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Office of Critical Infrastructure Protection and Emergency Preparedness

Bureau de la protection des infrastructures essentielles et de la protection civile

National Study of Academic Researchers

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Office of Critical Infrastructure Protection and Emergency Preparedness

2nd Floor, Jackson Bldg.
122 Bank St.
Ottawa, ON K1A 0W6
Tel: (613) 944-4875
Toll Free: 1-800-830-3118
Fax: (613) 998-9589
Email: communications@ocipep-bpiepc.gc.ca
Internet: www.ocipep-bpiepc.gc.ca

Author:

COMPAS Inc.
Multi-Audience Research

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Executive Summary

In fiscal year 2002-03, OCIPEP's Research and Development Division (DRD) commissioned a national study of academic researchers working in the fields of critical infrastructure protection, emergency preparedness, and cybersecurity. The objectives of the study were twofold:

- To generate a detailed inventory/database of researchers doing work in these areas, with contact information, references, recent projects, areas of specialization, keywords, etc.

- To anonymously survey the identified researchers to solicit their opinions on how best OCIPEP can further research and science initiatives in these fields in Canada.

Inventory Phase

The following table presents the final results for this phase of the study.

	Direct contact with Researchers	Indirect via Institutions
Number of contacts	245	267*
Researchers who returned completed form	50	21
Researchers who refused/not interested	7	—
Researchers not involved in research of interest to OCIPEP	62	19

* This refers to the number of contact points in institutions; each of these contact points (which were department heads, research groups, faculty offices, etc.) potentially led to numerous researcher contacts.

The highlights of the results are as follows:

- The inventory effort generated a detailed database of 71 researchers spread across 25 institutions in nine provinces. This was less than was hoped for, but sufficient for analytical purposes.

- It became clear during the study that engaging researchers to provide this kind of information is extremely difficult. Of 245 researchers that were directly contacted, only 159 responded to the study.

Survey Phase

The purpose of the survey was to enable OCIPEP to better understand the perceptions of academics with respect to key issues, including their preferences for funding research in these areas. Of the 71 researchers eligible to participate in the survey, 44 completed it. This represents a response rate of 62%, which is considered very high for surveys.

- 66% of surveyed researchers claimed to be aware of OCIPEP before they were contacted for this initiative. Among those who claimed prior awareness of OCIPEP, 83% said they were at least moderately familiar with the agency and its mission/role prior to this initiative (over one-third said they were very familiar).

- 68% of all researchers who completed the survey described their research as being in the area of critical infrastructure protection, 50% in emergency management, and 18% in cybersecurity (multiple responses accepted).

- Based on their participation in the first phase of this initiative, 80% of the researchers think they understand OCIPEP's role and research requirements. However, they were much more likely to say that they understand this moderately (66%) as opposed to very well (14%). One in five (21%) do not think they have a very good understanding of OCIPEP's role and research requirements.

- Indicating how willing they would be to participate in various activities related to CIP, EM and cybersecurity:
    - 78% would be willing to attend an OCIPEP-sponsored conference or workshop focused on CIP, EM, or cybersecurity;
    - 75% would be willing to participate in a Network of Centres of Excellence (NCE) focusing on CIP, EM, or cybersecurity;
    - 63% to present at an OCIPEP-sponsored conference/workshop;
    - 57% to prepare and submit a paper to an OCIPEP-sponsored journal focusing on CIP, EM, or cybersecurity; and
    - 50% would be willing to be a research chair/coordinator for a centre of excellence in CIP, EM, or cybersecurity.

- Rating the effectiveness of funding mechanisms to encourage future research in areas of interest to OCIPEP:
    - 80% attributed effectiveness to OCIPEP-specific grants and contributions;
    - 66% to networks of centres of excellence (NCEs);
    - 59% to funding councils (i.e. NSERC/SSHRC/CIHR);
    - 53% to Canada Research Chairs;
    - 48% to the Canadian Foundation for Innovation (CFI); and
    - 48% to short-term (one year) contract-based research.

- The vast majority of researchers, regardless of their area of research, indicated that they would personally conduct more research in these areas of interest to OCIPEP if more funding were available in them. Fully 73–88% said they would conduct much more

research (depending on the area), while most of the rest would conduct a little more research.

- Rating various ways that Canadian research in CIP, EM and cybersecurity could be promoted by OCIPEP:
    - 82% attributed priority to increasing the number of research grants available through the funding councils;
    - 71% to increasing the size of research grants available through the funding councils;
    - 70% to scholarships for graduate and doctoral students;
    - 60% to increased university/department budget for new faculty members;
    - 51% to coordination of conferences, workshops, symposia, etc.;
    - 50% to support/coordination for international links or exchanges;
    - 39% to development of a refereed journal or journals in these areas; and
    - 32% to newsletters, mailing lists, and other researcher networking tools.

- 87% expressed interest in working with OCIPEP to determine the research priorities in the areas of CIP/EM/cybersecurity (nearly two-thirds expressed strong interest).

- Over half the survey respondents also provided free-text general comments. Not one of these comments was negative; without exception, they were constructive, insightful, and in several cases highly complimentary.

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1.0 Introduction

The Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP) was created in February 2001 to provide leadership on the protection of national critical infrastructure and effective emergency management in Canada. OCIPEP's Research and Development Division (DRD) is tasked with supporting the development of both the capacity and capability of the Canadian research community to address emergency management (EM) and critical infrastructure protection (CIP) issues. In this context, CIP includes information technology security or cybersecurity.

In fiscal year 2002-03, DRD commissioned a national study of academic researchers working in the fields of critical infrastructure protection, emergency preparedness, and cybersecurity. The objectives of the study were twofold:

- To generate a detailed inventory/database of researchers doing work in these areas, with contact information, references, recent projects, areas of specialization, keywords, etc.
- To anonymously survey the identified researchers to solicit their opinions on how best OCIPEP can further research and science initiatives in these fields in Canada.

The information obtained through this study will be used to provide guidance concerning how best to further OCIPEP's research interests in the future, including its research agenda-setting and funding mechanisms.

The remainder of this report is organized as follows:

- Results of the Inventory of Researchers – this section provides an overview of the database of researchers that was developed. Note that the database itself is not included in this report; publicly available portions of the database can be obtained by contacting OCIPEP.
- Results of the Researcher Survey – provides the results and high-level analysis of the survey results
- Appendices – include the following:
    - Detailed description of the methodology used in the Inventory phase
    - Reporting form that was distributed in the Inventory phase
    - Detailed analysis of the researcher database that was developed
    - Questionnaire that was the basis of the online survey

2.0 Results of the Inventory of Researchers

The section gives a very basic picture of the contours of the information obtained from the Inventory phase of the study. Inventory respondents had been identified as being potentially involved in OCIPEP's areas of research interest. This summary notes some substantive findings and also provides some insight into the general quality and usefulness of the data for further analysis. It is based on an analysis of 70 cases. The final data set is slightly larger due to late responses.

The following table presents the final results for this phase of the study. In total, 71 individual researchers spread across 25 institutions in nine provinces returned a completed form. This was less than was hoped for, but sufficient for analytical purposes.

	Direct contact with Researchers	**Indirect via Institutions**
Number of contacts	245	267*
Researchers who returned completed form	50	21
Researchers who refused/not interested	7	–
Researchers not involved in research of interest to OCIPEP	62	19

* This refers to the number of contact points in institutions; each of these contact points (which were department heads, research groups, faculty offices, etc.) potentially led to numerous researcher contacts.

The highlights of the results are as follows:

- It became clear during the study that engaging researchers to provide this kind of information is extremely difficult. Of 245 researchers that were directly contacted, only 159 responded to the study. This was despite a process that included up to five separate contacts via email and two direct phone calls from a researcher.

- The majority of responses (50 out of 70) were generated from lists of individual researchers supplied by major granting agencies as well as OCIPEP. The remaining respondents were generated through pursuing institutional contacts.

- At the question level, 90 to 100% of respondents provided useful responses to basic classifying information such as respondent title, main institutional affiliation, province, main discipline, sub-discipline, key word description of research interests and perception of involvement in the main research areas relevant to OCIPEP.

- In the case of the "main discipline" question, 31.4% gave an "other" response. Enough information has been preserved so that these sometimes overly refined responses can be coded into explicit categories.

- Generally, between 55 and 70% of respondents were able to give useful responses to more detailed questions pertaining to publication citation, secondary formal affiliations, informal affiliations and organizational memberships.

- The vast majority of the respondents are active academics. A minority hold more executive level positions in institutes and academic units.

- The respondents were spread across 25 institutions. Based on one definition of the relevant sampling frame, this amounts to about 43% of potentially (broadly defined) relevant institutions. This is probably a conservative estimate, and anyone particularly interested in this feature of the data should consult Appendix D. If many minor non-responding institutions were excluded from the frame, one would get a more realistic (and higher) rate of institutional response.

- Every province except Prince Edward Island produced at least one respondent. Ontario produced over 50% of respondents. There are some indications that Quebec may be somewhat underrepresented, and this is commented on at various points in the report. However, this is speculative and is not based on an exact knowledge of the number of relevant researchers in each province.

- 61.4% of respondents say they are involved in emergency management research. Fifty percent are involved in critical infrastructure protection and only 11.4% are involved in cybersecurity.

- There are some interesting patterns with respect to simultaneous or overlapping involvement in areas of interest to OCIPEP. In particular, 20% claim to be involved in both emergency management and critical infrastructure protection.

- Respecting respondents' main disciplines the largest explicit category is civil engineering at 10%. Other disciplines representing more than five percent are computer science, electrical and/or computer engineering, geography, geology, information technology and psychology.

- As noted above, the largest discipline category is actually the open-ended "other" category at 31.4%. Details on the composition of this category are provided in the main text of this report.

- Eighty-one percent of respondents said they would be willing to be included in a publicly available database.

- 22.9% of respondents had "other" open-ended comments to volunteer at the end of the Researcher Reporting Form.

- When relationships between involvement and OCIPEP's three main areas of interest were examined, few conventionally significant relationships were found. This is, in part, a function of small sample size. The relationships that were found to be significant are:
    - Main institutional affiliation and involvement in critical infrastructure protection. Institutions tended to either have a fairly high involvement in this area or none at all.
    - Province and critical infrastructure protection. This picks up on the same types of patterns as the institution-critical infrastructure protection relationship. Ontario respondents are fairly likely to be involved in CIP while Quebec respondents are not at all likely to have such involvement.
    - Willingness to be in a public database and involvement in critical infrastructure protection. Specifically, people who were not involved in CIP research were very likely not to want to be included in the database. This may offer some clue as to the optic that respondents emphasize when considering OCIPEP.

Publicly available portions of the database of researchers can be obtained by contacting OCIPEP. A more detailed analysis of the nature of the dataset that was obtained can be found in Appendix C.

3.0 Results of the Researcher Survey

The purpose of the survey was to enable OCIPEP to better understand the perceptions of academics with respect to key issues, including their preferences for funding research in these areas.

3.1 Research Design

The following specifications applied to the survey of academics:

- Researchers who participated in the first phase of the initiative by completing and returning the research reporting form were contacted and invited to participate in an online survey.
- Email invitation letters were sent to all potential respondents. The letter identified the purpose of the research, encouraged participation, and offered assurances of confidentiality. It included a link to take people directly to the questionnaire in the language of their choice and a PIN number to control entry.
- Two email reminders were sent to potential respondents (approximately one week apart). The first was sent on March 18, and the second was sent on March 24.
- The questionnaire included 10 questions and was posted on an independent Web site.
- The questionnaire was available on the Web site between 11 and 26 March 2003.

Of the 71 researchers who were sent invitations, 44 completed the survey. This represents a response rate of 62%.

