Association of Canadian Early Career Health Researchers

Association de chercheurs canadiens en santé en début de carrière

Report for International Review Panel
Ottawa, ON: January 17, 2017

Available: acechr.ca/uploads/7/8/5/1/78517024/acechr_report_for_panel_2017-01-17.pdf

SUMMARY

Thank you to the members of the panel for bringing their expertise and offering their time to the review of the recent changes instituted at the Canadian Institutes of Health Research (CIHR). Our organization of Early Career Investigators (ECIs) consists of health researchers who began our careers while these changes were taking place. An ECI in Canada means a faculty member or scientist who has been in her or his first position as an independent investigator for up to five years.

The report outlines our organization's positions prior to and after the consultation between the CIHR and the research community that occurred July 13, 2016. This consultation followed many concerning reports about the quality of peer review in the first Project Grant competition.[1] Two of our three national co-chairs, Dr. Kristin Connor and Dr. Holly Witteman, attended that consultation and also served on the Peer Review Working Group led by Dr. Paul Kubes tasked with further specifying the details of how to implement the further changes agreed upon at the meeting July 13.

In this report, we:

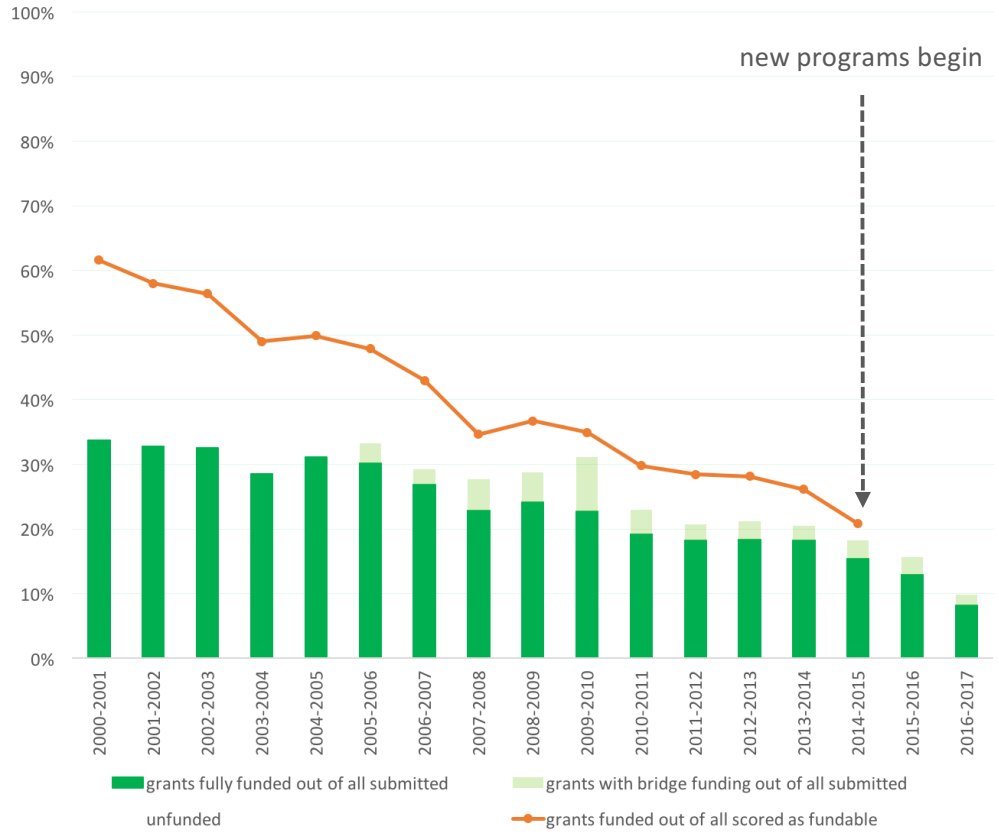
- Discuss the effects of program changes in the context of low funding
- Outline 3 key problems:
    1. Lack of equity and balance in grant allocation
    2. Reduced opportunities for early and mid-career researchers to grow their programs
    3. Failure to listen to the research community
- Make specific recommendations to address these problems**:**
    1a. Avoid bias by equalizing success rates by applicants' career stage and sex, adding other dimensions in future as appropriate.
    1b. Direct more funds to more equitable competitions. Fund a balanced portfolio rather than over-concentrating funding.
    2. Reconsider Foundation grant program and invest budgetary savings in higher success rates and more equitable funding.
    3a. Seek researchers' concerns early in the planning process, meaningfully address them, and issue detailed public documents specifying item-by-item responses and actions to each major concern raised by researchers.
    3b. Maintain trust and integrity in review by addressing stakeholders' concerns swiftly, including during a competition when urgent concerns are raised.
    3c. Transparently disclose how funding programs are designed and how funding decisions are made. Pre-register evaluation plans and provide anonymized data for external analyses.

