

8th Canadian Science Policy Conference
November 8-10, 2016

CSPC 2016

2nd Annual Science Policy Award of Excellence -
Youth Category





2nd Annual Science Policy Award of Excellence - Youth Category

CSPC is proud to present its 2nd Annual Science Policy Awards of Excellence—Youth Category which follows in the spirit of our 2013 Young Generation Award.

This award recognizes a young individual (student, postdoctoral fellow, researcher, entrepreneur, etc.) under the age of 35 who developed an innovative and compelling evidence-based policy that will make a positive difference to Canadians. Proposals were to be connected to one or more of the themes for the 2016 CSPC Conference. This award is designed not only to highlight innovative, evidence-driven policy ideas, but also to encourage innovative young people who may not currently be studying, or working on, public policy to develop and share their policy ideas.

The Selection Committee was so impressed by the quality of the submissions and the dedication of the applicants that they wanted to share these innovative evidence-based policy proposals with the CSPC community.

Please join us in congratulating our 2016 winner Amani Saini for her proposal “Using Genetic Tests to Stop Adverse Drug Reactions” and our runners-up, Richard Gooding-Townsend and Jessica Ross.



Amani Saini

2016 CSPC Award Selection Committee



We are honoured to have **The Honourable Kirsty Duncan**, Minister of Science with us to present the 2016 CSPC Science Policy Award of Excellence—Youth Category over the lunch hour on Thursday, November 10, 2016.



Dr. Ted Hsu
Former Member of Parliament and Critic for Science & Technology Policy



Melanie Cullins
Director, International Relations, National Research Council



Paul Dufour
Principal, PaucityWorks and Adjunct Professor, University of Ottawa



Sandra Noël
Chair, CSPC Science Policy Award Selection Committee

<http://sciencepolicy.ca/cspc-2016-science-policy-excellence-award-youth>

WINNER - AMANI SAINI

Using Genetic Tests to Prevent Adverse Drug Reactions

@amani_saini



Theme 1:
A New Culture of Policy Making and Evidence-Based Decision-Making: Horizons and Challenges

Theme 2:
A New Innovation Agenda for Canada What are we building?

Theme 4:
Canada's Return to the International Stage: How Can Science Help Foreign Policy?



BIOGRAPHY

Amani Saini holds a Master of Public Administration degree from Dalhousie University and bachelor's degree in Political Science from the University of British Columbia (UBC). Science was never her forte and she tried her best to avoid science classes, but the near death of her sister forced her to start searching for solutions to prevent adverse drug reactions. After she came across an article about genomics, a topic she knew absolutely nothing about before, she contacted scientists in Canada and worldwide to learn more about the discipline and DNA sequencing. She took her findings to scientists and pharmacists at UBC and found that there is a solution to adverse drug reactions that could be potentially feasible in Canada, which she has been advocating for since.

INSPIRATION

"A few years ago, while studying for her mid-terms, my then 19-year-old sister took an Advil Cold and Sinus pill which was given to her by a doctor at UBC Student Health Services for her common cold and had an allergic reaction. She was diagnosed with toxic epidermal necrolysis, a life-threatening condition and spent about three weeks at Vancouver General Hospital fighting for her life in the intensive care unit. We were told that there was no possible way she would make it, but miraculously she did! Afterwards I learned that adverse drug reactions are common and thousands of Canadians have died from them and I thus started searching for solutions to prevent them from happening. Through my research I learned about genomics and personalized/precision medicine. I hope one day no Canadian will have to suffer from an adverse drug reaction. This proposal is what I envision for the country."

OPPORTUNITY FOR ACTION

An adverse drug reaction (ADR) is a noxious unintended consequence of taking a normal dosage of a drug,¹ usually prescribed to an individual by a medical professional, that was properly administered and which was supposed to be beneficial for the patient towards curing a disease or sickness. A sick patient, anyone ranging from a child with the common cold visiting their pediatrician to an adult patient with a severe form of cancer in the intensive care unit, may be given a medication to take which they nor the administrator of the medication is aware that they are allergic to and their body will respond negatively to that drug. A 2013 Canadian Institute of Health Information report stated that between 2010 and 2011 more than 27,000 Canadians aged 65 and older suffered from an ADR.²

Using Genetic Tests to Prevent Adverse Drug Reactions

The consequences of an ADR may include damage to the proper functioning of a patient's body internally and/or externally, prolonged hospitalization, significant disability/incapacity, life-threatening injuries, congenital anomaly and even death.³

Costs associated with ADRs significantly add to health care expenditures in an era where health care spending already eats up roughly 50% of the annual budget in some provinces. In a 2011 study which examined 1,000 patients admitted to the emergency department at Vancouver General Hospital, 122 or 12.2% were in the department due to an adverse drug event. Of these patients, 48 were present because of an ADR (one type of adverse drug event defined as an unintended response that occurred despite use of an appropriate drug dosage). After adjustment, patients with adverse drug events had a higher risk of spending additional days in the hospital per month (6.3% versus 3.4%) and higher rate of outpatient health care encounters (1.73 versus 1.22), and the adjusted median monthly cost of care was 1.90 times higher (Can \$325 versus \$96).⁴ It was estimated that the added cost could be as much as \$49 million annually.⁵ These financial costs are in addition to the physical and psychological costs endured by ADR patients. Furthermore, the number of deaths resulting from ADRs is staggering. In Canada, they cause 10,000 to 22,000 deaths and cost the Canadian healthcare system over \$13 billion per year.⁶ In the United States, another developed country, 26,500 children die from ADRs each year.⁷

Until just recently, there was little, if not anything, that could be set in place to prevent ADRs and thus Canadian governments have not taken direct action on preventing ADRs. However, recent scientific advancements in the past decade have produced concrete evidence to demonstrate that ADRs can be prevented by making use of genomics.

