Pandemic Preparedness Strategic Research Initiative

Application Development Workshop

Ottawa March 1-2, 2007

PUBLIC HEALTH AGENCY *of* CANADA
AGENCE DE SANTÉ PUBLIQUE *du* CANADA

CIHR IRSC
Institut des maladies infectieuses et immunitaires
Institute of Infection and Immunity

AMMI Canada
Preventing and treating infectious diseases
Prévenir et traiter les infections

Canadian Foundation for Infectious Diseases
Fondation canadienne des maladies infectieuses

IDRC CRDI

Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Health Research Foundation
HRF R&D FRS
Fondation pour la recherche en santé

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Executive Summary

Influenza is an infectious disease that causes several thousand deaths worldwide each year. Occasionally, a new viral strain emerges to cause a pandemic that, in the past, has resulted in several million deaths. Infectious disease experts are concerned that the next pandemic is overdue, and believe that more research is needed to prevent its occurrence and/or reduce its health, social and economic impacts.

In response, in 2006, the Canadian Institutes of Health Research Institute of Infection and Immunity (CIHR-III) established the Pandemic Preparedness Strategic Research Initiative (PPSRI) to develop a coordinated and focussed pandemic preparedness research effort and to build research capacity in this area in Canada. The approach bears in mind CIHR's knowledge translation mandate by ensuring funded research teams commit to the integration of end-users into research projects and teams.

Following consultation with stakeholders, strategic research areas were identified. The Public Health Agency of Canada, Canadian Food Inspection Agency, Canadian Foundation for Infectious Diseases/Association of Medical Microbiologists Canada, International Development Research Centre and Canada's Research-Based Pharmaceutical Companies (Rx&D) Health Research Foundation joined CIHR-III to support research in the strategic areas, which formed the basis of several requests for applications (RFA) to support operating and team grants and other initiatives.

The purpose of the Application Development Workshop that was held in Ottawa on March 1-2, 2007 was to enable researchers who are interested in applying to this program to meet each other and end-users and to discuss areas of common interest with a view to preparing applications for these grants.

Over fifty individuals, all with an interest in pandemic influenza, including researchers, representatives from funding organizations and end-users of research results attended the Workshop. Participants were given an overview of the PPSRI and an overview of the Canadian Pandemic Influenza Plan that was developed by the Public Health Agency of Canada (PHAC). Representatives from partner organizations within the PPSRI introduced their organizations and the types of research that their organization is interested in supporting. Representatives from CIHR gave presentations concerning the grant process at CIHR, characteristics of successful grant applications and details of the requirements of specific RFAs launched under the PPSRI.

Participants had time to meet and discuss potential influenza research proposals during a mock application exercise and throughout the course of the meeting. They also provided feedback to CIHR-III and partners about the PPSRI and how they might enhance research on pandemic preparedness in Canada. CHIR-III and partners stated that they are planning to organize and host an annual pandemic preparedness meeting. Participants were enthusiastic about this possibility and provided constructive suggestions concerning its format.

Participants and organizers agreed that the meeting had achieved its objectives. Participants stated that the meeting was very informative, well planned and timely in light of the impending threat of pandemic influenza.

Background and Meeting Objectives

Influenza is an infectious disease that generally causes fever, sore throat, muscle pain, headache and fatigue. But, infections can be severe and result in several thousand deaths worldwide each year. New strains of the influenza virus occasionally emerge to cause an influenza pandemic that, in the past, has resulted in several million deaths. Most experts agree that the next pandemic is overdue. An influenza pandemic could have severe health, economic and social consequences. Worldwide, between 2 million and 7.4 million people could die including 11,000 to 58,000 Canadians. It is estimated that 4.5 to 10.6 million Canadians could become ill.

Recognizing the need to develop a coordinated and focused research effort and to build research capacity in pandemic influenza in Canada, the Canadian Institutes of Health Research Institute of Infection and Immunity (CIHR-III) established the Pandemic Preparedness Strategic Research Initiative (PPSRI). Research funded by the PPSRI is already taking place and several new requests for applications (RFA) were launched in December 2006 under the initiative.