[1] See a sample of the publicly shared reports: storify.com/hwitteman/cihr-reforms-researchers-responses

CONTEXT: A FUNDING CRISIS

Discussions about the quality of peer review are taking place in the context of declining grant success rates, reduced budgets of awarded grants, and research costs that have increased due to factors including inflation and a weak Canadian dollar. Leading up to the new programs, there were two cancelled competitions during ECIs' critical and vulnerable years as new faculty. The cancellation of the CIHR New Investigator program also removed a former source of ECI support during launch years.

Figure 1. CIHR funding success rates: Open Operating Grants Program, Foundation Grants, Project Grants[2]



All of these factors combined are contributing to laboratories closing, promising lines of research abandoned, researchers leaving academia or Canada, and promising students and trainees choosing not to pursue research.[3]

Analyses of data from the National Institutes of Health (NIH) in the United States for over one hundred thousand funded grants suggest that, if we define productivity as a function of the number of papers and citations generated by a funded project, there is no difference in productivity outcomes for grants ranked between the 3rd and 20th percentile.[4] This means that with CIHR funding rates as low

[2] Data from cihr-irsc.gc.ca/e/44063.html#fig9 (2000-2001 to 2004-2005) and cihr-irsc.gc.ca/e/49273.html#fig1 (2005-2006 to 2014-2015). We lack data on bridge funds prior to 2005, which may further lower estimates in the first 5 columns. Bridge funds in 2005-2015 added median 3% (IQR: [3%,4%], range: [2%,8%]) to CIHR's reported success rates. Projected 2016-2017 success rates reflect estimates provided by CIHR and align with the overall funding envelope.

[3] See our April 2016 survey of ECIs: acechr.ca/blog/acechr-survey-results and also a July 2016 survey across career stages: led by Dr. Liisa Galea: galealab.psych.ubc.ca/links/canadian-pi-survey/

[4] Fang et al., 2016: https://elifesciences.org/content/5/e13323

as they are, there is likely no detectable difference in productivity for grants judged by reviewers as being in the 8th vs. 12th percentile. In other words, it may be impossible to have peer review of sufficiently high quality that it can meaningfully distinguish between excellent proposals.

Therefore, although the focus of this panel concerns the peer review process, we urge the panel to ensure that their recommendations place peer review issues in appropriate context. It will be difficult to address current problems without changes to the overall funding landscape and how funds are allocated across CIHR's funding mechanisms.

ISSUE 1: New funding programs introduced or intensified inequities and imbalances

New programs show clear imbalances, disadvantaging applicants who are (a) earlier in their careers or (b) female.[5] Previous open funding CIHR programs were equitable or close to equitable on these metrics. Equity and balance are vital for meeting the CIHR Act for ensuring that the health research enterprise is sustainable and that the best research is funded rather than having funding decisions distorted by common biases.

Table 1 shows full funding success rates by career stage in the new CIHR programs. ECIs and mid-career investigators (MCIs) are experiencing substantially lower success rates compared to senior career investigators (SCIs). This is a drastic departure from the former relatively equitable success rates within the Open Operating Grants Program, and is compounding the effects of low funding rates for researchers who are earlier in their careers.