Every individual is made up of various genes, which are inherited from their parents and determine the traits they will develop, from whether they will have curly or straight hair, to how they will respond to certain medications. When some genetic variants in a cluster of immunity genes combine with certain medications, they can produce a negative reaction, an ADR.⁸ Scientists in several jurisdictions, including Asia, Europe and the USA have identified destructive drug-gene combinations.⁹

Today, technology has developed to the point that a simple test can be conducted which extracts DNA and sequences it to determine which genes and which gene variants an individual possesses. Here at home, in British Columbia, researchers are looking to introduce a genetic test to guide prescription practices by family doctors for patients who are over 65.¹⁰ This research is being funded through the National Research Council and Genome BC, both of which are government organizations.¹¹

PROPOSED ACTION

The identification of harmful drug-gene combinations means that some ADRs can be entirely prevented. For example, it was discovered that the gene variant HLA-B*15:02 combined with the drug carbamazepine resulted in the allergic reaction toxic epidermal necrolysis (TEN) and Steven Johnson's Syndrome (SJS), the less severe form of TEN.¹² When Taiwan identified patients carrying the HLA-B*15:02 gene and had them avoid carbamazepine, it saw a significant reduction in SJS-TEN, preventing an estimated ten cases of these potentially life-threatening diseases.¹³

Using Genetic Tests to Prevent Adverse Drug Reactions

In 2010, Taiwan, realizing the benefits associated with conducting genetic tests versus the costs of caring for SJS-TEN patients, began covering the cost of genetic tests as part of their national health insurance.¹⁴ This action towards preventing ADRs can be taken towards high frequencies of ADR related genes in Canada and/or all drug-gene combinations that have thus far been successfully identified.

Canadians should be tested to determine which gene variants they carry and if they carry a variant that could result in a negative reaction to a drug, then that trigger drug should be withheld. Thousands of lives could be saved and savings would be in the billions for Canada. Governments could give their citizens the option of having a genetic test; through the same manner in which patients receive blood tests today in each respective province. It will not be feasible to have 35 million Canadians tested at once and as health care is provincial jurisdiction, each province will differ in its approach and in prioritizing segments of their population. We must start somewhere and there are various population starting points jurisdictions could take:

OPTION 1: Patients. As a patient is prescribed a new drug by a family doctor or anywhere in the health care system which they have never taken before, they should be given the option of taking a genetic test to determine which gene variants they carry and this knowledge should be used to guide the prescription of drugs.

OPTION 2: Children born into a Canadian hospital. Parents should be asked if they would like to have their newborn tested and told about the consequences of ADRs. This would be a favourable stream to target as the child is already present in a health care facility, so this would reduce the future cost associated with visiting a family doctor and laboratory appointment. This would make the individual (and guardian) responsible for their own health and measures can be taken to ensure that they never suffer from an ADR from the time of birth to death.

The governments of the U.S. and the U.K. have already shown incredible support for the increased use of genomics to guide health decisions. In 2015, President Obama announced \$215 million to fund the creation of a national research program to sequence DNA to identify the genetic drivers of diseases.¹⁵ In order to continue to be a world leader in health and technology, the Canadian government should take on a similar national approach. Provincial jurisdiction over health makes it acceptable for provinces to act solely on health related initiatives. However, to effectively identify harmful drug-gene combinations, provinces need to work together to pool together their genetic information to explore correlations. Therefore, leadership from the federal government which fosters collaboration and brings together provinces and necessary partners would be conducive to detecting harmful drug-gene combinations.

Additionally, the federal government should reach out to international colleagues engaged in this pursuit. To identify the genetic variants for rare diseases, a larger sample size is required and therefore one country or even continent cannot combat rare diseases on its own and global cooperation is mandatory.

Using Genetic Tests to Prevent Adverse Drug Reactions

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RUNNER-UP - ROBERT GOODING-TOWNSEND

Using a Modified Lottery to Select Among Meritorious Grant Applications

@rjgoodin



Theme 5:

Science Funding Review: New Visions and New Directions



BIOGRAPHY

Robert Gooding-Townsend is a graduate student in mathematical biology at the University of Waterloo, where he studies large-scale forest dynamics and the sociology of science. His interdisciplinary background includes bioengineering, museum exhibit design, and science comedy – including a performance at CSPC 2015.

INSPIRATION

“The federal science funding review and recent CIHR controversy prompted me to consider the problem of science funding. In addition to being a defining issue for Canada’s science community and associated parties, this ties into my interests in game theory and philosophy of science. These were supplemented by my experience in science comedy, which taught me to find value in even the most absurd ideas. A survey of the relevant literature showed that incorporating random chance, while certainly an unconventional move, may have a number of advantages.”