In order to enhance the development of successful applications to these RFAs, CHIR-III and partners organized an application development workshop for researchers with a serious interest in submitting applications. (See Appendix 1 for the organizing committee members.) The main objective of the workshop was to support the researchers by providing an opportunity for them to learn more about the RFAs and the application requirements; meet each other and end users; and discuss potential research projects. Other objectives were to solicit feedback from researchers about the PPSRI, and to learn

what additional facilities or other infrastructure they require to optimally carry out pandemic preparedness research.

Over fifty individuals, all with an interest in pandemic influenza, including researchers, representatives from funding organizations and end-users of research results attended the Application Development Workshop in Ottawa on March 1-2, 2007. (See Appendix 2 for a list of meeting participants.)

Meeting Overview

Welcome

Participants were welcomed by Ms. Carol Richardson, Manager of Programs and Evaluation for CIHR-III who served as the meeting facilitator. Ms. Richardson outlined the objectives of the meeting and gave an overview of the meeting agenda. (See Appendix 3 for the meeting agenda.)

Overview of the Canadian Pandemic Influenza Plan, *Theresa Tam, Public Health Agency of Canada (PHAC)*

Dr. Tam gave a brief overview of the Canadian Pandemic Influenza Plan for the Health Sector that was developed by PHAC and stakeholders. The plan involves, in part, surveillance and testing, vaccine development, stockpiling of anti-viral drugs, and public education about influenza. Dr. Tam stated that research is a critical part of the plan, and PHAC is playing an important role in this regard. Current research directly supported by PHAC includes strengthening surveillance and laboratory capacities to detect novel influenza viruses and establishing methodologies to estimate vaccine effectiveness on an annual and real-time basis. PHAC is also a funding partner in the PPSRI. Dr. Tam anticipates that PHAC will continue to develop and support influenza research with plans to establish an influenza research network and to enhance its research program in the near future.

Overview of the Pandemic Preparedness Strategic Research Initiative, *Carol Richardson, CIHR-III*

In May 2006, CIHR-III established the PPSRI in order to develop a coordinated and focused influenza and pandemic preparedness research effort and to build research capacity in this

area in Canada. The activities of the PPSRI are led by the PPSRI Task Group, chaired by Dr. Mark Loeb, and are supported with the $21.5 million announced in the 2006 Federal Budget. In the first year of the PPSRI, CIHR and PHAC supported operating grants for research in the areas of disease control, prevention measures and healthcare system preparedness. In December 2006, CIHR-III in collaboration with the PHAC, Canadian Food Inspection Agency, Canadian Foundation for Infectious Diseases/Association of Medical Microbiologists Canada, International Development Research Centre and Canada's Research-Based Pharmaceutical Companies (Rx&D) Health Research Foundation launched two team grant and one operating grant RFAs. CIHR-III and partners organized the application development workshop in Ottawa to provide interested researchers with detailed information about the application requirements and to give them an opportunity to meet and discuss research projects, which could form the basis of applications for the grants. To further support influenza research in Canada, the PPSRI and partners plan to support networking activities such as annual meetings of funded researchers and end-users of the new research knowledge.

PPSRI partners

Ms. Richardson then introduced representatives from partner organizations within the PPSRI. Each gave an overview of his or her organization and the areas of pandemic preparedness research that the organization is interested in supporting. Highlights of their presentations are summarized below.

Canada's Research-Based Pharmaceutical Companies (Rx&D) Health Research Foundation, *Mark Ferdinand*

The Health Research Foundation 2006 is a private not-for-profit corporation supported by members of Canada's Research-Based Pharmaceutical Companies (Rx&D). It is currently moving towards a thematic grants program in which it will award one or two major grants per competition. The themes will be broadly related to pharmacotherapy and will be selected annually by senior scientific personnel in Rx&D companies and by members of the external research community. In June 2006, pandemic preparedness research ranked second as an area of research for the Foundation to fund on an ongoing basis. To achieve this aim, Health Research Foundation 2006 partnered with CIHR-III to support team grants in the areas of influenza prevention and transmission.