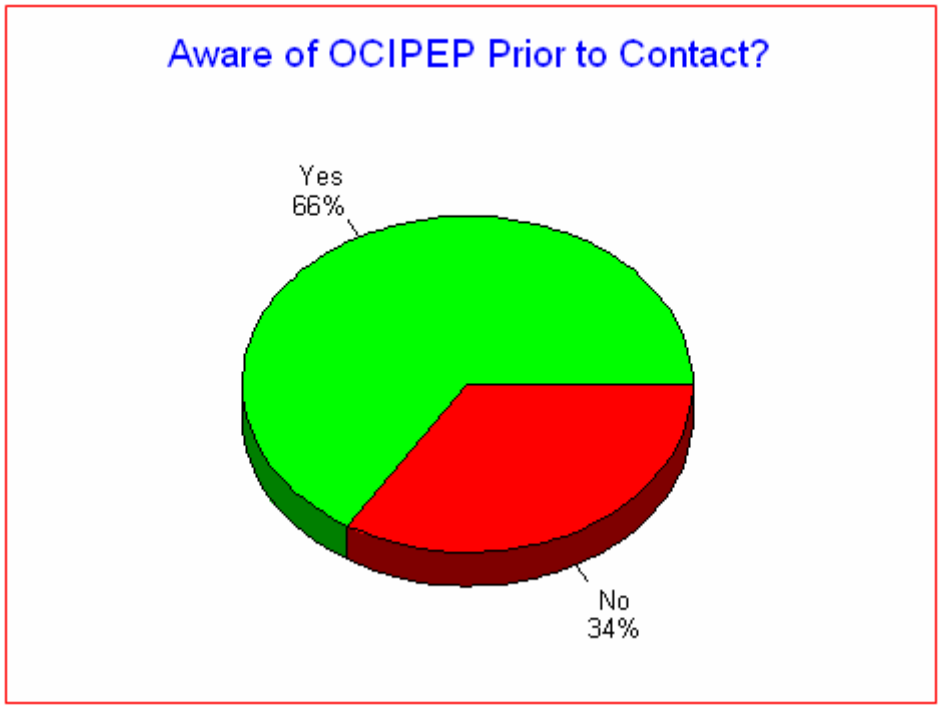
3.2 Awareness of and Involvement in OCIPEP-Related Research

In this section of the survey, researchers were asked about their prior awareness of and familiarity with OCIPEP, their own areas of involvement (i.e. research focus), their level of understanding of OCIPEP's role and research requirements, and their willingness to participate in various types of activities.

3.2.1 Most Researchers Claim Previous Awareness of OCIPEP

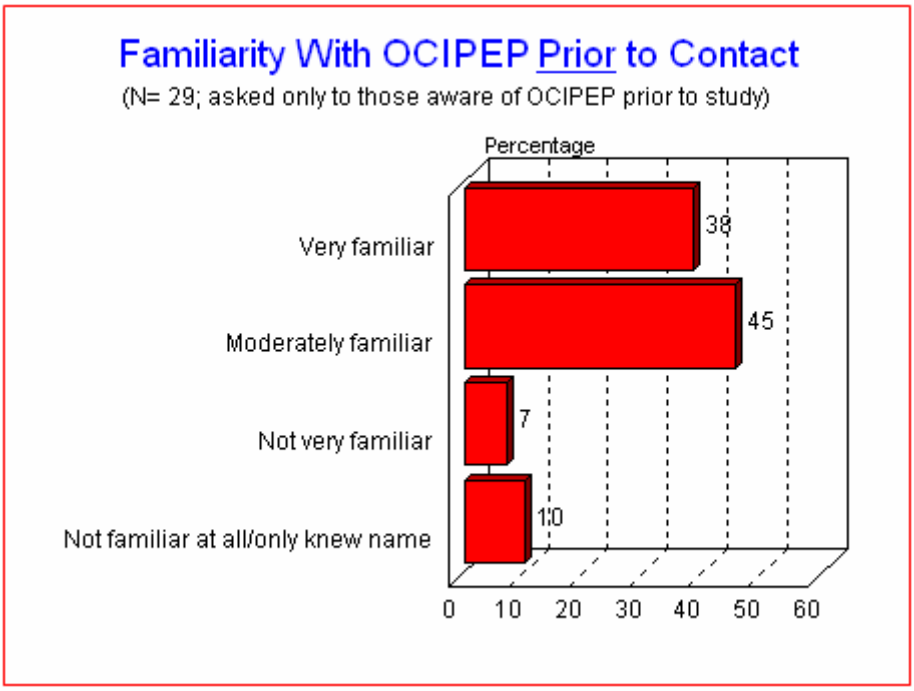
Two-thirds of the researchers who completed the survey claimed to be aware of the Office of Critical Infrastructure Protection and Emergency Preparedness before they were contacted for this initiative. Conversely, 34% were unaware of OCIPEP prior to being contacted.

Figure 1 Awareness of OCIPEP Prior to Contact



Among those who claimed prior awareness of OCIPEP, fully 83% said they were at least moderately familiar with the agency and its mission/role prior to this initiative (over one-third said they were very familiar). The rest had little or no familiarity with OCIPEP or had only heard the name.

Figure 2 Familiarity with OCIPEP Prior to Contact

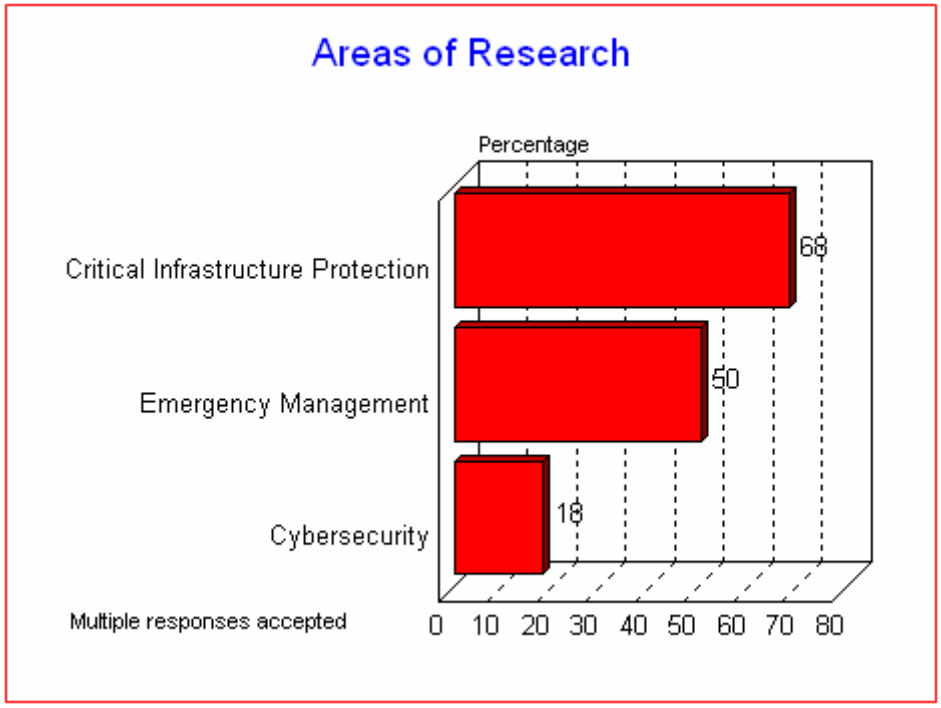


3.2.2 CIP and Emergency Management – Main Areas of Involvement

Researchers were given descriptions of the three research areas of interest to OCIPEP (Critical Infrastructure Protection, Emergency Management, and Cybersecurity) and were asked to identify the one(s) which best describe their own research activities. The three areas were defined in the survey as follows:

- Critical Infrastructure Protection (CIP) – Work related to the safety, security, reliability, dependability or resilience of critical infrastructure. Canada's critical infrastructure includes energy and utilities, transportation, telecommunications, safety services (fire, police, etc.), essential government services, and critical services such as financial, food and water, and health.
- Emergency Management (EM) – Work related to the management of emergencies and disasters of all types.
- Cybersecurity – Work related to studying or improving computer or information security.

Figure 3 Areas of Research

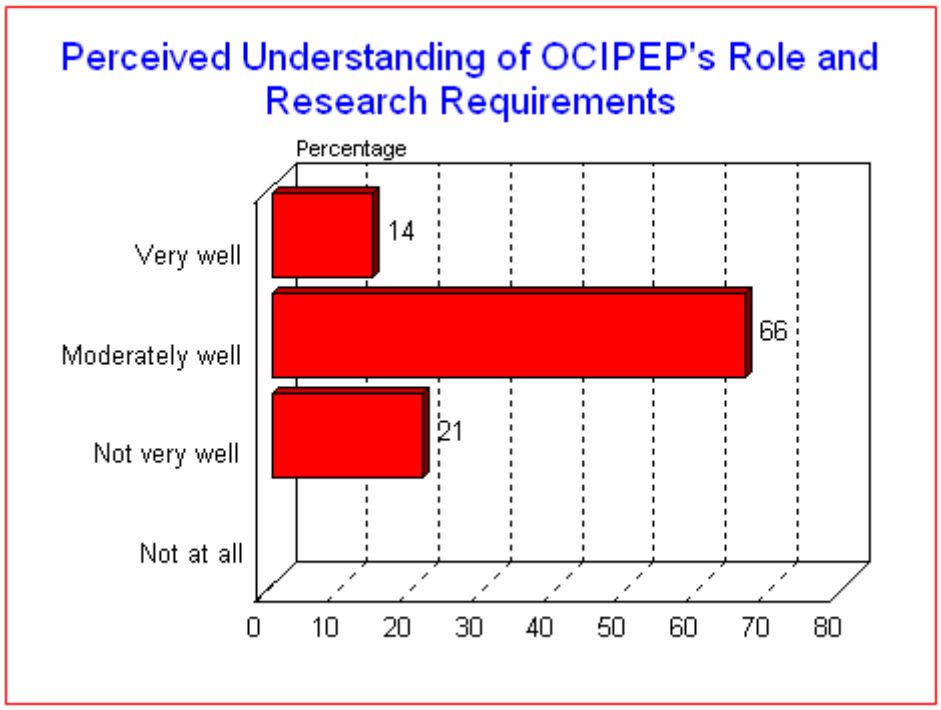


On the basis of these descriptions, just over two-thirds (68%) of the researchers who completed the survey described their research as being in the area of critical infrastructure protection, while exactly half saw it as being in emergency management (multiple responses accepted). Relatively few, comparatively speaking, described their research as being in the area of cybersecurity (18%).

3.2.3 Most Think They Understand OCIPEP's Role and Research Requirements

On the basis of their participation in the first phase of this initiative, over three-quarters of the researchers who completed the survey (80%) think that they understand OCIPEP's role and research requirements. However, they were much more likely to say that they understand this moderately (66%) as opposed to very well (14%). One in five (21%) do not think they have a very good understanding of OCIPEP's role and research requirements.