Table 1. Funding success rates (full funding) by career stage in new CIHR programs

	ECI	MCI & SCI*	MCI	SCI
Foundation Competition 1	4%		9%	25%
Foundation Competition 2	12%	13%	--	--
Project Competition 1 before $30M	7%	--	12%	16%
Project Competition 1 after $30M**	11%	--	12%	16%

*Split between MCI and SCI not published for Foundation Scheme 2. Foundation Scheme 1 and 2 had a managed intake for MCI and SCI whereas all ECIs were eligible to apply.
**An additional $30M was allocated by the federal government and directed largely to fund grants submitted by ECIs.

The National Institutes of Health (NIH) in the United States has, over time, instituted informal and then formal payline adjustments for ECIs to assist with unacceptably low funding rates for ECIs. This adjustment was implemented as a 15% success rate for early career investigators was deemed "dismal".[6] Paylines are the percentile within a competition below which NIH applications are largely funded. The actual paylines vary from institute to institute, but for example, the National Heart, Lung, and Blood Institute's published payline for R01s is 14 (14th percentile) whereas for early stage investigators it is 24 (24th percentile).[7] Other institutes have similar adjustments. The overall effect of

[5] CIHR currently collects applicants' sex (not gender) and career stage. Other applicant characteristics relevant to the Canadian research landscape (e.g., Indigeneity, race, ethnicity, disability) are not routinely collected so we do not know the extent to which other disadvantages exist. Other such potential disadvantages should also be investigated and addressed as necessary.
[6] Editorial: nature.com/neuro/journal/v12/n11/full/nn1109-1351.html
[7] See website: nhlbi.nih.gov/research/funding/general/current-operating-guidelines

this program has been positive for ECIs but negative for MCIs, suggesting that other agencies seeking to learn from the NIH experience should focus on sustainable funding across career stages.

In addition to inequities relevant to career stage, female Foundation grant applicants have received fewer, smaller grants compared to male applicants. Table 2 presents an overall picture of funding success in the CIHR reforms by applicant sex. Note that in the second Foundation Scheme, the difference was largely driven by differences in MCI and SCI applicants. Female MCI and SCI applicants had a success rate of 8% compared to 16% for MCI and SCI male applicants. This is also a departure from previous programs, in which there were far less dramatic disparities.[8]

Table 2. Funding success rates by applicant's sex in new CIHR programs

	Overall success rate	
	Male applicants	Female applicants
Foundation Scheme 1	13%	8%
Foundation Scheme 2	14%	10%
Project Scheme 1	13%	12%

Recommendations:

1a. **Ensure equity**. Reduce the influence of bias on funding results by ensuring that success rates are equalized by the dimensions currently collected (career stage and sex of applicant) along with other dimensions in future as appropriate.

1b. **Balance funding for equity and sustainability**. More equitable programs should receive a greater proportion of funds. In the current circumstances, this would mean allocating more funds to the Project grant program and less funds to Foundation grant program. Analyses of data from the NIH National Institute for General Medical Sciences (NIGMS) suggest that, at least for the type of research funded by NIGMS, productivity in the form of publications and citations is maximized when funding more, smaller laboratories rather than fewer, larger laboratories.[9] Investing in a broad, balanced portfolio of research helps ensure that the Canadian health research enterprise is sustainable and able to serve the needs of Canadians in the long term, thus complying with the CIHR Act.

ISSUE 2: New funding programs do not allow ECIs & MCIs to grow their research programs

The Foundation grant program was designed to consume 45% of CIHR's open funding budget. Although the Foundation grant program reserves 15% of grants (though not 15% of funds[10]) for ECI applicants, its results demonstrate clear bias towards SCIs. These large, long-term investments are paid for by reducing success rates and applying large across-the-board cuts in the Project grant program, where most ECI and MCI researchers must compete for funding. As such, the current Foundation grant program is a central source of career stage inequality in the CIHR funding landscape.