OPPORTUNITY FOR ACTION

Canada’s fundamental science review is timely. Not only is the current system due for review on account of a changing research ecosystem, but there have been several criticisms of its effectiveness. Most recently, these include the widespread condemnation of changes in CIHR’s peer review¹ and findings of bias against small universities in NSERC’s Discovery Grant program.² These compound previous criticisms of the inefficiency of the labour cost of the review process,³ longstanding concerns that Canada’s research culture is overly conservative,^{4,5} and a perception among some researchers that grant success is arbitrary and/or subject to reviewer bias,⁶ which has been borne out by empirical investigation.⁷

These issues are not surprising; it is very difficult to predict scientific success on the basis of grant applications. A study of peer review in the US National Institute of Health found that beyond the top 3% of ranked proposals, the rankings have no ability to predict productivity or citations.⁸ Further, psychologists studying expertise have shown that expert intuition is most unreliable when (i) there is a long time span between decisions and their effects (ii) there are few opportunities to practice and (iii) the environment is in flux.⁹ All of these conditions apply to research grant review. Because of the unpredictability of research, this is analogous to investing in an unknown market; economic models have shown that a random investment strategy is the most robust one under such conditions.¹⁰

ROBERT GOODING-TOWNSEND

Using a Modified Lottery to Select Among Meritorious Grant Applications

In light of these considerations, Farric and Casadevall suggest a modified lottery system, which first uses peer review to determine meritorious applications, and then selects randomly from among these.¹¹ Advantages include: retaining the benefits of peer review without the difficulties of stratifying the entire spectrum of applications; transparency and reduction in bias, since lotteries are already an accepted means to allocate scarce resources; administrative savings of money and labour, allowing researchers to spend more time doing science; equal opportunity for novel research avenues; greater predictability of research funds at an institutional scale; and more visibility for deserving but unfunded projects.

In spite of these criticisms, Canada's current grant system is not dire. The bin system used for NSERC Discovery grants is predictive of success, at least in the aggregate statistics reported by the 2014 International Review.¹² Furthermore, much of the effort in the Discovery program is spent assigning funding levels to meritorious proposals, rather than selection; this is much less amenable to a lottery system. In the following section, I will elaborate on how it might be appropriate to implement a modified lottery in Canada, as well as the agencies involved.

PROPOSED ACTION

Although a modified lottery system could be considered for any or all of the Tri-Agency funding councils, two areas in particular are good candidates for these changes: biomedical research and early-stage researchers. Biomedical research is suitable because: (i) the 2014 NSERC International review found higher performance, at statistically significant levels, in unfunded biomedical proposals as compared to funded ones,¹³ suggesting prediction is particularly difficult in this area; (ii) previous results about the poor reliability of peer review rankings were also in biomedical research,¹⁴ further confirming this suspicion; (iii) there may be significant overlap with CIHR, which is also currently overhauling its peer review system; (iv) CIHR's payline of 10-15%¹⁵ is close to the NIH's funding level.¹⁶ Early-stage researchers may be suitable because: (i) the lack of prior track record makes it difficult to assess potential; (ii) these researchers have been found to have difficulties with the current system;¹⁷ (iii) this would follow the successful international example of New Zealand's Explorer Grants.¹⁸

In any case, the steps would be as follows:¹⁹

- STEP 1:** Reduce the length of the application, so as to save on preparation time. Instruct researchers to submit applications which include only the crucial information²⁰ needed to assess applications as Meritorious or Not Meritorious.
- a) Optionally, introduce another ranking of Exceptionally Meritorious proposals, corresponding to NSERC Discovery bins A-C or the top 3% of applicants. These proposals would bypass the lottery and receive automatic funding.

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STEP 2: Rank all funding applications according to these categories, following a simplified version of the current peer review system.

- a) Reject all applications deemed Not Meritorious. Return reviewers' comments so applicants can improve their proposals for subsequent rounds.
- b) Enter all applications deemed Meritorious into the pool for a random draw.

STEP 3: Draw as many proposals as can be funded from the pool of Meritorious proposals.

- a) Retain all unselected proposals for subsequent draws, up to some designated expiration date.

STEP 4: Repeat the process in the next funding cycle.

One issue with this system is it does not address the allocation of funding levels. The simplest solution is to implement it for grants with a fixed payout, as in New Zealand's Explorer Grants.²¹ Failing this, funding levels should be allocated in a manner that achieves the transparency of a lottery.

The most pertinent agencies to the implementation of a lottery system would be the Fundamental Science Review Panel, together with the overall Tri-Agency and the three individual bodies of CIHR, NSERC, and SSHRC. However, any change of this magnitude would require broad consent from the affected research communities in addition to policy makers. This would take significant outreach, clear messaging, and time; fortunately, the broad mandate of the panel²² provides an opportunity. The need for consultation also implies such a proposal should be brought to CSPC 2016.

Ultimately, randomness in funding decisions may be harder to swallow for policy-makers than for researchers. After all, researchers already live by the aphorism "if we knew what we were doing, it wouldn't be called research."²³

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Using a Modified Lottery to Select Among Meritorious Grant Applications

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RUNNER-UP - JESSICA ROSS

Rethinking Phosphorus: Contaminant or Commodity? Securing Food for Our Future

Theme 3:

Clean Energy and Climate Change as Global Priorities: Implications for Canada?