Figure 4 Perceived Understanding of OCIPEP's Role and Research Requirements



These results came in response to the following question:

> *In Phase 1, you reviewed OCIPEP's research definitions in the areas of CIP, EM and cybersecurity to determine their applicability to your activities, and completed the reporting form for the Inventory of Researchers. After having gone through this process, how well do you think you understand OCIPEP's role and its research requirements?*

3.2.4 Willingness to Participate in OCIPEP-Related Activities Varies

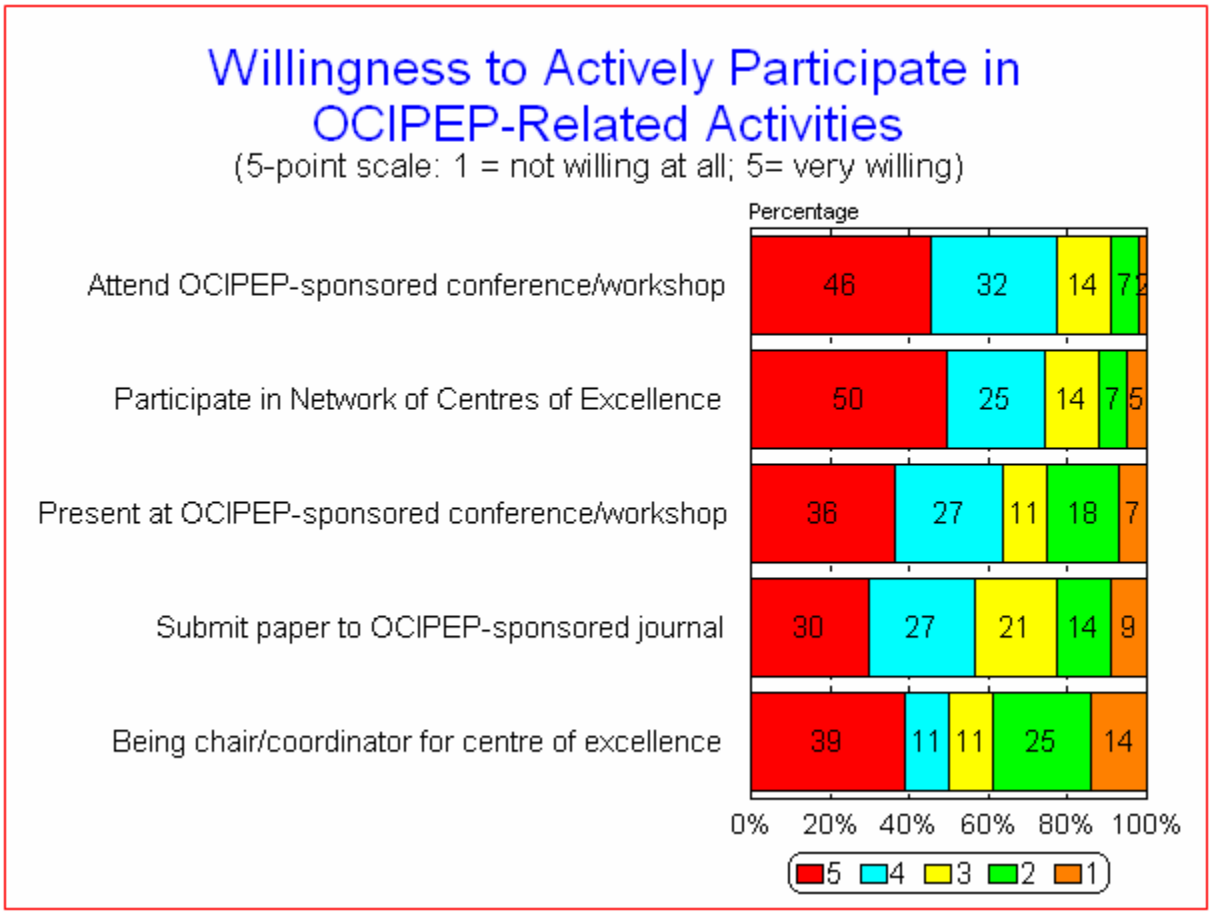
Researchers were asked about their willingness to devote part of their time or resources to various activities related to critical infrastructure protection (CIP), emergency management (EM), and cybersecurity. Using a five-point scale (1 = not willing at all, 5 = very willing), researchers were asked how willing they would be to participate in the following activities:

- Attending an OCIPEP-sponsored conference or workshop focused on CIP, EM, or cybersecurity.
- Presenting at an OCIPEP-sponsored conference or workshop focused on CIP, EM, or cybersecurity.
- Preparing and submitting a paper to an OCIPEP-sponsored journal focusing on CIP, EM, or cybersecurity.
- Participating in a Network of Centres of Excellence (NCE) focusing on CIP, EM, or cybersecurity.
- Being a research chair/coordinator for a centre of excellence in CIP, EM, or cybersecurity.

A majority of researchers expressed a willingness to participate in all these activities. However, the size of the majority varied considerably. There was widespread and similar willingness (75–78%) to attend an OCIPEP-sponsored conference or workshop and to participate in a Network of Centres of Excellence (46–50% were very willing to participate in these activities).

There was less willingness to participate in activities involving more specific, individualized responsibility. While over three-quarters would be willing to attend an OCIPEP-sponsored conference, only 63% would be willing to present at such a conference/workshop. Fewer still would be willing to prepare and submit a paper to an OCIPEP-sponsored journal (57%). Finally, researchers were the least likely to express interest in being a research chair/coordinator for a centre of excellence. While exactly half indicated that they would be willing to take on this type of responsibility, fully 39% said that they would not. Recall that three-quarters said they would be willing to participate in a network of centres of excellence.

Figure 5 Willingness to Actively Participate in OCIPEP-related Activities



3.3 Funding Research

This section focuses on issues related to the funding of research in areas of interest to OCIPEP, including their own response if more funding were made available for research in CIP, EM and cybersecurity.

3.3.1 Perceived Effectiveness of Funding Mechanisms

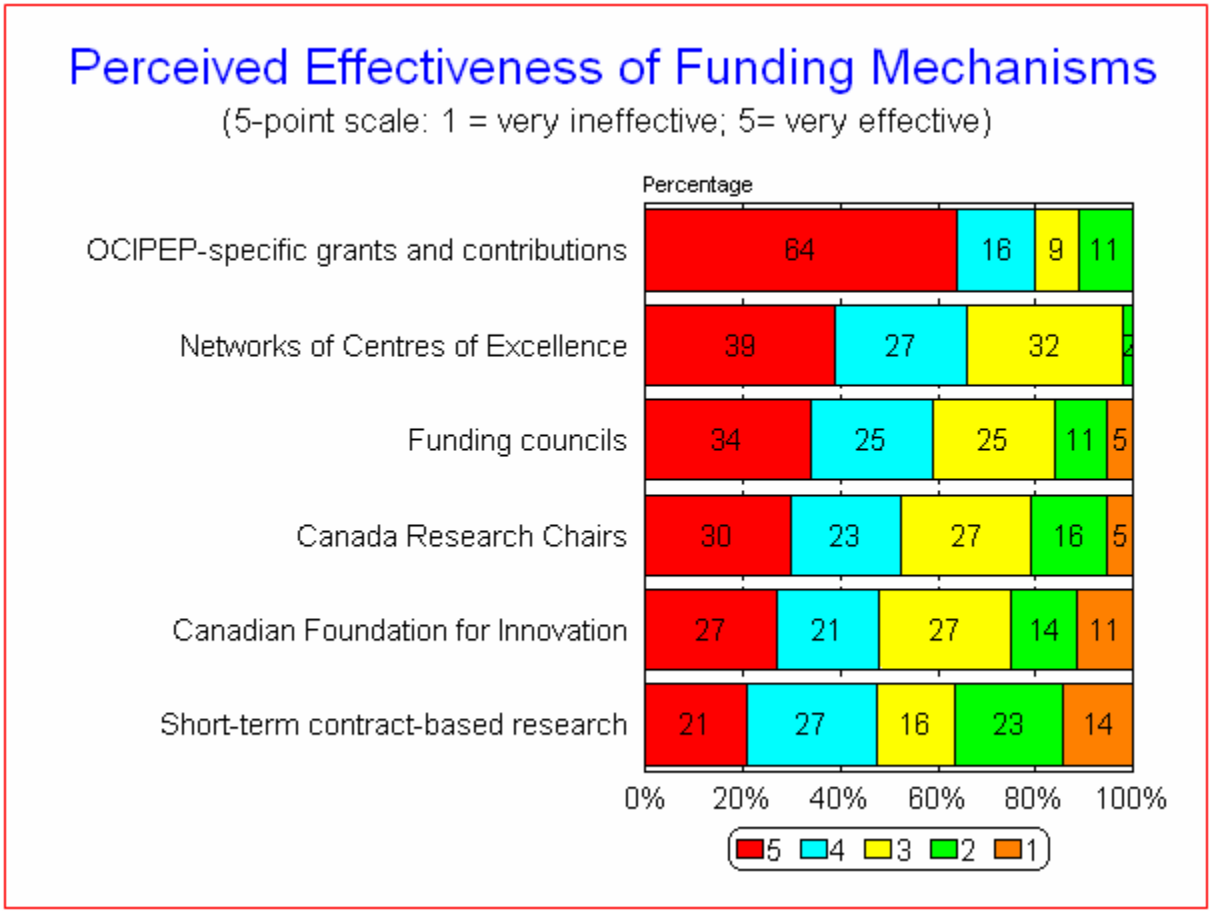
Researchers were asked to rate various different funding mechanisms in terms of their effectiveness in encouraging future research in areas of interest to OCIPEP (i.e. CIP, EM and cybersecurity). To do this, they were asked to use a five-point scale (1 = a very ineffective way to encourage future research; 5 = a very effective way to encourage future research). Funding mechanisms included:

- Funding councils (i.e. NSERC/SSHRC/CIHR)
- Networks of Centres of Excellence (NCEs)
- Canada Research Chairs
- Canadian Foundation for Innovation (CFI)
- Short-term (one year) contract-based research
- OCIPEP-specific grants and contributions mechanism

Perhaps not surprisingly, researchers were the most likely to identify OCIPEP-specific grants/contributions as an effective way to encourage future research. In total, 80% rated this method as effective, with nearly two-thirds viewing it as very effective. Support for other funding mechanisms was less widespread and strong. After OCIPEP-specific grants, Networks of Centres of Excellence were the most likely to be identified as an effective funding mechanism (66%), followed by funding councils (59%) and Canada Research Chairs (53%).

Fewer than half offered positive assessments regarding the effectiveness of the other two funding methods. Forty-eight percent viewed the Canadian Foundation for Innovation as an effective method to fund research, with the rest almost equally divided between those who rated it as neither effective nor ineffective (27%) and those who rated it as ineffective (25%). Researchers were most divided over the perceived effectiveness of short-term contract-based research: while the largest proportion (48%) described it as an effective mechanism, 37% described it as ineffective.

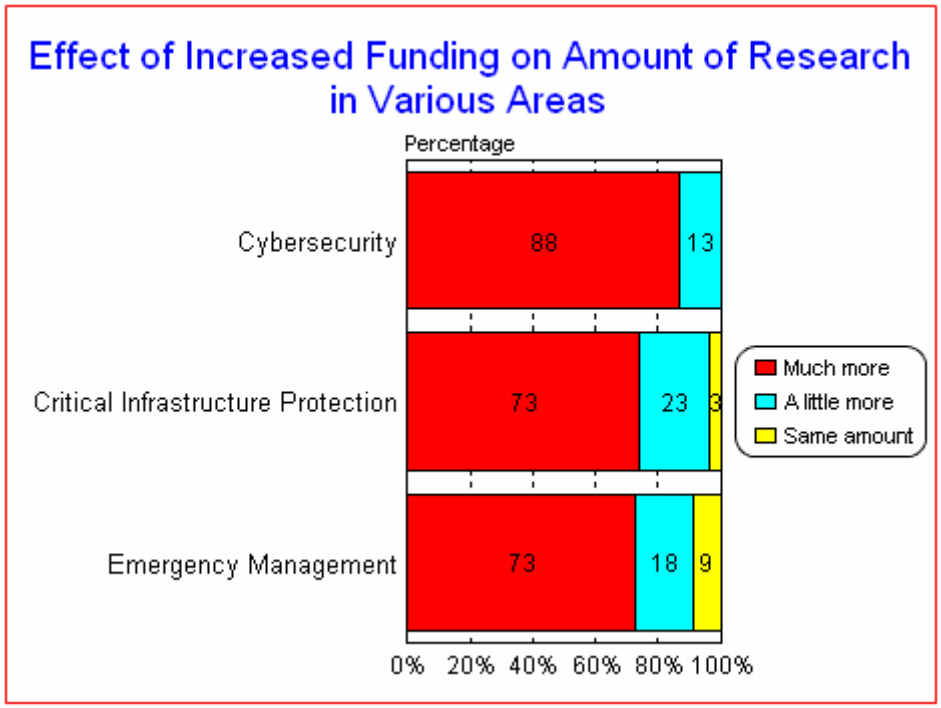
Figure 6 Perceived Effectiveness of Funding Mechanisms



3.3.2 Vast Majority Would Conduct More Research in Areas of Interest to OCIPEP if Funding Increased in Their Areas

The vast majority of researchers, regardless of their area of research, said they would personally conduct more research in these areas of interest to OCIPEP if more funding were available in them. Fully 73–88% said they would conduct much more research (depending on the area), while most of the rest would conduct a little more research. Very few researchers said they would conduct about the same amount of research as they have in the past.