Canadian Food Inspection Agency (CFIA), *Manjeet Sethi*

CFIA is Canada’s largest science-based regulatory agency. Its mandate is to safeguard Canada’s food supply and the plants and animals on which safe and high-quality food

depends. Avian influenza is an extreme concern for CFIA because of transmission of highly pathogenic strains of the virus from birds to humans in some parts of the world. CFIA is interested in funding research to increase knowledge on the ecology and pathogenesis of avian influenza viruses; to improve and develop novel diagnostics and to aid in the development of vaccines and anti-viral drugs. To support research efforts in these and other areas, CFIA has partnered with several organisations including CIHR-III. It also plans to enhance research capacity within its organization by hiring researchers and support staff and by developing methods such as rapid diagnostic tests.

Canadian Foundation for Infectious Diseases/Association of Medical Microbiology and Infectious Disease Canada (CFID/AMMI), *Melissa Coleman*

CFID is the national charity of the AMMI Canada, which is the largest association of medical microbiologists and infectious disease specialists in Canada. Its funding is received from AMMI members, corporations, foundations and individual donors. AMMI Canada is unique in that it brings researchers and clinicians together in a professional association; the association seeks closer relationships with organizations that share members' focus on infectious disease research, prevention and control. CFID has partnered with CIHR-III to support operating grants on influenza diagnostics, transmission, ethics review and anti-viral drugs. The foundation supports research that links researchers with clinicians and other end-users, builds research capacity and supports the development and involvement of young researchers.

International Development Research Centre (IDRC), *Dominique Charron*

The IDRC helps researchers and communities in developing countries to find solutions to their social, economic and environmental problems through action-oriented research. One of the programs within the IDRC is called Ecosystems Approach to Human Health (Ecohealth). Ecohealth supports an integrative approach to research that takes into consideration the social and ecological conditions that mediate human health and ecosystem relationships. Ecohealth supports several major health initiatives involving influenza research including the Asia Partnership for Avian Influenza Research, the Global Health Research Initiative and the PPSRI. Specific areas of research that Ecohealth supports include: (i) avian-human transmission and societal and environmental dynamics of zoonotic influenza transmission, including occupational risk; (ii) innovative strategies for prevention of zoonotic avian influenza transmission while maintaining agricultural livelihoods; (iii) studies on the spread of infection and shedding patterns; and (iv) determination of risk factors for zoonotic infection.

Public Health Agency of Canada (PHAC), *Theresa Tam*

The mission of the PHAC is to promote and protect the health of Canadians through leadership, partnership, innovation and action in public health. The PHAC was an early contributor to the PPSRI by co-sponsoring the Influenza Research Priorities Workshop with CIHR-III in Ottawa in September 2005. It has partnered with CHIR-III to fund PPSRI operating and team grants that support research on the prevention of influenza transmission and the development and optimal use of anti-virals and vaccines. The PHAC is also a key end-user of research information. It transfers knowledge to partners such as the Pandemic Influenza Committee, which is responsible for providing scientific-based recommendations and expert opinion to all orders of government with respect to the health sector preparation for an influenza pandemic.

Grants and Requests for Applications

Several presentations were made by representatives of CIHR to assist participants with their applications and to give them more information about the PPSRI team and operating grants launched in December 2006.

Writing a successful application, *Isabelle Jalbert, CIHR*

Dr. Jalbert gave an overview of the grant process at CIHR, and the two streams of funding, both open and strategic, that are available to researchers. She provided many tips and suggestions for grant writing and recommended a publication entitled “Guidebook for New Principal Investigators” developed by the CIHR Institute of Genetics that was given to participants and is available at: http://www.cihr-irsc.gc.ca/e/27491.html. She emphasized that researchers applying for strategic funds should read RFAs carefully and should address all of the RFA requirements in their proposals. Applications are assessed on the basis of the significance, feasibility and novelty of the research as well as the experience of the applicant (s) and their research environment. Common problems reported by CIHR peer reviewers of previous applications include: inappropriate research plans, faulty logic, failure to address potential pitfalls and a poorly defined direction or sense of priority. Dr. Jalbert concluded by inviting researchers to visit the CIHR website (www.cihr.gc.ca) often and to contact staff if they had questions or required assistance. In the questions that followed, participants learned that a specific pandemic preparedness review committee will assess applications to the PPSRI RFAs.