BIOGRAPHY

Jessica Ross studied Chemistry at Simon Fraser University from 2001-2003 before joining the military. She then earned her Bachelor's Degree in Chemical Engineering from the Royal Military College of Canada in 2007, and was subsequently trained as a Royal Canadian Electrical and Mechanical Engineering Officer. She was employed in various leadership and technical roles at 2 Service Battalion and the 1st Battalion of the Royal Canadian Regiment in Petawawa between 2008-2014. In addition to several training exercises and courses during this period, she completed a 6-month operational deployment in support of Operation IMPACT from 2014-2015. She was selected to return to school in September 2015 to further her Chemical Engineering education, and recently transferred from the M.Eng to the M.A.Sc program at the University of Ottawa, with a specialization in Science, Society and Policy. Jessica is married and has two children. Her hobbies involve her family, camping, skiing, and Star Trek.

INSPIRATION

"I came upon this topic through a chance encounter, when Dr. Sidney Omelon (University of Ottawa) invited me to work on a short crystallization project. Specifically, I investigated how to recycle phosphorus from municipal wastewater streams in a form that would be suitable for agriculture use.

Over the course of my readings and experiments, I learned that Canada is one of the largest importers of phosphorus for fertilizer production. The resource required for phosphorus fertilizer production is in a specific form known as phosphate rock.¹ It is not well-known that there is a finite global phosphate rock reserve.² My fascination grew at the mismatch between the information available in scientific journals, and the popular awareness of the topic. This compelled me to enroll in a specialization in Science, Society and Policy. As a student of this program, I will study the geopolitical forces that bring such topics into the public consciousness. Understanding what tools and actions are available and required to allow a country to take action before a forecasted problem becomes a crisis may help to shape a strategy to inform Canadians about the upcoming global phosphate rock limitation that will ultimately impact their food availability and cost. "

Rethinking Phosphorus: Contaminant or Commodity? Securing Food for Our Future

OPPORTUNITY FOR ACTION

Phosphorus is essential to life as we know it on Earth; it is present in or added to soil as a fertilizer, absorbed from the soil by plants, and ingested by humans and animals from crops. Unfortunately, it is also known to be harmful to waterways when present in high concentrations, causing blooms of algae which destroy fish and plant life. Significant progress has been made over the last 30 years to reduce the phosphorus load in waterways, and these efforts continue today.³

Less well known, however, is that as a non-renewable resource and non-replaceable element, there is a finite amount of useful phosphorus – commonly called phosphate rock - available for fertilizer production. By some estimates, there remains as little as 100 years' worth of phosphate rock reserves.⁴ The much-disputed territory of Western Sahara (controlled by Morocco) holds approximately two thirds of the world's reserve,⁵ and Canada is the single largest importer of phosphate rock from this area.⁶ Canada has no viable phosphate rock mines or reserves, and thus is completely reliant on Morocco for this resource.⁷ The political climate in Western Sahara is delicate, and with very few other producers of phosphate rock exporting their goods, Canada is in a difficult moral position.^{8,9} Phosphate rock is, in fact, a very precious commodity.

The European Union and Australia have made positive advances with respect to identifying the need to recycle phosphorus. They continue to improve their understanding of their respective phosphorus cycles, and enable the multidisciplinary research required to improve identify possible solutions.^{10,11,12,13}

Canada is falling behind other countries' advances in phosphorus recycling technologies, as we are still largely of the "phosphorus as contaminant" mindset. We need to evolve in order to mobilize the academic and industrial resources required to harness our own phosphorus cycles, improve the security of our phosphorous fertilizer, and therefore our food security.

PROPOSED ACTION

A national strategy is required in order to foster cooperation between academic institutions, as well as industry. Phosphorus recycling solutions must be economically viable and energy efficient. The expertise of civil engineers, chemical engineers, and geochemists, to name just a few disciplines, is required to fully understand the flow of phosphorus within Canada's agriculture and municipal systems.

This strategy must speak to all levels of government. Wastewater treatment occurs at the municipal level, while agricultural and environmental concerns affect both provincial and federal levels. Environment and Climate Change Canada (ECCC) regulations speak to phosphorus levels permitted in waterways, yet do not recommend guidelines for how the captured phosphorus should be recycled or disposed of, and does not consider approaches that could support agricultural needs.

JESSICA ROSS

Rethinking Phosphorus: Contaminant or Commodity? Securing Food for Our Future

This problem is unique in that the technical solution will differ from region to region, depending on local farming and industry practices, as well as municipal waste treatment procedures. For instance, wastewater from sewage is known to be rich in phosphorus, and every municipality has a treatment plant and/or plan in order to reduce the phosphorus load in the treated water that returns to their local environment. However, chemical properties of the wastewater stream can differ significantly between municipalities, due to local water conditions, nearby industry, freeze / thaw cycles, and the chemicals used to treat their municipal wastewater. This means that the protocol used to capture phosphorus in one municipality may not be effective at another. A strong network to share information and expertise is thus needed to help account for all of these variables.