Figure 7 Effect of Increased Funding on Amount of Research in Various Areas



3.3.3 Best Ways of Promoting Research

Researchers were asked to rate a number of ways that Canadian research in CIP, EM and cybersecurity could be promoted. Using a five-point scale: (1 = a very low priority, 5 = a very high priority), people were asked to assess the following in terms of where OCIPEP's efforts should be directed:

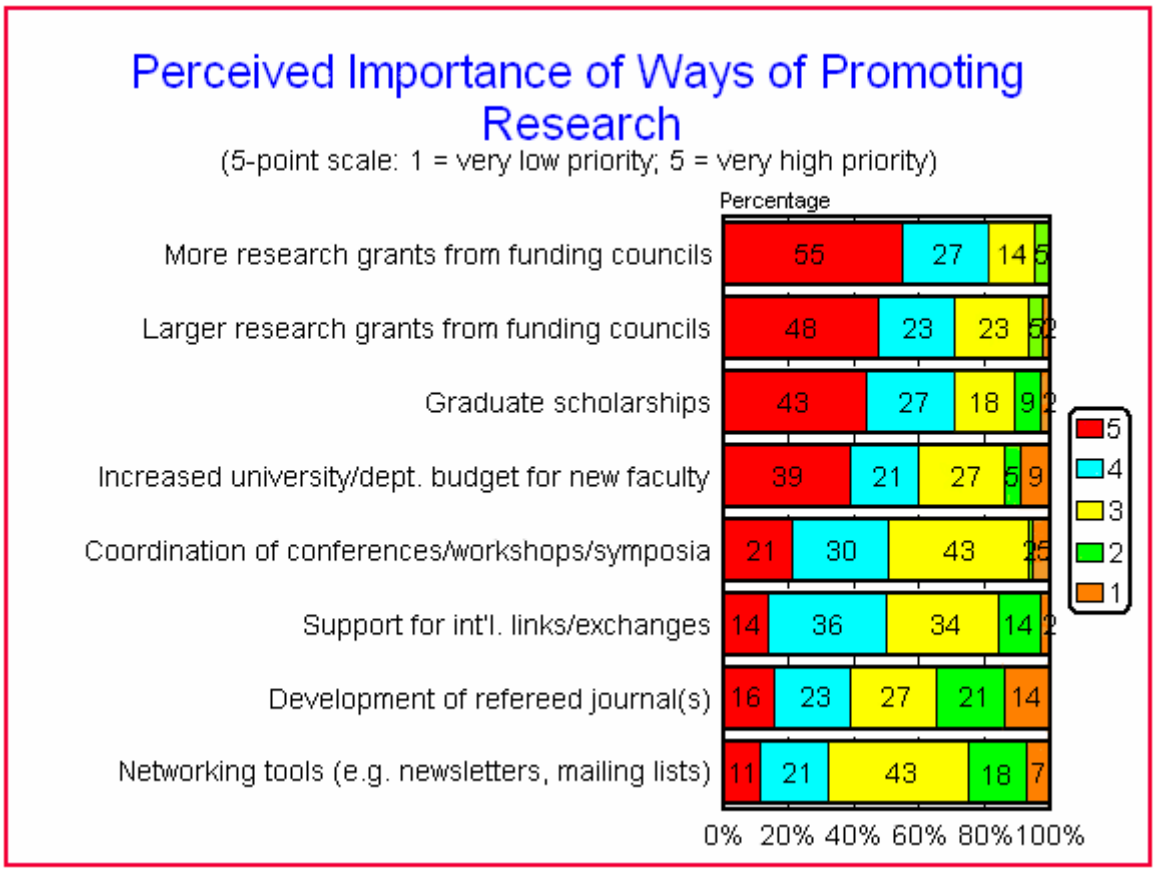
- Increased university/department budget for new faculty members;
- Increased number of research grants available through the funding councils;
- Increased size of research grants available through the funding councils;
- Support/coordination for international links or exchanges;
- Scholarships for graduate and doctoral students;
- Coordination of conferences, workshops, symposia, etc., in these areas;
- Newsletters, mailing lists, and other researcher networking tools; and
- Development of a refereed journal or journals in these areas.

There was widespread support for OCIPEP to be directing its efforts towards more research grants from funding councils. Fully 82% rated this as a priority area (i.e. scores of 4–5 on scale), with 55% attributing it high priority. There was also substantial and almost equal support for larger grants from funding councils and graduate scholarships (70–71%). This was followed by 60% who perceived increased university or departmental budgets for new faculty to be a priority. Between 39–48% attributed high priority to these areas.

Half (50–51%) of respondents felt that coordination of conferences and international links and exchanges should be priorities. However, the level of strong support for these activities was quite low, particularly compared to the items discussed above. People who did not identify these as priority areas were much more likely to view them with relative indifference (scores of 3) than to view them as low priority areas.

Support was lowest for the development of refereed journals and networking tools. Thirty-nine percent regarded the development of a refereed journal or journals in these areas as a priority. A similar proportion (35%) felt that this should not be a priority (27% were indifferent). Almost one-third (32%) regarded networking tools as a priority compared to one-quarter who did not (43% were indifferent).

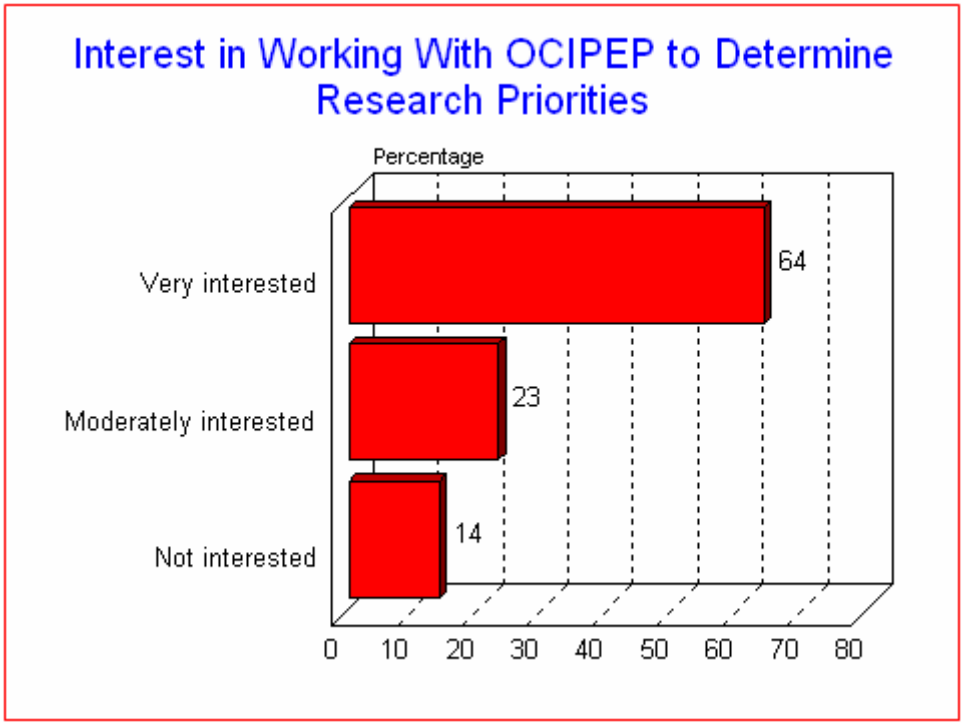
Figure 8 Perceived Importance of Ways of Promoting Research



3.3.4 Strong Interest in Working with OCIPEP

Asked how interested they would be in working with OCIPEP to determine the research priorities in the areas of CIP, EM, and cybersecurity, fully 87% of surveyed academics expressed interest, with nearly two-thirds expressing strong interest.

Figure 9 Interest in Working with OCIPEP to Determine Research Priorities



3.4 Free-text Comments Provided by Respondents

The last survey question asked researchers in an open-ended fashion whether they had any additional comments that they would like to direct to OCIPEP concerning the promotion of Canadian research in the areas of CIP, EM, and cybersecurity.

Over half the respondents (25) availed themselves of this opportunity. What follows is the grouping of respondents' verbatim comments by categories (some comments have been edited to preserve anonymity).

3.4.1 Increased coordination/collaboration between actors:

- *Better communication between government departments dealing with national security issues and the academic community. This could be accomplished, in part, by providing more accurate and up to date information on the various Web sites—Health Canada, DFAIT, and OCIPEP.*

- *The focus of increased research funding should be on collaborative projects with key stakeholders, such as industry and government agencies. If the research is not conducted collaboratively then the utility and the uptake of the findings will be limited.*

- *There needs to be a very strong integration between private sector and public sector work on this. Your questionnaire doesn't even mention private sector work.*

- *My research programs are in other areas, but I am familiar with emergency preparedness issues through participation in several government advisory committees including CRTI. There are two general issues. 1.) How to achieve an adequate state of preparedness in Canada in the short term. Much of the problem here is coordination of jurisdictions within and among different levels of government. OCIPEP should by now have a reasonable idea of the problems. Targeted funding in those areas (complementary or along with CRTI) along with conferences and other means of information exchange would be most effective. 2.) Identification of areas for R&D to improve preparedness in the long term. This is where partnership with the granting councils, universities and industry should be centre-stage, although their participation in immediate problems also should be encouraged. At the moment, implementation of what we already know is a major challenge.*

- *OCIPEP should strengthen its coordination with other government, non-government and private businesses. It can take initiatives to publish more on its activities that benefit Canadians in popular news media.*

- *Creation of mini research networks (like research centres) would be one of effective ways to promote the research. NSERC has a program called research network program which is to facilitate the development of such mini-networks. They are focused and very tailored to the issues. NCE is a national network which needs to capture all aspects of the research. It is sometimes not focused. For CIP/EM/cybersecurity work, focused research as well as coordinated efforts are required. This may not be suited for NCE.*

3.4.2 More targeted research/funding:

- *I believe in this field targeted research is much more likely to be successful than generic research – identify shortcomings and find researchers capable of addressing the questions. The researchers themselves may be capable of identifying the shortcomings but it should be a sequential process.*

- *Assess areas of research need, as measured by human and material/economic impact of emergencies. Focus research support on areas of highest impact. Assessment involves a combination of severity and probability.*

- *In my view the best way to promote research in the areas of CIP/EM/cybersecurity is by providing project specific funds.*

- *Funding targeted researchers in this area*

- *At present there are limited national funding opportunities for my area of interest, emergency management, and the impact that crises have on emergency service organizations. Rather, it is necessary to try to repackage the work in order to make it attractive to funders. Specific funds in this area would be highly valued.*

- *Our university is in the Prairies. Although we have an in interest in all of Canada, we are quite interested in rural issues, including the effects of distant rapid onset events on the Prairies. While this is not our only research interest, it is one of them and is of current interest. Please include an emphasis on the effects of distant events on the Prairies such as, disruptions to exports from this area.*