[8] Tamblyn et al., 2016: cmajopen.ca/content/4/2/E213.full & letter: cmajopen.ca/content/4/2/E213.full/reply#cmajo_el_1600
[9] See: nexus.od.nih.gov/all/2015/11/06/lab-size-and-strategic-support-of-science-thoughts-on-finding-the-right-mix/
[10] See our open letter: acechr.ca/blog/open-letter-a-crisis-for-new-investigators-in-health-and-biomedical-research

Recommendation:

2. **Reconsider the Foundation grant program**. The ACECHR has previously articulated our position[11] that, if it is to continue, the Foundation grant program would better serve the stated purpose of the overall CIHR program changes if it were simply a grant consolidation mechanism. Upon award of a second or third open grant, Principal Investigators would be automatically offered the opportunity to consolidate their grants, trading off a proportion of funds (for example, 10%) in return for some additional funding stability. Researchers who wish to further grow their programs can choose to compete for funding via the Project grant program. Any savings should be redirected to the Project grant program to help support higher and more equitable success rates.

ISSUE 3: CIHR leadership failed to listen to the research community

Members of the research community predicted the problems that occurred in the new funding programs.[12] Because CIHR ignored these stakeholder concerns, researchers understandably expressed additional frustration when the predicted problems occurred.

Recommendations:

3a. **Meaningful stakeholder engagement**. Programmatic changes must be made with meaningful stakeholder engagement. Members of the research community are key stakeholders. Research on other forms of stakeholder engagement (e.g., patient engagement) suggests certain principles. First, stakeholders' concerns must be sought early in the planning process. Second, stakeholders' concerns and suggestions must be meaningfully addressed. We recommend that—at least until a certain level of trust is rebuilt between the CIHR and the research community—the CIHR issue public documents specifying their item-by-item responses and actions to researcher concerns.

3b. **Swift corrections**. To meaningfully address stakeholders' concerns in 3a, as procedures continue to be iteratively refined, it is critical that CIHR swiftly address the concerns of Chairs, reviewers, applicants, and other stakeholders. Within a competition, stakeholders must be able to identify urgent problems in the review process and have their concerns addressed to maintain integrity and trust in the review. This includes, for example, supporting Chairs' roles in ensuring that all applications receive expert review. Ensuring expert review was one of our organization's key recommendations for improving the peer review process.[13] We are concerned that this goal continues to be under threat.

3c. **Transparency**. There must be public transparency around how funding programs are designed and how funding decisions are made, including any mathematical formulae used. Program evaluations must be pre-registered and complete evaluations must be issued. CIHR must provide public, anonymized, queryable datasets on grant funding competitions that allow the scientific community, policymakers, researchers, or members of the public to conduct independent analyses of how public funds are being awarded. Currently, grant-level data is incomplete, inconsistently formatted, and not amenable to data mining or analysis.

[11] See our brief prepared for July 13, 2016: acechr.ca/uploads/7/8/5/1/78517024/eci_report_cihrsummit_2016-07-12.pdf
[12] For example, see letters: csmb-scbm.ca/advocacy/SciCommResponds%20CIHR'sProposedReforms.aspx
[13] See our brief prepared for July 13, 2016: acechr.ca/uploads/7/8/5/1/78517024/eci_report_cihrsummit_2016-07-12.pdf

APPENDICES

1. ACECHR. A crisis for new investigators in health and biomedical research. Open letter, April 2016. (Available: acechr.ca/blog/open-letter-a-crisis-for-new-investigators-in-health-and-biomedical-research)

2. ACECHR. Early Career Investigators (ECIs) in health research: final report of a cross-Canada survey. April 2016. (Available: acechr.ca/blog/acechr-survey-results)

3. ACECHR. Report for CIHR Summit. July 2016. (Available: acechr.ca/uploads/7/8/5/1/78517024/eci_report_cihrsummit_2016-07-12.pdf)

4. ACECHR. Statement on the CIHR Peer Review Working Group final recommendations. September 2016. (Available: acechr.ca/blog/acechr-statement-on-the-cihr-peer-review-working-group-final-recommendations)

5. ACECHR. Equity Primer. September 2016. (Available: http://www.acechr.ca/uploads/7/8/5/1/78517024/acechr_equityprimer.pdf)