We cannot wait until the demand for phosphate rock increases to the point that recycling it into agricultural fertilizer becomes a desperate option. Canada has time to connect technical and academic experts under a national strategy in order to research and implement technology in a deliberate manner. There's no time like the present to take action to avoid the undesirable effects of the impending phosphate rock shortage.

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HONoured PARTICIPANT - CERINA LEE

“Clearing the Air” on Hookah Use in Canada’s Youth Population

Theme 1:

A New Culture of Policy Making and Evidence-Based Decision-Making: Horizons and Challenges



BIOGRAPHY

Cerina Lee is a graduating Master of Public Health (MPH) student, specializing in Health Promotion in the School of Public Health at the University of Alberta (convocation in November 2016). In October, she wrote the Certification in Public Health (CPH) exam to become a licensed Public Health Practitioner. Health policy field work and research have been a personal passion and have played a critical role in her growth as a future Public Health practitioner. With a background in nutrition and education, she has been interested on projects that focus on interventions specific to decreasing barriers in the physical and social environment, especially for vulnerable populations. In 2016 she was the Public Policy Intern for the Canadian Cancer Society AB/NWT, working on an advocacy plan for the full proclamation of the ban of waterpipe/hookah usage in Alberta, decreasing access from the youth population and decreasing risk of future chronic disease.

INSPIRATION

“I have always been inspired by health leaders dedicated towards health advocacy and chronic disease prevention. During my 4-month Public Health internship with the Canadian Cancer Society AB/NWT Division as a Public Policy Intern, I was inspired by my two preceptors, the Senior Public Policy Advisor and Action on Smoking & Health - Executive Director, who both exemplified the significant impact that a healthy public policy can have on the population. Specifically, their work on tobacco reduction policies across Canada was the drive for me to pursue an evidence-informed advocacy project that would make tobacco reduction a Canadian Government priority for all policy makers. In particular, I became passionate about the current rise of hookah smoking and how its unregulation has affected current smoking rates in the Province. Analysis of hookah reduction policy has inspired me to study policy and how it can create healthy setting changes on a population level.”

OPPORTUNITY FOR ACTION

Tobacco control in Canada is on the brink of rapid change.¹ The use of tobacco products is the leading preventable cause of disease and death in Alberta and Canada.² While overall smoking rates have been declining in recent years, tobacco use among Alberta youth remains unacceptably high. Despite significant gains in reducing tobacco use in Alberta with the renewed tobacco reduction strategy in 2012, waterpipe/hookah use remains unregulated in Alberta.

“Clearing the Air” on Hookah Use in Canada’s Youth Population

The “waterpipe,” also commonly known as “hookah” (India), “narghile” (East Mediterranean countries), or “kalian,” typically includes a head piece (with holes in the bottom) where the tobacco is placed, a body, water bowl/vase, one hose or multiple hoses, and a mouthpiece.³

Known as the youth-focused global epidemic, the issue of waterpipe use has become a growing public health concern across Canada, as the National Youth Smoking Survey revealed that more than 78,200 Canadian youth are current waterpipe users and 7100 Alberta youth tobacco users in Grades 6 to 12 are using flavoured shisha tobacco.^{4,5} In Canada, only four Eastern provinces (Quebec, Nova Scotia, New Brunswick and Prince Edward Island) and only a few municipal bylaws in Alberta and British Columbia have fully passed smoke-free legislation that includes the smoking of tobacco-like products.⁶ Alberta is, unfortunately, still in the midst of setting a date for the full proclamation of the ban of waterpipes. This means that the vast majority of Canada’s youth are able to freely access waterpipes.⁷

The majority of waterpipe tobacco are also flavoured, which has enticed the youth population to experiment with hookah. The Canadian Student Tobacco and Addiction Survey revealed that the use of flavoured waterpipe tobacco among Alberta youth presently exceeds the use of flavoured smokeless tobacco.⁸ Evidence indicates that the burning of hookah in public establishments produces carcinogenic chemicals caused by both first- and second-hand smoke.^{9,10} In fact, in comparison to cigarette smoking, waterpipe smoke contains 36 times the amount of nicotine and higher concentrations of heavy metals due to the higher number of puffs and volume intake.¹¹ Waterpipe smoking is also associated with preventable diseases such as lung cancer, coronary heart disease, and other respiratory diseases.¹² Furthermore, air quality in waterpipe venues have been noted to have very high toxicant levels and exposures.¹³ The increasing popularity of hookah lounges are associated with increased waterpipe smoking rates amongst Canada’s youth population and, in turn, re-normalizing the culture of tobacco smoking and placing more youth at high risk of tobacco-related diseases.^{14,15,16}

This issue is a politically sensitive matter that impacts numerous stakeholders including healthcare professionals, public health practitioners, politicians, policy makers, waterpipe establishments, hookah tobacco retailers, ethno-cultural groups related to traditional waterpipe use, the tobacco industry and the public (youth, workers, general population).¹⁷ The politically sensitive nature of the waterpipe smoking is primarily due to the actions of the opposing stakeholders - the tobacco industry, whose interference and lobbying is the main reason for hookah’s unregulation. Although the harmful health effects of waterpipe smoking has been well documented and agreed amongst numerous supporting health organizations, the tobacco industry has continued to debate that waterpipe smoking is a “cultural right,” emphasizing its usage by certain cultural Middle Eastern groups as the dominant users.¹⁸