3.4.3 Positive comments/encouragement:

- *Good questions. I think the responses to these questions will serve a very useful purpose for delineating how OCIPEP can achieve its goals.*

- *This is an excellent initiative by OCIPEP.*

- *I'm delighted to see OCIPEP moving ahead in this direction. We greatly need a national focus and support base for critical research.*

- *I'll watch these developments with interest.*

- *Any endeavour to encourage research in the areas of CIP/EM/cybersecurity is very important. As such, OCIPEP has the potential to play a very important role by becoming a key stakeholder.*

3.4.4 Promoting research:

- *On EM, we need to take a pro-active approach rather than simply responding to emergencies; particularly concerning geological and meteorological hazards (my main interests).*

- *About the second last question: explore relevant existing peer review journal and encourage people to publish in them before investing in a new one.*

- *Using existing mechanisms is more likely to help promote OCIPEP than establishing new purpose-specific ones because there are already too many sources of information and "coordination" to keep track of. Special issues in existing journals, for example, will work to build a constituency amongst established academics, and use of scholarships and research funding will attract new work, but these should use existing distribution mechanisms, or you will only find the people who have nothing to do but search for new money – not necessarily the ones you want to attract! Thanks.*

- *Increasing the critical mass of researchers is a top priority.*

3.4.5 Existing OCIPEP mechanisms:

- *Current distribution of OCIPEP research funds should be changed.*

- *OCIPEP's calls for proposals since 9/11, in my view, posed two problems for academic-based researchers interested in the field: 1.) The deadlines to submit proposals (often 30 days or less) are far too short for many academic researchers, whose time is usually committed more than 30 days ahead. Unless one already had a proposal drafted in the particular area covered by the RFP, most of us don't have the time to spare to prepare a proposal on short notice. OCIPEP may have to anticipate and announce its needs sooner and give longer periods to respond to them. This would allow more time to think about the proposal, to select research partners, etc. 2.) The topics seem oriented more toward business/industrial and technical applications than to academic-type research, particularly in the social sciences. That may simply reflect the reality of OCIPEP's needs.*

3.4.6 Other:

- *Try to address social, behavioural and ethical issues in more detail.*

Appendix A – Description of Methodology for Inventory Phase

A.1 Overview of Efforts to Locate Researchers

A multi-pronged approach was taken for locating researchers for the OCIPEP study. First, a seed list of 56 researchers was obtained from OCIPEP. Then, certain institutional research databases were searched to find researchers. After that, post-secondary educational institutions in Canada were contacted to request access to their faculty (see below for a description of the creation of the sampling frame). In addition, knowledgeable individuals of various kinds were relied on to give guidance as to where appropriate researchers might be located. Whatever methods were used to find researchers, successfully contacted and relevant researchers were used as a source of referrals for potential contacts in the research community. In some cases, this was only true in a general way in terms of defining the types of institutional links that researchers had.

What follows here is a description of the identification and locating of researchers through searches of key institutional databases and the merging of those findings with the original OCIPEP seed list.

A.2 Locating Researchers Through Key Research Funding Agency Databases

At the beginning of the project, it was thought that it might be worthwhile to do general searches of the Web in order to find researchers who could be linked to certain key words. When this was tried, the results overwhelmingly produced government URLs that are not relevant to this project or which are essentially references to OCIPEP itself. In some cases, references to foreign researchers were obtained, but this too is not of relevance to this project.

Based on these early efforts, it was decided to do Web and/or database searches keyed to the primary research funding agencies in Canada. These are:

- National Sciences and Engineering Research Council (NSERC)
- Social Sciences and Humanities Research Council (SSHRC)
- Canadian Institute for Health Research (CIHR)

NSERC has a publicly-available database containing nearly all important information on NSERC grants and award winners in disaggregated form. This can be searched directly on the Web. While the possibility of direct Web searches for CIHR and SSHRC databases was considered, these agencies have not organized their *publicly* available data in a sufficiently disaggregated fashion to be of use in locating specific researchers over a multi-year period. However, based on special requests to those agencies, it was possible to get some useful listings of researchers. Searches relating to each funding agency are noted below.

A.2.1 NSERC Database

The NSERC database allows searching of names of individual grant winners over multiple years. The time criterion that was used in our search was the period 1997–2002 using competition years rather than fiscal years. The following search combinations were tried in order to capture the various aspects of the research of interest to OCIPEP. Logical operators are underlined, and the number of initial grants located is provided in parentheses.

- critical or infrastructure or protection (137)
- emergency or disaster (4)
- [information or technology] and security (1)
- cybersecurity (0)
- security (12 – mostly relating to computer and IT security in some fashion)

Note that it is possible for a researcher to be represented more than once in the above figures as the search actually focuses on separate grants, and a researcher might have received more than one NSERC award in the time period of interest. This was rare, but it did occur.

Once these researchers' projects had been located, a senior researcher went through each one of them and did two things:

- First, each research project was considered as to whether it fell within the broad criteria defined by OCIPEP as being of interest.
- When it was found that a project was of interest, which was the case in the majority of projects located, then the details of the project were put into a contact database, along with basic contact data about the researcher. This contact data often had to be derived from additional searches of university/post-secondary Web sites. However, in many cases, NSERC provides fairly easy ways of accessing such sites in the middle of a search process.

The type of projects (and thus researchers) who were excluded tended to be in certain aspects of biology, metallurgy, small particle physics, forestry or similar fields. Even then, the nature of such studies was considered to see if it might even tangentially be of interest to OCIPEP. Many of the projects that were included related to infrastructure protection and rehabilitation from a civil engineering perspective, the design or protection of computers systems and/or software, mapping or inventorying of assets and the management of critical processes, particularly those relating to utility networks or communications systems.

Note that some researchers were outside Canada. This meant that decisions had to be made concerning their relevance. Generally, if it was possible to get enough information on these types of researchers, they were included if they were a Canadian postdoctoral fellow receiving a grant in the United States. However, they were not included if they had been a Canadian academic who ultimately moved on to a private sector position in another country. This only affected two cases.

Ultimately, this process yielded 68 eligible and distinct researchers.

A.2.2 SSHRC Database

Turning to SSHRC databases, the version of their database that is available online does not provide sufficient information over a period of years to be of much use. However, SSHRC officials were contacted in October, and they agreed to conduct searches in the private version of their database and these searches followed the same general methodology (with minor variations) that had been used in NSERC searches.

Instructions were given to SSHRC officials to try the same search strings that had been used with NSERC. It was also suggested that they try additional strings that seemed useful to them, based on their knowledge of key words in research areas with which they were familiar. SSHRC was told to provide documentation of any other words used. According to documentation provided by SSHRC, they ended up using the following search words:

- Security, surveillance, control, management crisis, conflict, catastrophe, disaster, flood, ice storm, emergency, protection, infrastructure, terror

The search was keyed to the same five-year time frame that had been used with the NSERC data, 1997–2002.

This yielded an initial list of 93 projects, some of which had multiple researchers associated with them. A senior researcher then examined the substance and keywords of these projects with a view to eliminating those that were of marginal relevance. This reduced the list to 55 research projects, each with one or more researchers. This basic information, with associated contact information, was then used to prepare contact lists for future contacting of the researchers.

By way of example, the types of projects that were usually eliminated were those pertaining solely to general concerns with international relations and international conflict and that did not relate to some aspect of the management of Canada's internal affairs. If a project was focused on international relations that had some fairly direct link to the management of Canada's internal security and stability, then it generally was retained on the list.

This yielded 84 valid and distinct researchers.

A.2.3 CIHR Database

Again, the publicly-available online database for this agency was not very useful in terms of detail and level of aggregation. However, a search of the agency's Web site did yield a listing of participants at a recent conference on biological terrorism and related issues. From this list, the names and institutional affiliations of 32 Canadian-based researchers were extracted. Additional follow-up work generated more exact contact information for these people, and they were included in the sample of individual researchers.

It was finally possible to get in touch with a knowledgeable person within CIHR and to have a search of their internal database made. This was done according to the same general parameters used in the other institutional research agency searches mentioned above. This yielded 27 distinct researchers involved in 43 projects. These elements have not yet been included in the contact sample. The reason for this is that they are of doubtful relevance. Nearly all of the research being

conducted by these people relates to very general issues in emergency medicine unit management or related triage issues. They can be added to the researcher sample if desired. However, their primary effect would probably be to increase the apparent non-response rate.

The elements identified in our searches of research agency databases were merged with the OCIPEP seed list.

A.3 Development of Sampling Frame of Post-Secondary Institutions

The sampling frame is a comprehensive list of faculties, departments, schools, and centres within the institutions of higher education in Canada that may conduct research related to critical infrastructure protection, emergency management, and cybersecurity, as defined for this study. The sampling frame identifies the universe of interest with respect to institutions. It serves as the starting point for systematically identifying academics that may be undertaking research of interest to OCIPEP, but does not itself identify researchers of interest.

The sampling frame was developed in two steps. In step one, a database of all institutions of higher education in Canada and their respective Web sites was created. A list of all universities and colleges in Canada was found on the Internet, and then verified through comprehensive provincial lists of universities and colleges.

Step one began with a listing of institutions found in the University of Waterloo's Web site[1] (N=176). Following this, the Association of Canadian Community Colleges (ACCC) Web site[2] was used to add community colleges not found in the University of Waterloo listing. This was done by inputting the data into identical Microsoft® Excel formats, combining the two listings together, and then conducting a word order sort. The ACCC listings include institution name, province, municipality, and Web site (N=295).

In step two, each Web site was systematically explored to identify faculties, departments, schools, and centres within each institution that may house academics whose research is of interest to OCIPEP. The primary focus was departments. In smaller schools, the departments were too small and so the faculty was used. In larger institutions, research centres that grouped faculty around a particular issue and specialized programs were also explored and included in the sampling frame. In such instances, it is understood that the scope of the centre would overlap with the scope of various departments.

Within each post-secondary institution, the following departments, faculties and schools were systematically explored:

Faculty of Engineering

Biological Engineering
Chemical Engineering
Civil and Environmental Engineering

[1] http://www.uwaterloo.ca/canu/index.html
[2] http://www.accc.ca/english/colleges/membership_list.cfm

Computer Engineering
Electrical Engineering
Engineering Science
Materials Engineering
Mechanical & Aerospace Engineering
Mechanical & Industrial Engineering
Mining

Faculty of Medicine

Anaesthesia
Community Health
Emergency Medicine
Epidemiology
Immunology
Microbiology & Infectious Disease
Parasitology
Pharmacology
Toxicology

Faculty of Arts and Science

Agriculture, Food, Nutritional Science
Atmospheric & Oceanic Sciences
Behavioural Neuroscience
Biochemistry
Biological Sciences
Biology
Chemistry
Communications Studies Program
Computer Science
Earth Sciences
Environmental Sciences
Environmental Studies
Geography
Geology
Psychology
Sociology

Faculty of Pharmacy

Faculty/School of Business

School of Health Studies

School of Nursing, Faculty of Health Sciences

A.3.1 Sampling Frame Content

The institutions sampling frame includes the following information:

- Institution
  - name
  - city/town
  - province

- College/Faculty/Department/School/Program
  - name
  - Web site

- Head of department/faculty
  - name
  - title
  - personal email address
  - mailing address
  - telephone number
  - fax number

In total, 267 representatives of post-secondary institutions were contacted. These were drawn from 58 separate institutions (note: there were sometimes several potential contacts in one institution… different departments, faculties, etc.).

A.4 Contacting Researchers and Post-Secondary Institutions

A.4.1 Key Informant Interviews

The contact strategies to be used with potential researchers and post-secondary institutions were assessed through a set of key informant interviews undertaken in advance of the contact phase. These interviews were conducted with post-secondary department heads that were randomly selected from the institutions sample frame that was developed, with attention to diversity of disciplines, institution size, and geographic region. As a result of the feedback received, the definition of research areas of interest was expanded slightly, the reporting form modified (for inclusion in the inventory of researchers), and the email contact note revised.

