevertheless, challenges to working from home such as lack of space and noisy environments were noted.

To address these issues, we have implemented specific initiatives with strong institutional backing—namely, grant writing and leadership training tailored to our setting, and active identification and support of female scientists eligible for promotions. Enhanced mentorship was identified as desirable by 15 (83%) of 18 female faculty staff; therefore, we are designing a career-guidance programme suitable for local and international staff and inviting prominent female scientists to run workshops, creating a platform for potential role models. We will assess the effect of these initiatives through qualitative and quantitative evaluation.

However, substantial challenges remain, particularly concerning career mobility—hitherto seen as necessary for scientific career progression in an international environment. Funding bodies are beginning to recognise these issues, but they are yet to provide the substantial levels of support and innovative leadership needed to overcome them.

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- Walsh MN. Women as leaders in cardiovascular medicine. *Clin Cardiol* 2018; **41**: 269–73.
- Moss-Racusin CA, van der Toorn J, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J. A “scientific diversity” intervention to reduce gender bias in a sample of life scientists. *CBE Life Sci Educ* 2016; **15**: pii: ar29.
- Valentova JV, Otta E, Silva ML, McElligott AG. Underrepresentation of women in the senior levels of Brazilian science. *PeerJ* 2017; **5**: e4000.
- Halpaap B, Vahedi M, Certain E, et al. Tracking the career development of scientists in low- and middle-income countries trained through TDR’s research capacity strengthening programmes: learning from monitoring and impact evaluation. *PLoS Negl Trop Dis* 2017; **11**: e0006112.
- Leke RG, Nolna SK. Health research: mentoring female scientists in Africa. *Nature* 2016; **536**: 30.
- Nicholson E. Accounting for career breaks. *Science* 2015; **348**: 830.
- Staff J, Mortimer JT. Explaining the motherhood wage penalty during the early occupational career. *Demography* 2012; **49**: 1–21.

## Australia’s strategy to achieve gender equality in STEM

In Australia, increasing the representation of women in science, technology, engineering, and mathematics (STEM) is a national imperative. In 2016, the Australian Federal Government identified gender equality as a key platform in its National Innovation and Science Agenda.<sup>1</sup> Although the efforts of women to advance gender equality in STEM

remain central, men have been notably absent in these efforts despite holding the power and influence to create substantial change. Engaging decent and influential men to work beside women to accelerate gender equality in STEM is a major strategic opportunity and priority.

In 2016, the Australian Federal Government announced support for two complementary national programmes to tackle gender equality: the Science in Australia Gender Equity (SAGE) programme and the Male Champions of Change (MCC) STEM. SAGE is a partnership between the Australian Academy of Science and the Australian Academy of Technology and Engineering and is a programme aimed at improving the attraction, retention, and success of women, transgender, and gender diverse individuals in the Australian STEM higher education and research sectors. As of 2017, 45 higher education and research institutions are participating: 33 Australian universities (83% of all Australian universities), six medical research institutions, and six publicly funded research institutions. The programme requires participating institutions to analyse data on gender equity and develop action plans for improvement, and has largely been informed by the UK Athena SWAN.

The MCC STEM is a programme that brings together senior male leaders at the CEO level from business, government, university, and research sectors to “listen, learn, and lead through action”, with a view to taking practical action to accelerate progress on gender equality. In most organisations, those in high positions often receive information that is filtered and less critical feedback. The MCC programme flips this approach by asking leaders to listen to the insights of their employees and experts, particularly women, to reflect on the human experiences of gender inequality in their organisations and their own role, and to personally lead system-wide actions. MCC STEM provides one of the few spaces where senior men can step up beside their female counterparts to

For more on the Science in Australia Gender Equity see <http://www.sciencegenderequity.org.au/>

For more on the Male Champions of Change STEM see <http://malechampionsofchange.com/>