Furthermore, waterpipe/hookah bar retailers have argued a “human rights challenge” in relation to its usage on cultural grounds – that proclaiming the ban will be a violation of the Charter of Rights and Freedoms. Currently, there is a demand for resolution on this issue across, not only Canada but North America, as the popularity of waterpipes and flavored tobacco among youth, clearly indicates it must become a public health priority.^{19,20}

“Clearing the Air” on Hookah Use in Canada’s Youth Population

PROPOSED ACTION

Regulation and policy have been chosen as important levers to use to change the behavior and culture of waterpipe smoking as there is substantial evidence that states that public health policy can significantly improve public health.^{21,22} From the evidence, the proposed action would be the formulation of a comprehensive healthy public policy surrounding waterpipe use to facilitate or drive behavior change (decrease youth use of flavoured waterpipe and waterpipe tobacco rates) that will lead to improved health outcomes.²³ By prioritizing health on Canada’s political agenda, policy makers across Canada need to protect the health of the youth population in terms of their access to flavored waterpipe tobacco and exposure to waterpipe smoke in public establishments.²⁴ Specifically, regulations that ban waterpipe use in public establishments and workplaces will immediately decrease access to waterpipe tobacco among the youth population as this measure will be prohibit youth from accessing waterpipe establishments. This regulation will also prevent exposure to second-hand waterpipe smoke in these establishments leading to improved health outcomes due to a reduction in exposures to toxic levels of second-hand smoke.²⁵ These, alongside public health education interventions aimed at educating youth on waterpipe smoking and appropriate knowledge translation on waterpipe health effects to the general public, will address misconceptions brought on by the tobacco industry’s marketing.

Canada’s most comprehensive smoke-free bylaws are ones that fully include waterpipe smoking. At the national level, the current enforcement of smoke-free public places and workplaces have become challenging as the majority of legislation is specifically geared towards tobacco smoking.²⁶ Thus, it is imperative that the Supreme Court of Canada ruling and Health Canada’s definition of “tobacco-like products” is clearly aligned and defined through evidence-based research by stating its health effects, addressing any misconceptions about its use, and its negative influence on re-normalization of tobacco smoking.²⁷ As research surrounding waterpipe use is very recent (2010-2015), it is imperative for the Public Health Agency of Canada to support research facilities and organizations including University of Alberta, University of Waterloo, PROPEL Centre for Population Health Impact and Ontario Tobacco Research Unit continue their research on waterpipe smoking in Canadian youth, and continue their collaboration with government officials and stakeholders to align research with policy.²⁸

Youth deserve first class protection from the harms of tobacco.^{29,30} At a provincial and municipal level, as mentioned, waterpipe smoking is unregulated in the majority of Provinces in Canada. The proposed action would be to understand and evaluate the successes of the 4 Provinces on how they have regulated waterpipe use through policy change.³¹ From there, Provinces should be encouraged to make the appropriate amendments to pre-existing legislation that include the ban on waterpipe smoking in indoor and public workplaces.

“Clearing the Air” on Hookah Use in Canada’s Youth Population

In Alberta, the proposed action steps have been spear-headed by recommendations formulated by Alberta’s key health organizations (Canadian Cancer Society, Action on Smoking & Health, etc.) in urging the Notley Government to fully proclaim and implement the Tobacco and Smoking Reduction Act (in the next year 2016-2017) to include:

I. **Ban on flavoured waterpipe tobacco:** the Alberta Government should fully implement the flavoured tobacco ban by removing the exemption on flavoured waterpipe tobacco and prohibit the sale of flavoured tobacco, which is being currently used by thousands of youth.³²

II. **Ban on waterpipe use in public establishments and workplaces:** the Alberta Government should proclaim the provisions that ban waterpipe use in public establishments and protect Albertans from exposure to secondhand smoke from waterpipe smoking.³³

Using the Creating Tobacco-free Futures 2012-2022, as an example of a tobacco reduction model, provincial legislation banning waterpipe and flavored tobacco will prospectively provide a cascade effect for the rest of Canada’s Provinces in tobacco reduction and protection of its youth population.³⁴

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“Clearing the Air” on Hookah Use in Canada’s Youth Population

Hookah Use: Alberta CAMPAIGN FOR A SMOKE-FREE ALBERTA

What is "hookah"?

Many waterpipe users **INCORRECTLY** believe that waterpipe smoking is **LESS** harmful and less addictive than other forms of tobacco use.

DID YOU KNOW?

HOOKAH (according to CDC) are waterpipes that are used to smoke different types of tobacco including flavors such as apple, mint, cheery, etc. Although many believe that hookahs are less harmful, it has the same health risks as cigarette smoking.

What is the evidence?

2013 Youth Smoking Survey

7100 Albertan youth tobacco users in Grades 6-12 are using flavoured shisha (waterpipe) tobacco.

What is the issue?

Waterpipe smoking has become a rising popularity amongst Albertan **YOUTH**

Flavoured shisha or waterpipe tobacco is **EXEMPTED** from the ban.

Higher exposure of public to harmful secondhand smoke and enticing youth to alternative forms of smoking.