A.4.2 Contacting Researchers

The database of researchers considered to be potentially involved in areas of interest to OCIPEP contained four elements. The first element consisted of a "seed" list provided by OCIPEP. The remaining elements were based on an examination of three sources: recipients of National Science and Engineering Research Council (NSERC) grants, recipients of Social Science and Humanities Research Council (SSHRC) grants, and academics identified through the Canadian Institute of Health Research (CIHR) Web site. The list developed from these sources contains contact information for 240 researchers, 216 of which included email addresses. Email invitations were sent to all 216 researchers. Email addresses were found for the remaining 24 researchers who were then sent an invitation.

The following steps were undertaken as part of this phase of the research:

- An email invitation was sent to 50 researchers, selected randomly from the list, on November 22. The purpose of this limited mail-out was to serve as an informal pre-test to gauge the initial response of researchers. A negative response, or none at all, would have resulted in a re-consideration of the contact strategy before the full sample of researchers had been approached.
- The remaining invitations were sent out by email one week later, on November 28, as responses from researchers were beginning to arrive, and no negative feedback had been received (or fallout observed).
- Approximately one week after all the email invitations to researchers were sent, follow-up phone calls were made to confirm receipt of the email, encourage participation, and invite recipients to call/email in case of difficulties or questions.
- On December 11, reminder emails were sent to all researchers with the exception of those who had already responded.
- Three subsequent email reminders were sent to researchers who had not responded. The second reminder was sent out on 19 December 2002, the third on 13 January 2003, and the fourth and final reminder was sent out on 19 February 2003.

A final set of follow-up phone calls was made during the week of February 24th, five days after the final email reminder was sent. Calls were made to all researchers who had not already responded.

In total, therefore, researchers on the original list received five email notices/letters about the initiative and two phone calls. This represents a very intensive reminder regime to try to engage potential participants.

In addition, contact was made with five researchers, not on the initial contact list, whose names were provided by other researchers. As noted, of the 245 researchers that were contacted, 50 returned completed forms, seven indicated a lack of interest, and 62 said that this did not apply to them. In total therefore, some form of response was received from 49% of the researchers contacted.

A.4.3 Contacting Post-Secondary Institutions

On December 10 and 11, 267 email letters were sent to post-secondary institutions across the country (including faculties, departments, research groups within institutions) asking for their assistance and support for the OCIPEP initiative.

A reminder regime, including follow-up phone calls and emails, was initiated at the beginning of January and continued until this phase of the initiative was completed. A first set of reminder emails was sent out on 6 January 2003, with reminder phone calls taking place the week of January 20th. A second set of reminder emails was sent on February 25, followed by a second set of phone calls during the last week of February and the first week of March.

In total, therefore, post-secondary institutions received three email notices/letters about the initiative and two phone calls. A total of 58 distinct institutions were contacted. As well, a total of 21 individual researchers returned completed forms to be added to the inventory.

Appendix B – Researcher Inventory Form

OCIPEP Inventory of Researchers
Reporting Form

Please provide information about yourself and your research activities so that you can be included in the Inventory of Researchers that is being compiled by the Government of Canada's Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP). An important part of OCIPEP's mandate is to ensure a strong research community with the capacity and capability to address emergency planning, critical infrastructure protection and cybersecurity issues. To this end, OCIPEP is interested in identifying academic researchers and research groups that contribute to these important areas in order to gain a national perspective on the status of such work in Canada, and to facilitate and support future work in these areas.

The information that you provide will be treated in confidence, will only be used for the purposes of this study, and will not be shared without your consent. It should only take you about 15 minutes to provide the requested information. If something does not apply to you, please just skip that part of the Inventory form.

Should you have any questions about this initiative, please contact Adam Hatfield of OCIPEP at the following email address – adam.hatfield@ocipep.gc.ca – or by phone at 1-800-830-3118.

Thank you for agreeing to participate in the Inventory of Researchers.

Inventory of Researchers

Contact/Background Information

1. Please provide your full name. _____

2. What is your preferred title? Please choose one response from the options below by putting an **X** in the appropriate box.

• President	
• Vice-President	
• Dean	
• Director	
• Chair	
• Professor	
• Associate Professor	
• Assistant Professor	
• Adjunct Professor	

• Professor Emeritus	
• Doctor	
• Other (specify):	

3. Please provide:

a) Your main work telephone number and an alternative number at which you can be reached, including your area code and extension number (where relevant).

Main work phone number: _____

Alternative phone number: _____

b) Your main email address and an alternative email address at which you can be reached (if you have one).

Main email: _____

Alternative email: _____

c) Your personal Web page address/URL (if you have one).

Web page: _____

d) Your office mailing address.

Office Number:	
Building:	
Department/School/Research Unit:	
University/College or Similar Level of Institution:	
Street Name and Number:	
City:	
Province:	
Postal Code:	
Post Office Box (if relevant):	

Research Activities/Areas of Interest

A key part of this study is to understand the research activities and areas of interest that researchers are involved in. Please give particular care to the questions in this section.

4. Which of the following fields do your research activities best fall within?
   Please choose all that apply by putting an X in the appropriate box(es).

• Emergency Management	
• Critical Infrastructure Protection	
• Cybersecurity	

5. What is the major discipline in which you do most of your work? Please choose from the options below by putting an X in the most appropriate box (one only).

• Biology	
• Chemistry	
• Civil Engineering	
• Computer Science	
• Economics	
• Electrical and/or Computer Engineering	
• Environmental Sciences	
• Geography	
• Geology	
• Information Technology	
• Management/Administrative Studies	
• Mathematics	
• Mechanical Engineering	
• Medicine or Health Sciences	
• Physics	
• Psychology	
• Public Policy	
• Sociology	
• Statistics	
• Other (specify):	

6. Please describe the major sub-discipline(s) in which you do most of your work.

_____

7. Please indicate the key words that best describe your main areas of research interest.

_____

8. Below, please provide a brief description of the most significant or representative research projects (to a maximum in which you are or have been involved in the areas of emergency planning, critical infrastructure protection or cybersecurity.)

Project 1: _____

Project 2: _____

Project 3: _____

Project 4: _____

Project 5: _____

9. Please identify your most significant or representative publications (articles/papers) in the areas of emergency planning, critical infrastructure protection or cybersecurity (include no more than 10). When you do this, please use the standard citation format most common in your field.

Citation 1 _____
Citation 2 _____
Citation 3 _____
Citation 4 _____
Citation 5 _____
Citation 6 _____
Citation 7 _____
Citation 8 _____
Citation 9 _____
Citation 10 _____

10. If you have any abstracts of research activities in the areas of emergency planning, critical infrastructure protection or cybersecurity, please send them as an attachment (Microsoft® Word preferred).

Research Affiliations

11. Please provide the names of your major institutional affiliations. By institutional affiliation, we mean such things as your membership in research centres, research groups, research institutes, other universities that you are formally associated with, or similar kinds of formally constituted organizations.

Institution 1: _____
Institution 2: _____
Institution 3: _____
Institution 4: _____
Institution 5: _____

12. Now, please provide a brief description of your less formal research group affiliations. By this, we mean things like groups of people who are jointly applying for grants, involved in working together on existing projects, or networks of researchers that communicate about research issues without necessarily being part of some formal organization. We are only interested in collaborations in the areas of emergency planning, critical infrastructure protection and cybersecurity.

Group 1: _____

Group 2: _____

Group 3: _____

Group 4: _____

Group 5: _____

13. Please list below your memberships in academic, professional, trade, industry or similar groups that you feel are useful or relevant to research in the areas of emergency planning, critical infrastructure protection or cybersecurity.

Membership 1: _____
Membership 2: _____
Membership 3: _____
Membership 4: _____
Membership 5: _____

Inclusion in Publicly Available Database

14. Please put an **X** in the appropriate box below to give or deny permission for your information to be included in a publicly available database of researchers active in the areas of emergency planning, critical infrastructure protection and cybersecurity.

• I GIVE MY PERMISSION for my inclusion in a publicly available database of researchers in the areas of emergency planning, critical infrastructure protection and cybersecurity.	
• I DO NOT give my permission.	

If you have any additional comments or information that you wish to provide, please include it here (optional):

_____
_____
_____
_____
_____

Thank you.

This completes your participation in this important part of our project.

Appendix C – Detailed Analysis of Inventory Results

C.1 Introduction

Phase I of this project produced a data set containing 70 respondents. Of these 70, 20 came from the institutional contact lists and 50 came from the lists of individual researchers that were extracted from major granting agencies such as CIHR, NSERC and SSHRC, as well as from OCIPEP. The research proposal had indicated that a basic summary report of this data would be provided if numbers warranted. The number of respondents is just great enough to suggest that there would be some benefit in examining distributions for variables in Researcher Reporting Form data. The purpose of this report is to give a very basic picture of the contours of the information obtained from respondents as well as some insight into the general quality and usefulness of the data for further analysis. This should provide a preliminary basis for OCIPEP's efforts at identifying and nurturing a research community linked to OCIPEP's mandate.

First, we will provide an overview of the extent to which questions did elicit responses. Second, we will present a frequency distribution for each major variable in the data. Finally, we will look at the major bivariate relations between key variables that can be reasonably examined using bivariate statistics. In particular, we will look at how respondent identification of areas of interest relevant to OCIPEP relate to classifying variables such as title/position of the researcher, post-secondary institution with which they were associated, province in which the institution is located, and major discipline of the respondent.

The complexity of analysis that can be undertaken is limited by the relatively small sample size and the presence of large numbers of alpha or string variables in the data set. Most of these string variables are of secondary importance. However, some of them could be converted into useful numeric variables in later analysis if desired. Some of the string variables have been converted to numeric form for this analysis. Others are presented in descriptive form in the main text or in later appendices.

C.2 Overview of Response Rates for Different Questions

In order to provide a general idea of data quality, we will briefly consider the percentage of respondents who gave valid responses to major questions. The actual substance of their responses will be presented subsequently.

First of all, 100% of respondents did provide us with basic classifying information including preferred title, major institutional affiliation, province of residence and main discipline. Albeit, with respect to the last point, 31.4% gave an "other" response for main discipline, but it is possible to connect such responses with more detailed meaning. Some respondents did think that out explicit list of disciplines was lacking. However, a closer look at those respondents suggests that they often have an overly refined or particular view of their own area of concentration.

When we turn to the questions indicating whether or not a respondent has a perceived involvement in any of OCIPEP's three main areas of interest, we find that 92.9% indicated that they did have an involvement in at least one of those areas.

Similar information on other questions is as follows:

- 94.3% made some explicit indication of sub-discipline in question 6.
- 95.7% made some explicit description of their research area in question 7.
- In the question 8 series, 90% were able to name at least one specific research project in which they had been involved that related to OCIPEP's mandate.
- In the question 9 series, 68.6% were able to name at least one publication relating to their work in OCIPEP's areas of interest.
- In the question 11 series, 65.7% were able to name at least one formal institutional affiliation other than their main one.
- In the question 12 series, 57.1% were able to name at least one informal research group affiliation.
- In the question 13 series, 67.1% were able to name at least one academic, professional, trade, or industry organization in which they had membership.
- In question 14, relating to permission for inclusion in a database, only one person did not provide an explicit response. For the purposes of analysis, it was assumed that this person did not want to be included.
- In question 15, concerning other comments the respondent might wish to make, 22.9% provided such responses.