Team Grants

Principles and Procedures, *Isabelle Jalbert, CIHR*

The objective of the CIHR Team Grant program is to support expert teams of researchers that address an important health issue that is best approached through a collaborative team effort. Teams must consist of at least three independent investigators, each of whom must have an established research track record in areas related to the proposed project. Applicants need to outline relevance of the project and the strengths of the team, and to state how the team approach will enhance and accelerate the resolution of an important health-related issue. Peer review of the applications is a two-step process with letters of intent and full application stages. In the question period that followed, the following points were made.

- Applicants should be aware that the RFAs highlighted at this meeting have different allowable costs.
- Applicants are encouraged to include team members from multiple disciplines.
- Teams must have one Nominated Principal Applicant and at least two other Principal Applicants.
- Principal applicants, but not co-applicants, must hold a university appointment in order to meet CIHR's eligibility requirements.
- Team members can come from industry, but unless they hold a university appointment, will not be eligible to act as a Principal Applicant.
- Three of the team members must have appointments or cross-appointments with a university.

The Role of End-Users, *Elizabeth Stirling, CIHR*

One of the goals of CIHR is to engage in and promote knowledge translation. Knowledge translation, as defined by CIHR, is the exchange, synthesis and ethically-sound application of knowledge within a complex system of users to accelerate the capture benefits for Canadians. The PPSRI has included a knowledge translation component in many of its activities. For example, end-users were consulted during the development of the strategic research priorities of the PPSRI and many RFAs launched under the PPSRI require end-

users as co-applicants. In addition, applicants must provide a knowledge translation and communication plan for the dissemination of the new knowledge generated through the proposed research project.

Biology, Vaccines, Ethics, Legal and Social Research RFA, *Carol Richardson, CIHR-III*

The deadline for the letter of intent for this team grant RFA is June 15, 2007. A full description can be found at: http://www.cihr-irsc.gc.ca/e/32804.html. Specific eligibility requirements for the RFA are that an end-user of the research results must be a co-applicant, a formal training component for graduate students and/or post-doctoral fellows must be part of the proposal and that randomized control trials (RCT) are allowed. If applicants intend to include an RCT component in their application, they must contact the CIHR RCT staff for application procedures. The following points were made in the question period that followed.

- The lead applicant can also be the end-user.
- For applications that include an RCT component, the RCT peer review committee will evaluate the proposal first and submit a report to the PPSRI peer review committee.
- New vaccines and novel vaccine platforms are beyond the scope of the RFA.
- Vaccine research should be targeted towards humans but can include an animal vaccine component.

Transmission and Prevention RFA, *Carol Richardson, CIHR-III*

Eight letters of intent to apply for this RFA were received by the deadline in February 2007 and a percentage of these will be asked to submit full applications by July 15, 2007. See: http://www.cihr-irsc.gc.ca/e/32802.html for a full description of this RFA. Several research areas related to the transmission and prevention of influenza are eligible. The proposal must include a training component for graduate students and/or post-doctoral fellows. An international researcher may be included as a co-applicant, but he or she can not be the principal investigator. Applicants were encouraged to include end-users as co-applicants.

Operating Grants

Transmission, Ethics Review and Antivirals RFA, *Carol Richardson, CIHR-III*

The registration deadline for this operating grant RFA is October 1, 2007. See: http://www.cihr-irsc.gc.ca/e/32803.html for a full description. A training component for graduate students and/or post-doctoral fellows must be included. Partners will review the summary section to see if the proposal is relevant to their mandate. Knowledge translation and communication plans for the research results must be included. One of the issues raised in the questions that followed was that there needs to be clarification about what constitutes old and new vaccines and anti-viral drugs.

Mock Application

On the second day of the meeting, participants worked in small groups to take part in a mock application exercise. The groups were asked to imagine that a pandemic influenza strain had been reported in humans and poultry in Canada, and were asked to develop a letter of intent for an RFA that included a title, research questions, relevance, team members and end-users. Each group then presented their proposal in plenary. The exercise gave researchers an opportunity to meet one another and to discuss research questions and approaches relevant to a pandemic influenza outbreak situation.

Moving Forward and Lessons Learned

CIHR-III and its partners are committed to supporting and developing a network of pandemic preparedness researchers and research users. The PPSRI and the RFAs that were discussed at the workshop in Ottawa are part of this commitment. Participants were asked to provide suggestions and recommendations for other ways in which CIHR-III and partners could support pandemic preparedness research. Many innovative and useful suggestions were made. See Appendix 4 for a complete list.

