

STRENGTHENING CANADA'S RESEARCH CAPACITY: THE GENDER DIMENSION

Executive Summary



Council of Canadian Academies
Conseil des académies canadiennes

Science Advice in the Public Interest

**STRENGTHENING CANADA'S RESEARCH CAPACITY:
THE GENDER DIMENSION**

The Expert Panel on Women in University Research

THE COUNCIL OF CANADIAN ACADEMIES

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The Council of Canadian Academies

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Message from the Chair

Throughout history, women have made important contributions to society. Their influence grew as they began entering the workforce in greater numbers and won access to academic institutions at all levels. Over the past three decades the number of top flight female researchers has increased significantly. So in 2008, when the results of the first Canada Excellence Research Chairs (CERC) competition were announced, it came as a surprise to many that not one of the 19 appointed Chairs was female. What could have been a celebrated announcement drew critical national headlines, and a public outcry. In addition, university administrators began to ask themselves some tough questions and do a little soul searching. The Minister of Industry moved quickly to investigate the reasons behind why women had not been selected to receive even one of the world-class research awards worth \$10 million over seven years, by appointing an Ad Hoc Panel on CERC Gender Issues, which submitted its report in April, 2010.*

Based on the findings of the Dowdeswell *et al.* report, the Minister of Industry asked the Council of Canadian Academies to further examine the factors that influence the career trajectory and statistical profile of women researchers in Canadian universities. I was honoured to chair the Expert Panel, which was comprised of Canadian and international experts from a diverse set of backgrounds. The Panel's journey was rigorous and intense as we considered both the qualitative and quantitative evidence available to us.

Trying to sort out the evidence has not been easy. Within the constraints of the available data, literature and knowledge, we have gone as far as we could responsibly go to examine the factors that affect women in university research careers, and point to hypotheses. We have also identified key areas for further research that we hope will be taken up by others. We hope this assessment will serve as an important tool for policy-makers and university administrators in the development of new policies and programs that will further women in university research careers.

* Dowdeswell *et al.*, 2010. Report to the Minister of Industry of the Ad Hoc Panel on CERC Gender Issues.

On behalf of the Expert Panel I would like to thank the 13 reviewers who took the time to critique this report to ensure it was a balanced, evidence-based document. As well, I would extend our thanks to the Council's research staff; Elizabeth Dowdeswell, the Council's President; and Janet Bax, our Program Director who ably supported the Panel from the start.

A handwritten signature in black ink, appearing to read "Lorna R. Marsden". The signature is fluid and cursive, with a large initial "L" and "M".

Lorna R. Marsden, Chair

Expert Panel on Women in University Research

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Report Review

This report was reviewed in draft form by the individuals listed below — a group of reviewers selected by the Council of Canadian Academies for their diverse perspectives, areas of expertise, and broad representation of academic, industrial, policy, and non-governmental organizations.

The reviewers assessed the objectivity and quality of the report. Their submissions, which will remain confidential, were considered fully by the Panel, and many of their suggestions were incorporated into the report. They were not asked to endorse the conclusions nor did they see the final draft of the report before its release. Responsibility for the final content of this report rests entirely with the authoring Panel and the Council.

The Council wishes to thank the following individuals for their review of this report:

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The report review procedure was monitored on behalf of the Council's Board and Scientific Advisory Committee (SAC) by **Susan A. McDaniel, FRSC**, Director, Prentice Institute & Canada Research Chair in Global Population & Life Course, Prentice Research Chair & Professor of Sociology (Lethbridge, AB).

The role of the report review monitor is to ensure that the panel gives full and fair consideration to the submissions of the report reviewers. The Board of Governors of the Council authorizes public release of an expert panel report only after the report review monitor confirms that the Council's report review requirements have been satisfied. The Council thanks Dr. McDaniel for her diligent contribution as review monitor.