C.3 Preliminary Univariate Results

C.3.1 Distribution of Respondent Titles

Here, we turn to a bit more detailed view of the substance of response on selected variables. Skipping over some of the initial material in the form that related to names and addresses, the first generally useful piece of information is contained in Question 2 regarding the respondent's preferred title. The results for this are as follows:

2. What is your preferred title?

		Frequency	Percent	Valid	Cumulative Percent
Valid	Vice President	1	1.4	1.4	1.4
	Director	9	12.9	12.9	14.3
	Chair	4	5.7	5.7	20.0
	Professor	20	28.6	28.6	48.6
	Associate Professor	14	20.0	20.0	68.6
	Assistant Professor	6	8.6	8.6	77.1
	Adjunct Professor	2	2.9	2.9	80.0
	Professor Emeritus	4	5.7	5.7	85.7
	Doctor	5	7.1	7.1	92.9
	Other or Ambiguous	3	4.3	4.3	97.1
	Ph.D. Candidate	2	2.9	2.9	100.0
	Total	**70**	**100.0**	**100.0**	

Not surprisingly, this sample consists primarily of working academics with a small, but not insubstantial, number of people working in more executive-type positions in academia and related institutions.

C.3.2 Distribution of Respondent Main Institution

Data were extracted from address string variables in order to construct a code for institution with which a respondent was associated. Results are as follows:

Respondents' post-secondary institution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	York University	2	2.9	2.9	2.9
	University of Western Ontario	6	8.6	8.6	11.4
	University of Waterloo	2	2.9	2.9	14.3
	University of Toronto	10	14.3	14.3	28.6
	University of Ottawa	1	1.4	1.4	30.0
	University of New Brunswick	4	5.7	5.7	35.7
	University of Manitoba	2	2.9	2.9	38.6
	University de Guelph	2	2.9	2.9	41.4
	University of Calgary	3	4.3	4.3	45.7
	University of British Columbia	3	4.3	4.3	50.0
	University of Alberta	3	4.3	4.3	54.3
	Laval University	2	2.9	2.9	57.1
	Université du Québec	3	4.3	4.3	61.4
	Simon Fraser University	4	5.7	5.7	67.1
	Ryerson University	2	2.9	2.9	70.0
	Royal Military College of Canada	3	4.3	4.3	74.3
	Queen's University	4	5.7	5.7	80.0
	Memorial University	3	4.3	4.3	84.3
	McGill University	2	2.9	2.9	87.1
	Dalhousie University	2	2.9	2.9	90.0
	Carleton University	2	2.9	2.9	92.9
	Brandon University	1	1.4	1.4	94.3
	Saint Mary's University	1	1.4	1.4	95.7
	University of Saskatchewan	1	1.4	1.4	97.1
	Private person with link to Ryerson	1	1.4	1.4	98.6
	John P. Robarts Research Institute	1	1.4	1.4	100.0
	Total	**70**	**100.0**	**100.0**	

The country's main post-secondary institutions seem reasonably well covered. Note that institutions in the "University of Quebec" system are placed in one category. Similarly, all public university campuses in New Brunswick are placed in one category. Some further comment on

coverage of institutions is useful, and detailed comments on gauging the degree of coverage are provided in Appendix D. Given the logic developed in that appendix, we note that it is reasonable to say that we have covered about 43% of the potentially relevant institutions. However, this should be taken as a conservative perspective in that the way one defines "potentially relevant" is somewhat arbitrary. Note that the lack of extreme clustering in specific institutions is probably in part the result of the fact that the lists derived from funding agencies were the most efficient in yielding completed sample points. There is probably a bit of a (somewhat useful) bias in such lists to show some spread of awards across a reasonable variety of institutions.

C.3.3 Provincial Distribution of Respondents

Looking at this in terms of the provincial locations of the respondents, we find the following:

Provincial Code

		Frequency	Percent	Valid	Cumulative Percent
Valid	Alberta	6	8.6	8.6	8.6
	British Columbia	7	10.0	10.0	18.6
	New Brunswick	4	5.7	5.7	24.3
	Newfoundland	2	2.9	2.9	27.1
	Nova Scotia	3	4.3	4.3	31.4
	Ontario	37	52.9	52.9	84.3
	Québec	7	10.0	10.0	94.3
	Manitoba	3	4.3	4.3	98.6
	Saskatchewan	1	1.4	1.4	100.0
	Total	**70**	**100.0**	**100.0**	

Prince Edward Island does not appear in the sample. Ontario is the dominant part of the sample, taking up over 50% of the cases. This is not unexpected, as Ontario is the largest province in terms of population. However, from that point of view, it is perhaps slightly surprising that Quebec, another major centre of population, does not have a higher representation in the results. In any case, these are just impressions of the results and are not based on an actual knowledge of the distribution of post-secondary faculty in Canada. Yet, we do know that some potentially relevant Quebec institutions did not provide any respondents.

C.3.4 Linkage of Respondents to Main Areas of OCIPEP's Mandate

Turning to involvement in general areas of research of interest to OCIPEP we see the following patterns emerging from responses to Q4:

4_1. Your research activities: Emergency Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not involved in emergency preparedness	27	38.6	38.6	38.6
	Involved in emergency preparedness	43	61.4	61.4	100.0
	Total	**70**	**100.0**	**100.0**	

4_2. Your research activities: Critical Infrastructure Protection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not involved in Critical Infrastructure Protection	35	50.0	50.0	50.0
	Critical Infrastructure Protection	35	50.0	50.0	100.0
	Total	**70**	**100.0**	**100.0**	

4_3. Your research activities: Cybersecurity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not involved in Cybersecurity	62	88.6	88.6	88.6
	Involved in Cybersecurity	8	11.4	11.4	100.0
	Total	**70**	**100.0**	**100.0**	

61.4% claim to be involved in emergency management research. Exactly 50% claim involvement in critical infrastructure protection. Finally, only 11.4% claim involvement in cybersecurity. This last figure seems somewhat surprising, but, in all likelihood, it probably is a rarer interest than the others, no matter how measured. Commentary on this analysis from other team members has underlined the fact that enrolments in fields such as computer engineering tend to be lower than in other areas of engineering. Also, people with background in computer engineering and computer science may be highly likely to be drawn into private sector research and away from research in the kinds of institutions focused on in this data.

It is of interest to consider how these expressions of research interest overlap. In other words, some respondents will name more than one of the three areas as a focus for their work. The following table provides a summary of such overlap patterns:

Profile of involvement across all three OCIPEP fields

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Involved in all three	2	2.9	2.9	2.9
	Involved in EM and CIP	14	20.0	20.0	22.9
	Involved in EM and CS	1	1.4	1.4	24.3
	Involved in CIP and CS	2	2.9	2.9	27.1
	Involved in EM	26	37.1	37.1	64.3
	Involved in CIP	17	24.3	24.3	88.6
	Involved in CS	3	4.3	4.3	92.9
	Not involved in any of the three fields	5	7.1	7.1	100.0
	Total	**70**	**100.0**	**100.0**	

As can be seen above, there are important overlaps across the three research domains. In particular, note that 20% of respondents indicate involvement in both emergency management and critical infrastructure protection. There are small overlaps between cybersecurity and the other areas. However, simply because of the low frequency of people involved in cybersecurity its overlaps with other areas must also be minimal.

Later in this summary, we will return to the above variables and make them the focus of more detailed analysis.

C.3.5 Distribution of Respondent Main Discipline

Turning to question 5 concerning a respondent's major discipline, the results are presented below:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Biology	1	1.4	1.4	1.4
	Chemistry	1	1.4	1.4	2.9
	Civil Engineering	7	10.0	10.0	12.9
	Computer Science	4	5.7	5.7	18.6
	Economics	1	1.4	1.4	20.0
	Electrical and/or Computer Engineering	5	7.1	7.1	27.1
	Environmental Sciences	2	2.9	2.9	30.0
	Geography	5	7.1	7.1	37.1
	Geology	4	5.7	5.7	42.9
	Information Technology	4	5.7	5.7	48.6
	Management or Administrative Studies	2	2.9	2.9	51.4
	Mechanical Engineering	3	4.3	4.3	55.7
	Medicine or Health Sciences	2	2.9	2.9	58.6
	Psychology	4	5.7	5.7	64.3
	Public Policy	1	1.4	1.4	65.7
	Statistics	2	2.9	2.9	68.6
	Other	22	31.4	31.4	100.0
	Total	**70**	**100**	**100**	

Disciplines in our closed-ended listing representing more than five percent of the sample are civil engineering, computer science, electrical and/or computer engineering, geography, geology, information technology and psychology.

Respondents were allowed to specify their own disciplines if they didn't think they fit into the explicit categories. Twenty-two respondents wanted to make their own specification. This amounts to 31.4% of the sample and was far larger than any of the closed-ended categories. In some cases, their responses are probably overly particular or whimsical, but they do shed some additional light on the disciplinary structure of the sample. One response was associated with each item in the list given below. Obviously, some of the responses are virtually the same and should be combined in future analysis. For example two respondents noted variants of "Geomatics" as a response. Two respondents mentioned "Microbiology" as at least part of their response. "Social Work and Medical" and "Service Social" could reasonably be combined into the same category also, even though one of the respondents may be more involved in medical social work activity.

The following is a complete list of the "other" self-described disciplines:

- Aerospace Engineering
- Biosafety
- Communications Technology
- Cybercartography, mapping

- Emergency Management
- Ethics and Philosophy
- Foresterie/hydrologie
- Geomatics
- Geomatics (Information Systems)
- Hacktivism
- History/Conflict Studies
- International Relations
- Meteorology
- Microbiology
- Microbiology & immunology
- Military Studies
- Nuclear and Radiation Technology
- Pharmacology
- Politics
- Risk Management
- Service Social
- Social Work and Medical

Before leaving the question of disciplinary designation, it should be noted that the original form of the question directed respondents to designate one "main" discipline. Several respondents did not understand or chose to ignore this instruction. Therefore, they gave responses pertaining to a variety of disciplines. The analysis provided above is based on assigning such multiple response respondents one of their choices. However, sufficient information is preserved in the data set so that if someone wished to look at all the (sometimes technically inappropriate) responses such people made, it could be done using a series of dichotomous variables created in the data set. Another point to note is that, in a few cases, the author of this report assigned a main discipline to a person where they had not provided a designation, but it was obvious they were teaching in a particular kind of academic unit associated with a particular discipline.

Much of the rest of the questionnaire covers information about specific citations, secondary institutional attachments and memberships. These were necessarily coded as string variables. For this reason, the possibilities for analysing them or generalizing from them in their present form are somewhat limited. They could be turned into numeric variables with a bit of work, but it is debatable whether they would be much more useful in that form. In any event, we will display some basic listings of the responses for the main variables in this part of the questionnaire.