To further support this initiative, CIHR-III and partners also plan to hold an annual meeting of researchers and end users. To help in the organization of the meeting, participants were asked to provide suggestions for the location, types of participants and format. Participants were enthusiastic about the potential meeting. A detailed summary of their suggestions is found in Appendix 5.

Summary

The organizing committee and participants were pleased with the degree of collegiality and constructive nature of the meeting. The researchers who attended the meeting said they were pleased to learn more about the RFAs and the application process, to have a chance to meet one another and end-users and to have opportunity to discuss potential research proposals. CIHR-III and its partners were pleased to have the opportunity to inform researchers about their organizations and mandates and to receive constructive suggestions for ways to support pandemic preparedness research in the future.

See Appendix 6 for a summary of responses to a questionnaire soliciting feedback on the workshop from participants.

Appendix 1: Organizing Committee Members

Name	Affiliation
Judy Bray	CIHR Institute of Infection and Immunity
Dominique Charron	International Development Research Centre
Melissa Coleman	Canadian Foundation for Infectious Diseases/AMMI Canada
Bethany Heinrichs	CIHR Institute of Infection and Immunity
Isabelle Jalbert	CIHR Knowledge Creation Programs
Anne Malo	Public Health Agency of Canada
Carol Richardson	CIHR Institute of Infection and Immunity
Manjeet Sethi	Canadian Food Inspection Agency
Bhagirath Singh	CIHR Institute of Infection and Immunity
Elizabeth Stirling	CIHR Knowledge Synthesis and Exchange

Appendix 2: List of Meeting Participants

Name	Affiliation
Caroline Alfieri	Sainte-Justine Hospital
Joseph Beyene	Hospital for Sick Children
Guy Boivin	Laval University
Earl Brown	University of Ottawa
Mark Cameron	University Health Network
Dominique Charron	International Development Research Centre
Melissa Coleman	Canadian Foundation for Infectious Diseases
Kevin Coombs	University of Manitoba
Gaston De Serres	Institut national de santé publique du Québec
Ken Dimock	University of Ottawa
Jan Dubowski	Université de Sherbrooke
Mark Ferdinand	Rx&D's Health Research Foundation
Keith Fowke	University of Manitoba
Klaus Gutfreund	University of Alberta
Chantal Hicks	Statistics Canada
Isabelle Jalbert	Canadian Institutes of Health Research
Francois Jean	The University of British Columbia
Yoav Keynan	Dept. Medical Microbiology, University of Manitoba
Frederick Kibenge	Atlantic Veterinary College, University of Prince Edward Island
Réjean Lapointe	Université de Montréal - CHUM Notre-Dame

Name	Affiliation
Denis Leclerc	Centre de Recherche en Infectiologie
Mao-Cheng Lee	University of Alberta and University of Alberta Hospital
Kathy Magor	University of Alberta
Anne Malo	Public Health Agency of Canada
Catherine McDonald	Canadian Foundation for Infectious Diseases
Allison McGeer	Mount Sinai Hospital
Bevin McMullin	University of British Columbia
Shelly McNeil	Canadian Centre for Vaccinology, Dalhousie University and Canadian Association for Immunization Research and Evaluation (CAIRE)
Colleen J. Metge	University of Manitoba
Chris Miller	Geonox
David B. Nicholas	Sick Kids Hospital
Jason Nie	Joint Centre for Bioethics
Oladele (Dele) Ogunremi	University of Saskatchewan/Canadian Food Inspection Agency
Tracey O'Sullivan	Institute of Population Health, University of Ottawa
John Pasick	Canadian Food Inspection Agency, National Centre for Foreign Animal Disease
Astrid Petrich	McMaster University/St. Joseph's Healthcare (SJH) Hamilton
Carol Richardson	Canadian Institutes of Health Research
Melody Sajedi	Canadian Institutes of Health Research
David Scheifele	University of British Columbia and Canadian Association for Immunization Research and Evaluation (CAIRE)