Elizabeth Dowdeswell, O.C., President & CEO
Council of Canadian Academies

Executive Summary

The university environment has undergone major changes in the past four decades. Despite decades of women's underrepresentation on campus, gender parity in terms of student enrolment was reached in 1989 (see Chapter 3). Women now outnumber men as undergraduate and master's students, and represent nearly half of all PhD students. Although women have outnumbered men at the student level for over 20 years, these changes have not necessarily been reflected to the extent one would expect in the ranks of the professoriate, particularly at the levels of full professor and senior administration.

There are many reasons for concern at the lack of proportional representation of women in senior positions in all facets of our society, including politics, law, medicine, the arts, business, and academia. The underrepresentation of women in any of these areas is a concern considering the fundamental Canadian values of equality, fairness, and justice, as outlined in the *Canadian Human Rights Act*, the *Canadian Charter of Rights and Freedoms*, and the *Employment Equity Act*. This report focuses on women in academia: the 11,064 women with PhDs who are employed full-time in degree-granting institutions. In comparison, there are 22,875 men in this category (see Table 3.1).¹ Besides educating millions of students, these researchers and innovators are working to address the major issues Canada faces in the 21st century, including climate change, demographic shifts, healthcare, social inequality, sustainable natural resources management, cultural survival, as well as the role Canada plays as an international actor. These contributions are in addition to the basic, or knowledge discovery, research that is one of the main duties of academic researchers. In the knowledge economy, a talent pool of Canada's top thinkers, researchers and innovators is needed to help secure and build Canada's economic edge. The wider the pool is from which to draw, the more perspectives, experiences, and ideas will be brought to the creative process. Arguments for fully including women in research careers range from addressing skills shortages and increasing innovation potential by accessing wider talent pools, to greater market development, stronger financial performance, better returns on human resource investments, and developing a better point from which to compete in the intensifying global talent race.

1 The Panel noted that it is important to keep in mind that many talented women and men are employed in part-time university positions, despite the fact that they are not included in this analysis. Please see the List of Definitions and Abbreviations as well as Figure 5.1 for further discussion of this issue.

This report was initiated by the Minister of Industry as a result of the paucity of women represented in the 2008 Canada Excellence Research Chairs (CERC) program. The results of the 2010 Dowdeswell *et al. Report to the Minister of Industry of the Ad Hoc Panel on Canada Excellence Research Chair (CERC) Gender Issues*, provided further impetus for this assessment. The Council of Canadian Academies was asked to assemble a Panel of experts to answer the following question:

What policies and what societal, cultural, and institutional, economic, and other relevant factors influence the career trajectory of women researchers in Canadian universities and underlie gender disparities observed in Canadian university researcher's statistical profile, by discipline area, rank, duty/position/stature, salary, tenure, research funding and any other relevant indicators?

INTERNATIONAL COMPARISONS

In addition to the central charge, the Panel was tasked with comparing the statistical profile of women in university research careers in Canada to those in other key jurisdictions, such as OECD countries. In general, the pattern of distribution of women researchers, associate professors, and full professors is similar across Canada and several OECD countries (such as the U.S., the U.K., Australia, and the EU average), with a few exceptions (individual EU member states). The higher in the ranks one looks, the fewer women are present in comparison to men. There are, however, differences within ranks that are worth noting (e.g., some countries have more women at the full professor level than others). The Panel also found that the EU and the U.S. have led the way in terms of benchmarking and tracking the progress of women researchers, thereby presenting good practices from which Canada can learn.

ILLUSTRATIVE PRACTICES

The Panel was also asked to identify good practices to attract and retain women researchers. The Panel found ample evidence of these international and national initiatives within governments, universities, schools, and advocacy groups, which are designed to train, hire, retain, and promote women in research. These include:

- strategies to increase the competitiveness of individual women, such as mentorship, scholarships, targeted grants, and outreach opportunities;
- university initiatives that aim to create more flexible and family-friendly environments, such as spousal hiring practices, part-time tenure track positions, after-hours child care centres which provide quality care, and systems of awards for gender-friendly departments;

- government policies and research council programs that aim to remedy systemic issues, such as legislated quotas, employment equity policies, and extending grants to accommodate parental leave; and
- legal action to redress inequalities and injustices.