Popularity of waterpipes and shisha tobacco extends well beyond the traditional cultural use in the Middle East.

What is being done currently?

STOP Alberta's flavoured tobacco legislation is still not fully implemented. Legislation was passed to allow for a ban on the use of waterpipe smoking in public establishments and shisha tobacco, it has not been enacted by Cabinet.

What are the Policy Recommendations?

#1 Ban waterpipe use in public establishments and work places

#2 Ban flavoured pipe tobacco including shisha (waterpipe) tobacco

PRIORITIES We need FULL proclamation & implementation of the tobacco and Smoking Reduction Act (TSRA)

How can the public get involved?

WRITE A LETTER! Ask for support in the full proclamation and implementation of the ban on waterpipe use in public places and a ban on flavoured pipe & shisha tobacco.

CONTACT YOUR MLA! Are you on social media? Check out our Facebook and Twitter page and share regular updates!

Alberta youth deserve first class protection from tobacco industry products

Want more information? Visit www.smokefreealberta.com

<https://www.youtube.com/watch?v=xbzt8y904i8>



HONoured PARTICIPANT - JANIS GEARY

Funding agencies should require mutually beneficial agreements for international collaborations

@janisgeary



Theme 4:

Canada's Return to the International Stage:
How Can Science Help Foreign Policy?



BIOGRAPHY

Janis Geary developed a fascination with microbes in her rural Manitoba high school, and decided to pursue Microbiology (University of Manitoba) to become a lab technician. Her tight budget led her to choose a co-op degree to offset tuition, and this job led her to working in Nairobi, Kenya. She became aware of, and subsequently interested in, social determinants of health, and completed an MSc in Global Health (University of Alberta, project based in rural Uganda). She also began working for the Canadian North *Helicobacter pylori* Working Group, based in Edmonton with projects in the NWT and Yukon (2007-present). This work piqued her interest in how policies for research influence many aspects of how it functions and has impact, and she decided to pursue a PhD to study science policy. Her PhD work (University of Alberta) examines how scientists manage data and materials in global research initiatives and will suggest best practices for equitably managing scientific resources.

INSPIRATION

"During my PhD thesis research and work, I have met with dozens of scientists and experts involved in large collaborative scientific projects. These projects include partnerships with Indigenous Peoples, and researchers from lower-income countries. I found that many researchers who are trained in disciplines with little influence from social sciences are unaware of the complex legal and social environments they work in. Despite the current impacts, many view global scientific inequities as a past problem, and fail to mitigate the historical context of resource misappropriation. This history and resultant lack of trust continues to impact collaborations.¹ Researchers often dismiss the value of formal agreements to guide partnerships, and reject institutional oversight of their work. However, my interdisciplinary training and experience has taught me that using agreements to promote mutual benefits in scientific partnerships does not just protect the interests of lower-resourced partners, it can help create better science."

OPPORTUNITY FOR ACTION

Funding agencies in Canada are shifting towards a more open-access model of knowledge dissemination. This shift includes requiring that results are published in open-access journals, and increasingly, that data and materials are also quickly made available to the research community.² Calls for openly sharing data and materials have come directly from the scientific community as well, including health research initiatives,^{3,4} basic sciences,⁵ and open access journals.⁶

Funding agencies should require mutually beneficial agreements for international collaborations

A problem arises, however, when Canadian researchers wish to collaborate with foreign researchers. If data release standards are too onerous, researchers may decide to not partner with Canadian experts. As an example, Genome Canada made a \$25 million investment to launch the Canadian-led International Barcode of Life Project based out of Guelph. To reach the goals of creating a globally comprehensive database of DNA barcodes, Genome Canada stipulated that all data generated from the project must be made openly available. The rule, however, was not received well by the DNA barcoding community and may have hindered developing country participation in the project.⁷ While the project reached its goals in terms of numbers, the publicly available barcode records have substantial under-coverage of species from lower income countries.⁸

Additional evidence shows that the developed-country standard of free flowing materials and data is not universally accepted and does not necessarily result in functional international collaborations. Poorer countries are increasingly unwilling to sacrifice their research materials and data for study in foreign countries. Infamously, Indonesia withheld avian flu strains citing a lack of access to the benefits that would arise from the research.⁹ History repeated itself when disputes over intellectual property rights led to restricted access to Middle East respiratory syndrome viruses in 2012.¹⁰

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity has also now entered into force and has been ratified by 81 countries. This international agreement sets out the standard for Canadians doing even non-applied biological sciences to develop mutually beneficial research relationships that acknowledge inequities between partners. Scholars have demonstrated that research agreements can be effectively used to facilitate developing mutually beneficial partnerships.^{11,12,13}

While many Canadian researchers likely use research agreements to outline partnerships with developing countries, Canada can take a leadership role in the scientific community through formally acknowledging the complex legal and social environments that impact international research collaborations. Canadian funding agencies can require that researchers create agreements, and can provide resources to develop such agreements. If all Canadian researchers partnering with developing countries were required to create mutually beneficial research agreements in order to receive grant funding, Canada would become a more attractive partner to many foreign researchers looking for collaborations.