Name	Affiliation
Manjeet Sethi	Canadian Food Inspection Agency
Shayan Sharif	University of Guelph
Robert Slinger	University of Ottawa
Elizabeth Stirling	Canadian Institutes of Health Research
Shannon M. Sullivan	Élisabeth-Bruyère Research Institute
Mavanur R. Suresh	University of Alberta
Jane Sutherland	The Ottawa Hospital - General Campus
Theresa Tam	Public Health Agency of Canada
Dat Tran	The Hospital for Sick Children
Veronika von Messling	INRS-Institut Armand-Frappier
Tania Watts	University of Toronto
Hana Weingartl	University of Manitoba & NCFAD/CFIA
Yongping Yan	The 4th Military Medical University, Xi'an, China
Jose Gustavo Zayas Zamora	University of Alberta
Yan Zhou	VIDO, University of Saskatchewan

Appendix 3: Meeting Agenda

Pandemic Preparedness Strategic Research Initiative

Application Development Workshop

March 1-2 2007

International Development Research Centre

Auditorium, 14th Floor,

250 Albert St., Ottawa

Thursday March 1, 2007

13:00 Part I Introductions

Welcoming remarks and introductions
Carol Richardson, CIHR-III

Overview of Canadian Pandemic Influenza Plan
Theresa Tam, PHAC

Overview Pandemic Preparedness Strategic Research Initiative (PPSRI)
Carol Richardson, CIHR-III

- Canada's Research-Based Pharmaceutical Companies (Rx&D) Health Research Foundation 2006
  Mark Ferdinand, Rx&D

- Canadian Food Inspection Agency
  Manjeet Sethi, CFIA

- Canadian Foundation for Infectious Diseases/Association of Medical Microbiology and Infectious Disease Canada
  Melissa Coleman, CFID/AMMI Canada

- International Development Research Centre
  Dominique Charron, IDRC

- Public Health Agency of Canada
  Theresa Tam, PHAC

15:00 *Break*

15:30 Part II Grants and RFAs

Writing a successful application
Isabelle Jalbert, CIHR

Team Grants

- Principles and Procedures
  Isabelle Jalbert, CIHR

- The Role of End-Users
  Elizabeth Stirling, CIHR

- Biology, Vaccines, Ethics, Legal and Social Research RFA
  Carol Richardson, CIHR-III

- Transmission and Prevention RFA
  Linda McKenzie, CIHR

Operating Grants

- Transmission, Ethics Review and Antivirals RFA
  Carol Richardson, CIHR-III

Partner Consultations: Questions and Answers

18:00 *Dinner, East India Company, 210 Somerset St. West. Ottawa*

Friday March 2, 2007

8:30 Part III Mock Application
Facilitated by Carol Richardson, CIHR-III

Process overview

- Introductions and expertise
- Preparation of mock team application
- Presentations of mock applications - opportunities and challenges

10:30 *Break*

11:00 Part IV Moving Forward and Lessons Learned
Facilitated by Carol Richardson, CIHR-III

- Supporting a network of pandemic preparedness researchers and research users
- Evaluation of workshop

12:30 *Lunch*

1:30 Part V Team Development: Next Steps

3:00 Adjourned

Reference Documents

Canadian Pandemic Influenza Plan
(http://www.phac-aspc.gc.ca/cpip-pclcpi/)

CIHR Pandemic Preparedness Strategic Research Initiative Report
(http://www.cihr-irsc.gc.ca/e/32573.html)

Appendix 4: Areas for Future Development in Pandemic Preparedness Research

From Operating Budgets:

- Organize and support workshops with a specific research theme (*e.g.* influenza diagnosis, surveillance or vaccines). Participants agreed that the format of the current workshop held on March 1-2, 2007 in Ottawa had successfully encouraged research collaboration and the development of research projects and, therefore, should be used as a template for future workshops. The workshops should include both researchers and end-users.
- Organize and support an annual meeting on influenza and pandemic preparedness. Specific suggestions for the location, participants and format are summarized below.
- Offer scholarships to foster the development of researchers with expertise in influenza.
- Funding organizations should set aside 10% of funds for new young investigators in order to broaden research expertise in Canada.