A key finding from a review of these practices is that rarely does one initiative work in isolation to “fix” a problem or meet an objective. Rather it is a combination of practices and policies that, taken together, can be applied to meet objectives and bring about real change.

THE STATISTICAL PROFILE OF WOMEN IN UNIVERSITY RESEARCH IN CANADA

After a year-long review of several sources, the following messages emerged as a result of the Panel’s assessment of data:

1. **Women’s progress in Canadian universities is uneven by discipline and rank.** Since 1970, there has been a great deal of positive change in women’s representation in post-secondary education. However, women’s representation varies by discipline and rank. As of 2008–2009, women formed the majority of enrolled bachelor’s (57.1 per cent) and master’s (54.5 per cent) students, and were nearly at parity with men at the doctoral level (46.7 per cent); however, only 32.6 per cent of all faculty members were women. In terms of discipline, women faculty members in Canada are best represented in humanities, social sciences and education (HSE) (39.6 per cent) and life sciences (LS) (35.0 per cent). Their numbers are lowest in physical sciences, computer science, engineering, and mathematics (PCEM) (14.8 per cent). Despite gains over the past four decades, there is a great distance to go to approach equity. This is especially true in PCEM, where women enrol in PCEM bachelor’s programs in significantly lower proportions (24.0 per cent) than they do in HSE (61.6 per cent) or LS (69.2 per cent). Though women’s representation in PCEM disciplines is relatively low, the Panel identified a finding that may have positive implications: cross-sectional data indicate that the proportion of women who enrol in PCEM disciplines at the bachelor’s level is relatively similar to the proportion of women at the assistant professor level. This finding speaks to the importance of attracting girls and young women to PCEM disciplines before they enter post-secondary education. Clearly, the factors that affect the career trajectories of women researchers differ across disciplines. Progress cannot be tracked by aggregate numbers alone — it is essential to consider women’s representation by discipline, rank, and job status (permanent versus casual).

2. **The higher the rank, the lower the percentage of women in comparison to men.** Canadian census data suggest there is a higher proportion of women who are part-time professors than there are full-time professors. While PhD parity already exists in many disciplines, and women are currently 46.7 per cent of all PhD candidates in Canada, snapshot data from a single point in time indicate that the percentage of women is lower at each ascending rung of the faculty ladder. By rank, women represent nearly half of all sessional instructors and lecturers and 42.6 per cent of assistant professors, but they are only 36.2 per cent of associate professors and 21.7 per cent of full professors. Synthetic cohort data, on the other hand, suggest that the proportion of women in full professor positions generally reflects the proportion of PhD graduates 25 years earlier, albeit with a decrease from the level of associate professor to full professor. This indicates that the passage of time alone will probably not be enough to reach parity — the “glass ceiling” effect. The glass ceiling is also evident at the ranks of senior administration. The specific transitions where there are the greatest decreases in the proportions of women represent the areas of greatest potential for positive change.
3. **In general, the Canadian profile is similar to that of other economically advanced nations.** The profile of women's representation in Canadian universities is strikingly similar to that found in other economically advanced nations including the U.S., and to the average profile across the EU (Figure 3.8). As students, women tend to outnumber men. Their proportions equal off at the doctoral degree level, after which men outnumber women at every increasing academic rank. The differences between ranks are clear. The Panel found that because EU statistics represent an average across the 27 member states included in this analysis, it is essential to note variations by country — especially *within* ranks. Sweden, for example, has a higher percentage of female associate professors than Canada, whereas Germany has a lower percentage of associate and full professors who are women.
4. **The Panel was limited in its ability to analyze all assessment questions in full due to a paucity of Canadian data.** The shortage of comprehensive and longitudinal data from the Canadian government, the Tri-Council, Canadian universities, and the private sector, a lack of gender disaggregated data regarding the critical postdoctoral research period, as well as restrictions to access to some existing data (e.g., Federal Contractors Program data) impeded the Panel's analysis and is a serious barrier to researchers across Canada. The Panel was especially concerned by the chronic lack of attention

to diversity data, including gender, race, ethnicity, indigeneity, disability, and other markers of social location. The paucity of comprehensive Canadian qualitative surveys designed to understand the reasons for the low proportion of women holding full professorial posts also affected the Panel's ability to address the charge. A clear definition of the challenges is needed in order to create solutions and achieve goals.