PROPOSED ACTION

I propose that funding for research that involves collaborations with scientists from low or middle income countries should be contingent on establishing research agreements that outline mutually beneficial terms for managing research outputs, rather than assuming that open access data release produces the best outcomes. This policy would be developed and implemented in partnership between the three major funding agencies in Canada: NSERC, SSHRC, and CIHR, with input from their respective researcher communities.

Funding agencies should require mutually beneficial agreements for international collaborations

Currently, the only requirement to create mutually beneficial research agreements comes from the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans.¹⁴ Researchers are instructed to create research agreements when conducting research that involves First Nations, Inuit and Metis Peoples of Canada. These guidelines could be expanded to include a similar requirement when conducting research with partners from low and middle income countries.

For research that does not involve humans, funding agencies could use the existing guidelines from the TCPS to draft research agreement guidelines that are relevant to their community of researchers. Several funding agencies already require researchers to develop agreements between collaborators on a grant,^{15,16} and these policies could be updated to incorporate terms to promote mutual benefits in international collaborations. Funding agencies should also encourage researchers to make their agreements publicly available to make it easier to draft new agreements.

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JANIS GEARY

Random Grant Allocation Should Replace Some Extensive Peer Review

@janisgeary



Theme 5:

Science Funding Review: New Visions and New Directions

INSPIRATION

“I, like every other academic, spend what feels like unreasonable amounts of time writing requests for funding, sometimes to be rewarded with not only a rejection, but reviewer comments that are irrelevant or unhelpful. Taken in account with the low, low rates of acceptance, grant allocation feels like a lottery, except without the benefit of actually being random. I was inspired by the current peer review-review at CIHR, the review being undertaken by the Minister of Science, and the negative impact that I’ve witnessed ineffective peer review have on early career researchers. Too many great young scientists are turning away from academia because they feel that the system is broken or impossible to crack. I have heard numerous faculty refer learning how to “play the game” to get ahead. We should not be training grant technicians skilled at obtaining funding. We should be training scientists.”

OPPORTUNITY FOR ACTION

Peer review for allocating scientific funding has major challenges and needs to be fixed.

- I. There is evidence that the current system is biased. CIHR’s allocation of funding has shown possible bias towards males in the recent Foundation Scheme.^{1,2} Other research demonstrated a preference for males, large research teams, and large institutions in all funding between 2001 and 2011.³ The Canada Research Chairs had to implement guidelines to prevent unconscious bias and make a call to Universities to nominate more women, Aboriginal Peoples, persons with disabilities, and visible minorities.⁴ There are likely other factors that impact how peer review is completed that have not been extensively studied yet. For example, research has found that whether or not a judge reviews a case after a break has significant impacts on the favourability of the ruling.⁵ It is plausible that similar effects might be seen in peer review of grants.
- II. The current system is expensive, costing both time and financial resources. Researchers must spend time to travel to and/or at peer review committee meetings, which cost a lot of money to administer and run. The more we spend on applying and reviewing grants, the less we have to put towards actual research.
- III. Current systems are probably not better at predicting success than random allocation. Some of the most highly cited scientists do not get NIH funding in the USA,⁶ and research of NIH funding shows that while reviewers are good at determining unfundable grants, they are no better than random at predicting which research will return the best results.⁷

Random Grant Allocation Should Replace Some Extensive Peer Review

- IV. The current system encourages researchers to pursue less creative lines of inquiry. Research shows that funding systems based on peer review encourage conformity rather than innovation.^{8,9,10,11,12}
- V. The veneer of effective competition in grant allocations allows many types of review committees to make assumptions about a researcher's potential based on their history of receiving grants. Officially, many grants and awards consider previous awards to be evidence of scholarly achievement, and reviewers are tasked with evaluating researchers based on their history of receiving grants. Unofficially, other committees (such as faculty hiring committees) may be tempted to hire the researchers with the best grant record and therefore presumed competitiveness in receiving more grants, rather than evaluating their potential to do innovative research in the future. This leads to a system that privileges connections to large research groups and institutions over creative thinking and innovation.¹³

PROPOSED ACTION

Because of the many challenges of the current peer review system and the lack of evidence it actually works to fund the best science, I propose that we allocate a significant proportion of available grant funds randomly to a subset of fundable grants, rather than have them awarded entirely based on ranking of peer review scores. Some peer review would still be needed to separate unfundable projects from fundable ones, and truly exceptional research should be given priority for funding. However, the lengthy process to determine precise scores and allocate money based on the ranking of scores of the majority of grant applications that fall in the middle of the scoring spectrum is likely unnecessary.

By only allocating a portion of grant funding randomly, researchers and funding agencies could compare the funding models and determine if the expensive lengthy peer-review committee process produces outcomes that justify its costs. It would provide the much needed evidence to support changes to our peer-review system. Random allocation should be implemented at all three Tri-Council funding agencies to allow for comparison of random allocation across disciplines, although a smaller pilot at a single (brave) agency could be initiated to develop the process.

As is standard, researchers impacted by this change should be involved in the process of implementing it. However, concerns from established researchers should be taken with skepticism, given that they are the ones who created this expensive, lengthy, potentially ineffective system. They are also the ones who benefit the most from the current biases in the system. If grants are funded randomly, there would be a reduced benefit to well-connected researchers.

Random Grant Allocation Should Replace Some Extensive Peer Review

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