Through RFAs:

- Suggestions for research areas and types of grants that should be supported through future RFAs:
    - Grants for infrastructure (*e.g.* rapid sequencing, epidemiological databases, immunotyping centres).
    - Research grants to study basic influenza biology and immune monitoring.
    - Pilot projects or small operating grants to establish a proof-of-principle (*e.g.* new anti-virals).
    - Grants that support the maintenance of networks.
    - Research grants to compare, in a head-to-head fashion, vaccines, anti-virals and other products that have been developed by companies. For example, novel candidate vaccines are best produced by industry, but it is rare for a company to compare its vaccine with a competitor. This type of comparison is best suited to academia where investigators can work at arms length from industry and gain valuable insights about the efficacy of different vaccines.

  - Ensure that sensitive cohorts are included in RFA descriptions (*e.g.* the elderly, children, pregnant women).
  - Current RFAs are a bit restrictive. There is a need to promote more creativity. Launch an RFA in a broad area so that researchers can take the initiative to develop projects on topics that they view to be novel and important.
  - In a pandemic, there will be an immediate need for research to determine methods to prevent transmission of the virus and to treat infected individuals, but the grant approval process will be hampered because of the pandemic. Therefore, launch an RFA now calling for applications that describe research that would only take place in the event of a pandemic. Projects with the potential to have a significant impact during a pandemic would be selected and pre-approved for funding ($100,000-$150,000). As an incentive for investigators to apply for funding that they may never receive, provide seed money to offset the expense of the application.

- Have applicants for team grants include a description of how they would transition in the event of a pandemic to meet the needs of the country. What would be their main research questions? What is the current state of research in these areas? The response should include all aspects of a pandemic (preparation, prevention, response and recovery).
- Create and direct a network of researchers or a centre of excellence. The network should include individuals and teams that perform biomedical, clinical, or ethics research and those that set policies. If a network or a centre of excellence was formed, there will be a greater opportunity for research collaboration and improved responsiveness to a pandemic should one occur.
- Principal investigators must be the first or last author of team grant applications, but there are a limited number of principal investigators in the field of influenza research. This reduces the number of applications that are submitted by teams. To enhance the number of team applications, there should be fewer restrictions on the team member requirements.
- The government has provided funding for a five year period. The short-term nature of the grants (2-3 years) limits the ability to conduct certain types of research such as the development of novel vaccines. Funding agencies should partner so they can offer long-term funding.

- CIHR should establish a permanent influenza committee.
- A more general research plan for all infectious disease may be helpful for other problems and would be more broadly applicable. In other words, establish a Plan B if a pandemic does occur but it is not flu.

Wish list of larger infrastructure support and other mechanisms:

- Establish a committee to ensure that there is no duplication of grants to same research areas.
- Establish a committee to be charged with monitoring the incidence of emerging diseases to address preparedness and to respond to evolving needs.
- Establish web-based sites to enhance communication amongst influenza researchers and end-users. The websites could include different types of information such as:
    - A list of e-mail addresses of influenza researchers or websites related to influenza to foster collaboration.
    - A site in which researchers could post important unpublished results that do not easily fit into a publication. End-users and researchers could access the site to determine whether a specific research project has been done and learn the results. The database would be open access with a simple intellectual property agreement, and the person or group who performed the research would be acknowledged.
    - A site to allow funded teams to interact, share research ideas and procedures and avoid duplicating research experiments.
    - A forum to discuss vaccination and immune responses in animals and humans to influenza and other infectious diseases.
    - A database for surveillance. A statistician should be hired to support the database.
    - An inventory compiled by CIHR, NSERC and CFI of funded equipment and facilities.
- Create regional influenza resource centres to provide support for immunophenotyping, flow cytometry, gene array, diagnostics, testing, etc.
- Create an influenza genome centre.

- Establish a network of containment facilities (level 3 laboratories and level 3 and 4 animal facilities) and related expertise for pandemic preparedness. Increase the number of these facilities. Provide low level containment for immunization and vaccine testing, for example, in association with the high level containment facilities. Some participants noted that these labs exist at the University of British Columbia and in Saskatoon (very large), so scientists should not feel restricted by level 3 requirements for their research. There are also federal labs that can be used to do research requiring a high level of containment. Interested researchers should be given access to the facilities that are already in place.

- Establish an infectious disease centre of excellence or focus on building research networks. This fosters collaboration instead of competition. This approach worked effectively with the SARS consortium, and will be necessary in order to deal with any pandemic-scale infectious disease outbreak.