MAIN POLICIES AND FACTORS THAT AFFECT THE CAREER TRAJECTORIES OF WOMEN RESEARCHERS IN CANADA

The findings described above are a result of several factors that the Panel identified during the course of this assessment. After a review of Canadian and international reports and literature, as well as a qualitative analysis of secondary Canada Research Chairs data, the Panel concluded that the following policies and factors affect the career trajectories of women researchers:

1. **Canada could be doing more to fulfill its national and international commitments to women's rights. In addition to upholding the Canadian value of equality, this would bolster Canada's capacity to engage a diverse pool of talented researchers.** Canada is not meeting its own objectives in relation to gender equity goals as laid out in the *Employment Equity Act*, the *Canadian Human Rights Act* and the *UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)*. This is demonstrated by the lack of transparency in equity programs such as the Federal Contractors Program; the underrepresentation of women in the Canada Research Chairs program and their total absence from the CERC program.
2. **The pathway to becoming a researcher is laid before university.** The use of a life course perspective is critical to understand the career trajectories of women researchers. Socialization, schemas, and stereotypes define social roles and expectations, and contribute to the lack of encouragement for girls to forge non-traditional paths. As a result, female students consistently report lower levels of self-confidence in PCEM disciplines than males do. This is despite studies that indicate that the math achievement gap is closing, and that the math achievements of girls and boys are influenced by gender equity at the national level.

3. **Young Canadians lack sufficient knowledge about educational requirements for future careers, as well as a clear understanding of what PCEM careers entail.** Evidence indicates that there is a disconnection between the educational choices some students make at the secondary level and their post-secondary or career goals. Negative perceptions of some research-based careers, a poor understanding of what these careers entail, and a lack of role models who encourage engagement with science and math, appear to be factors behind this finding. These results are particularly relevant in light of research which revealed that 75 per cent of physicists globally considered a career in physics *before* they entered university. Programs that have the goal of increasing student awareness about the possibilities of research-based careers early on, especially in science, engineering, and technology, were identified by the Panel as a promising practice.
4. **The paucity of women in leadership positions makes it difficult for other women to envision themselves as leaders.** The paucity of women in leadership positions can also make it difficult for women to *become* leaders. The higher in the ranks one looks, the fewer women are present in comparison to men in positions such as full professors and presidents of universities, leaders of government agencies, and CEOs of private sector companies. Mentorship and sponsorship initiatives provide women with role models who defy gendered expectations and offer advice and support.
5. **Institutional practices can negatively influence the career trajectories of women researchers.** While preparing successive generations for research careers, universities and their affiliated hospitals and institutes conduct the majority of research in Canada. The transition of the university from a traditional, elite, male-dominated institution to one where new student and faculty demographics prevail has required adjustments in policies, practices, attitudes, and leadership to welcome women and minorities. Yet chilly climates, including the cumulative effects of stereotyping, recruitment, and evaluation biases still remain challenges for some academic women. This can result in the perception that women are undervalued, as indicated by the number one finding of the Panel's re-analysis of Canada Research Chairs data. Illustrative practices that respond to these challenges include actions on behalf of university administrators, such as ensuring transparency in search processes to find candidates for jobs, being sensitive to issues such as subtle biases in hiring, promotion and the allocation of resources, ensuring fairness and credit in the allocation of community service responsibilities, and by implementing policies that encourage the mentorship and sponsorship of new faculty.

6. **For women, a small but persistent salary gap can have significant financial effects over the long term.** This gap cannot be fully explained by age or rank, and has changed little during recent years. Even at the full professor level, women make 95 per cent of what men do. Although this pay gap is smaller than the gender pay gap in general, it is still problematic. Over years of work, this disparity contributes to a substantial pay difference between women and men faculty, and continues to affect income through pension payouts after retirement. Preliminary data indicate that this disparity is especially pronounced for women who are also racialized minorities.
7. **The paid work-family life balance is a particular challenge for women researchers with families.** Compared to men in academia, Canadian data indicate that women tend to have fewer children and American data show that academic women start their families later in life. In addition, women researchers with children tend to be in lower academic positions than men. This comes as little surprise, considering several studies show that women in academia spend more time on child care and other unpaid domestic labour than men. Extra investments in family responsibilities can translate into challenges for women who need to build their professional profile through conferences and networking events outside of regular working hours. While there are some illustrative practices, such as stop-the-tenure-clock initiatives, on-site and after-hours child care, and travel funds for dependents, family-friendly policies are not enough to address this systemic challenge. Simply put, old models of career progression are insufficient for the diversified workforce of today. More flexible models of career progression are an important consideration, including part-time tenure track positions that develop into full-time permanent positions, job-splitting options for couples and others, and modified workloads to facilitate re-entry to academia.

CONCLUSION

To answer the questions posed, the Panel used the data that were available to develop a baseline of information about women researchers in Canada. Within the pages of this assessment, the Panel presents a statistical profile of the current state of women in university research careers by rank and discipline, and provides a preliminary analysis of trends through synthetic cohort studies. In order for readers to understand how women researchers in Canada fare in comparison to women in the United States, Australia, the United Kingdom, and the European Union, the results of the Panel's investigation into the status of women in international research careers are also detailed. In keeping with the life course perspective of this assessment, determinants of selection for research careers before and during

the postsecondary years are discussed; push and pull factors that are present within the university environment are evaluated; and the challenges of the paid work-family life balance for women in academia are analyzed. To provide even more comparative context, the Panel presents their findings regarding the similarities and differences between the general experience of women researchers in academia with those in government and industry.

Overall, the general trajectory of women researchers has improved during the course of the past 40 years. Nevertheless, there remain significant issues and challenges, as evidenced by the paucity of women in the highest ranks of academia as well as their low representation in PCEM fields. There are, it turns out, several trajectories of women researchers, which differ by rank, discipline, and the goals of individuals. It is clear that women are willing and capable members of the research community, and there is some evidence of willingness on the part of both the community and its institutions to evolve. However, continued institutional transformation is also important, in order to offer better support for a more diverse group of scholars and researchers, and to continue to consider new perspectives on what constitutes valuable research and knowledge. This shift is also seen in the dramatic growth of higher education research and development (HERD) expenditures, which have almost doubled (from \$5,793 million to \$11,174 million) over the past decade alone (see Figure 1.3).

Acknowledging inequity and taking proactive steps to ensure equity are two different things. In order for Canada to undertake steps to maximize its research potential, those efforts must include looking at why women continue to be underrepresented in certain fields in university faculties, and in senior administrative positions in universities. Just as there are many challenges due to the dynamic nature of the social and institutional systems that women researchers encounter throughout their life course, so there are several opportunities for progress. Government has policy, program, and funding tools; the private and non-governmental sectors have funding and workplace tools; and our training and academic institutions have policy and institutional practices that can all play a part in ensuring the greatest advantage is taken of our Canadian talent pool.

The benefits of a diverse research community extend far beyond the walls of universities. We interact with the outcomes of Canadian research projects throughout our daily life. The technology we use at home and in our offices, the schools where our children are educated and the ways in which we think about society all incorporate ideas and outcomes from our great Canadian innovators. A wider pool of researchers can translate into a wider range of excellence, with clear benefits for all Canadians.



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