- Establish a mechanism for funded teams to interact to full advantage, avoiding duplication, sharing basic infrastructure and skills.

- Establish a network for immune-monitoring of vaccine efficacy and influenza patient cohorts.

- Create an on-line questionnaire concerning mechanisms to support pandemic preparedness research and solicit responses to get broader input.

- Increase the number of scientists studying influenza by supporting training of graduate students and post-doctoral fellows via priority announcements of studentships and fellowships.

- Establish a communication strategy to inform the public and governments about the achievements of the funded research and the value of the research results to the country. Also provide information about the number of innovative projects that have not been funded because of lack of money.

- In the event of a pandemic, procedures should be in place to speed the turn-around time for reviewing applications for research funds from the usual six months to two months.

- A separate influenza committee should be established within CIHR. There are plenty of issues to address that warrant a separate committee. This approach would emphasize the importance of flu research, and has worked successfully in the promotion of HIV/AIDS research.

Appendix 5: Suggestions for an Annual Meeting of Pandemic Researchers and End-Users

Location:

Suggested locations included: Toronto, Ottawa, Halifax, Vancouver, Winnipeg, Montreal, or other cities with direct flights. The location should alternate between the east and the west. A tour of the Winnipeg facilities should be arranged.

Participants:

- Principal investigators—funded researchers and new investigators who may not be funded but are in relevant fields.
- Team leaders and members of funded research teams including investigators, trainees and end-users (1-3 per team plus end-users).
- International researchers, health personnel, policy makers from the US, Europe and Asia as partners and to provide a needed international perspective.
- Graduate students and post-doctoral fellows.
- Representatives from the PHAC, CIHR and CFIA.
- Representatives from vaccine and pharmaceutical companies.
- Representatives from agriculture.
- Academic directors/administrators.
- Policy makers and representatives from provincial regulatory bodies such as the ministries of health and agriculture.
- Ethics/REB leaders.
- End-users such as:
    - Health officials/clinicians.
    - Members of the community.

- Representatives from the First Nations
- Military personnel who will be needed to help with quarantine.

Format:

- Oral presentations covering topics such as diagnostics, anti-virals, vaccines, epidemiology and policy to be given by researchers/teams.
- Round table discussions on topics such as new RFAs and for brainstorming to identify novel research questions and approaches that can be taken to answer them.
- Presentations by end-users about what they expect and require from researchers.
- A keynote speaker presentation.
- Include a mix of scientific presentations, progress updates including what is happening at the international level, and other formats to share data.
- Discussion of future directions, which would include presentations by national decision makers concerning priority issues.
- A forum where knowledge translation can occur—from bench (researchers) to bedside (clinicians) to bench (researchers).
- Divide the meeting into two days. One for basic science and one focused on clinical issues and the application of the research results.
- Hold local stakeholder meetings to feed into the general meeting.
- Hold the meeting semi-annually.
- Have the meeting in conjunction with major influenza meetings. The next one is in Toronto in June 2007.

Appendix 6: Workshop Evaluation

Participants rated the overall effectiveness/usefulness/interest of all sessions:

Poor	*Fair*	*Good*	*Very Good*	*Excellent*
1	*2*	*3*	***4***	*5*

n = 13; **Average = 4.0**

Presentations were effective in summarizing the Canadian Pandemic Influenza Plan and the PPSRI — unanimous agreement

Presentations were effective in improving understanding of the grant programs and RFAs — unanimous agreement

- "Binder helpful"
- "Helpful but some things still unclear"

The Workshop was effective in enhancing linkages among researchers — unanimous agreement

- "Lots of time for networking."
- "Definitely yes. Many bright minds working toward final goal to protect Canadians."
- "More mock teams may have been helpful."

The Workshop assisted team development for joint applications to the RFAs — yes = 11, no = 1

- "Definitely helpful and necessary for the future."
- "Difficult because teams already formed before the meeting."

Based on the Workshop experience, recommend that the Institute of Infection and Immunity hold a similar work shop in the future — unanimous agreement.

General comments

- "Very informative and well planned."
- "Very well organized and timely response to impending threat."
- "Doing a great job. Thanks."