C.3.6 Distribution of Respondent Sub-Discipline

Question 6 dealt with the respondents' major sub-disciplines. Open-ended responses were recorded. Specific responses for question 6 were as follows:

- Aerodynamics, gasdynamics, explosions, propulsion
- Application of GIS and remote sensing technology to geomorphology
- As VP Research I have responsibilities for risk management across campus
- atmospheric science, storms, climate

- bacteria and bacterial viruses
- Biochemistry and microbiology
- Biology, Geology, Geography, Health, GIS
- CBRN protection and toxicological implications of exposure to chemical agents
- Chemistry, toxicology, biosafety
- Clinical Pharmacology with a focus on toxicology and adverse reactions
- Community Policy and Planning
- Computer and Network Security
- computer modelling, statistical analyses and modelling
- Computer Science and Engineering
- conflict analysis
- Conflict Studies and Military History
- conséquences des catastrophes sur la santé biopsychosociale des sinistrées et des intervenants; conséquences des catastrophes en milieu rural
- Critical Infrastructure Protection
- Data networking
- Decision Science
- Education and lobbying for chemical defence and preparedness. Note, I am not directly conducting research in my lab, but am involved in a number of administrative activities (Biological and Chemical Defence Rev).
- Electrical Power System
- Environmental and Occupational Epidemiology
- Environmental Ethics
- Epidemiology, food safety
- Fatigue, fracture, failure analysis and life prediction of materials/components/structures
- Fire and Explosions, Forensic Engineering
- Fluid Mechanics, Computational Fluid Dynamics
- Foreign Policy Studies
- Geomatics applied to earth-science problems (Geohazards)
- Geomatics Engineering
- géomorphologie, dendrochronologie
- geomorphology, paleohydrology, paleoclimates
- geomorphology, storm and climate change impacts, natural hazards
- Géophysique appliquée, Géotechnique des régions froides, Science du pergélisol, Mesures in situ en géophysique et en géotechnique
- Health and Environmental Risks: Risk Management and Risk Communication
- Human Factors, I/O Psychology
- icing
- International Relations
- Mobile and pervasive computing
- Mobile Mapping Systems, Navigation Systems
- natural geological hazards
- Non-destructive testing and imaging
- Political Studies – Local Government

- Power System
- Protection of Electric Power Systems, Control of Electric Generating Units
- Public Policy, Public Participation, Impact Assessment
- Quaternary geology
- Regional and rural development theory and practice with special emphasis on sustainable development in Africa and indigenous development strategies in Africa; Canada's international policies in ODA and technology
- Remote Sensing
- Researching drugs for treating smallpox in the event of an outbreak
- Resource and Environmental Management
- robotics, intelligent systems, computer vision
- Science du feu, télédétection, sécheresse, e-learning
- snow avalanches
- Social Work, psychiatry
- software safety
- Structural engineering, buildings and bridges, reinforced and prestressed concrete, using advanced composite materials for both new structures and retrofit of existing structures (damaged or functionally obsolete)
- Structural Engineering, Earthquake Engineering
- Structural Engineering, Risk and Reliability Analysis, Highway Bridge Evaluation and Rehabilitation
- Technology Assessment
- Telecommunications and Policy
- télécommunications numériques, sécurité informatique
- transportation
- water resources engineering
- water supply and distribution networks

All but four respondents provided sub-discipline detail.

C.3.7 Key Words Associated with Respondent Research

In question 7, when asked to identify the key words associated with their research, the following wide variety of verbal responses were received:

- anthrax, toxin, Bacillus anthracis
- Biology
- coastal erosion, river flooding, slope failures
- coastal ice, natural resources, image analysis, visible, IR, radar
- code calibration, full-scale testing, concrete structures, steel structures
- computer security
- concrete, steel, FRP, advanced composites, bridges, beams, columns, strengthening, repair, prestressed, flexure, shear, compression, tension
- development, ODA, applied geomatics, atlas development, cartographic theory
- earthquakes, volcanoes, landslides
- Emergencies-Local Response 1
- emergency telecommunications
- emergency telecommunications, critical infrastructure, disaster information networks
- energy and utilities, power system protection, computer-based protection
- environmental risk assessment and management; emergency management; public policy assessment; mitigation; environmental education
- environmental ethics; human values and perceptions of risk;
- explosions, detonations, blast waves, effect on structures
- extreme hazards analyses, climate change and variability, modelling of extremes
- fatigue, fracture, corrosion, failure analysis, life prediction and extension, mechanical behaviour
- fire explosions
- flood
- food safety, antibiotic resistance, E coli O157:H7
- géomorphologie, instabilité des versants, montagnes, avalanches, slushflows, dendrochronologie, géorisques
- glacier changes, sediment yield, extreme events, surface erosion
- Globalism, terrorism, conflict studies, Canada-U.S. Relations
- Hacktivism, civil society, world politics, infowar, cyberwar
- human health risk assessment strategies; epidemiology of biological aerosols and human health, injury prevention, agricultural environments
- hydraulic events, system reliability, water quality
- icing
- imaging, tomography, detection
- information security culture, decision-making under stress, critical teams
- intrusion detection, counter-hacking
- microbial genetics, bacterial viruses, botulinal toxins
- mitigation strategies, vulnerability analysis, business impact studies, policy development
- mitigation, prevention, planning, hazard and vulnerability assessment

- mobile multi-sensor systems, navigation systems, imaging sensors, sensor integration, mapping, Geographic Information Systems (GIS)
- mobile, distributed, pervasive, wireless, resource limited, fault tolerant
- natural hazards, climate change
- Natural hazards, mitigation, mountain environments, landslides, GIS
- natural toxins, exposure assessment, industrial hygiene
- neuromuscular disease, neuromuscular physiology, chemical warfare agents, education, lobbying, hospital preparedness
- peacekeeping, conflict resolution, international peace and security
- pergélisol, changements climatiques, impacts, infrastructures nordiques, propriétés physiques du pergélisol
- personal protective equipment, exposure risk assessment, chemical agent exposure, guidance to first responders
- power system stability and security
- power system stability and power quality
- power systems, generators, protection, control, adaptive and artificial intelligence applications
- poxvirus, myxoma, virokines, viroceptors, chemokines, apoptosis, immunomodulation, signal transduction, serpins, cytokines
- real-time GIS, rule-based systems in GIS, metadata and semantic interoperability
- risk assessment, risk management, risk communication
- road safety, weather-transport interactions
- routing, switching, protection, restoration
- safety-critical software, hazards, software requirements, software testing, air traffic control
- santé post-désastre, santé des intervenants
- sécurité réseau protocole codage
- seismic retrofit, reinforced concrete, seismic demands, nonlinear structural analysis, performance-based seismic design
- shock waves, blast waves, explosion, detonation, blast protective materials
- snow avalanche forecasting, snow avalanche runout
- spatial analysis, Web-based GIS, database management, simulation modelling
- storms, precipitation, drought, floods
- télédétection optique, thermique, radar, feux de forêts, sécheresse agricole, e-learning
- terrorism, counter-terrorism, intelligence
- toxicology, adverse drug reactions, immunopharmacology
- trauma research, PTSD, emergency responders
- visually guided mobile robotics
- vulnerability, community assessments, hazardousness of place
- water management (e.g. supply, flooding, allocation, quality)
- Web-based GIS, 3D visualization, Internet security, digital mapping, photogrammetery

Only three respondents did not provide any sort of response to question 7.

C.3.8 Willingness to be in Public Database

There are two more items that are sufficiently precise to bear some comment in this section of the report. One of them asks respondents whether they give permission to have their names included in a publicly available database. This was question 14. Fifty-seven, or 81%, said "yes." Thirteen respondents, or 18%, said, "no." Note that one person failed to give either a "yes" or "no" response, but has been included in the "no" category.

C.3.9 Other Comments by Respondents

Finally, in this section, it is worth listing the unconstrained responses that people gave when asked if they had any final comments. These are of somewhat more general importance than other items late in the form because they do give some perspective on how people were reacting to the overall thrust of the Researcher Report Form. They are as follows (from 16 respondents—note that spelling errors and other idiosyncrasies are left in; in some cases unusually long responses are cut off, or have been edited to preserve anonymity):

> *I am involved in a broad diversity of research institutes across our campus, and I have many interactions with other universities in Canada. I am also the first line of contact for many government relations with our university.*
>
> *I am capable of and very much interested in conducting research aiming at evaluation of consequences of imaginary and real explosions, elaboration pf protective measures and development of new blast protective materials evaluation of consequences of imagi—*
>
> *I cannot answer questions 8 and 9 because I do not have any specific work in the area of emergency management. However, I believe that my experience in image analysis, visual interpretation, photogrammetry and airphoto interpretation would be relevant to—*
>
> *I have spent the past six years working as a consultant and only joined [my university]. Therefore little of my work on emergency response and information security culture is published. I intend to continue to undertake research in—*
>
> *I look forward to becoming fully involved with this initiative as I believe it is a step in the right direction towards identifying and mitigating the increasing risk from natural hazards.*
>
> *I wish you well with this study. My work is very relevant to your goals although it is focused on the physics of hazardous natural, atmospheric phenomena It is very important for your activities*
>
> *Much of our work is summarized in confidential reports for the government, military, industry, and first responder organizations, and hence is not available to be cited above.*
>
> *My research is in earth surface processes. In the event of an emergency my research group has high capabilities to help assess impacts on natural and disturbed landscapes*

Terrorism potential has caused microbiologists to step up to the plate when needed. While I have basic research interests that could be of certain value, I do not consider myself to be involved in emergency planning, critical infrastructure or cyber secure—

We are informally involved with APCO (Association of Public Safety Communications Officials) the local Central Ambulance Communication Center and the Community Care Access Center – I'm not sure where these fit in the above

We are offering a capability to numerically simulate the effects of blast waves in complex geometries and to analyze structural responses to explosion-generated gasdynamic disturbances in general.

Your list of relevant disciplines seems a bit narrow, particularly thinking in terms of disaster response, or the tactics and motivations for terrorist attack.

C.4 Preliminary Examination of Bivariate Relations between Select Variables

Here, we will return to questions where respondents would generally classify their research focus (using terms derived from OCIPEP's mandate), and we will see if such general research foci are related to their discipline, province, main institution and title. In the comments that follow, we will only provide a brief verbal summary of certain relationships.

C.4.1 OCIPEP Relevant Research Interests and Position or Title

When we take our three indicators of OCIPEP relevant research interests, we find that none of them are significantly (using a chi-square test) related to the position or title of the respondent. In part, this is a result of small sample size. However, even from a descriptive perspective, there are no particularly striking relationships at the sample level.

C.4.2 OCIPEP Relevant Research Interests and Respondent's Primary Institution

In only one of the three relationships is the relationship at or near conventional significance (significance = .05 or less). That is the relationship between institution and critical infrastructure protection. This arises from the variation across institutions in which institutions tend either to have no one involved in CIP or to have a reasonably high percentage of respondents in CIP.

C.4.3 OCIPEP Relevant Research Interests and Respondent's Province

As one might expect, the only clearly significant relationship (using Chi-Square) is the one between province and involvement in critical infrastructure protection. This picks up some of the same features as the post-secondary institution variable. As a further elaboration of this, we see that our Ontario respondents are likely to be involved in critical infrastructure protection research, while our Quebec respondents are completely unlikely to be involved in such research. This is an aspect of the data that may need some attention in future work as Quebec does have expertise in electrical grid management. So, we must ask whether we are not picking this up because the Quebec experts are largely outside post-secondary institutions or because we may have received responses that less fully represent Quebec than some other provinces.

C.4.4 OCIPEP Relevant Research Interests and Respondent's Main Discipline

None of the three relationships between areas of OCIPEP research interest and main discipline are conventionally significant. Useful information might be obtained by unpacking the large "other" category, and translating its components into specific disciplinary categories.

C.4.5 A Final Note on One Relationship

We also checked the relationship between willingness to be included in a public database and involvement in each of the three main areas of OCIPEP relevant research. Here, we did find one significant and generally noteworthy relationship. Specifically, people who were not involved in CIP research were very likely not to want to be included in the database. This may offer some clue as to the optic that respondents emphasize when considering OCIPEP.

C.5 Brief Concluding Note

The purpose of this analysis was to provide a general picture of what was obtained rather than to arrive at a highly defined crystallization of results. In addition, it was desirable to provide a general overview of the quality of the data. Some final points to note are:

- At the level of question response, most of the questions have elicited useful information from the majority of respondents.
- The sample provides reasonably good coverage of the country with respect to institutions, province and discipline. However, some questions for the future remain. In particular, future work should consider whether under representation of Quebec exists or if the figures obtained represent a reasonable picture of the Quebec academic profile.
- Most respondents are or were mainstream academics, but some hold executive-type positions in academia.
- The large "other" category for main discipline could likely be unpacked in a fruitful manner. Looking into the specific components of the other category, one obtains an interesting picture of the fine-grained manner in which many researchers think of their "main" discipline.
- "Cybersecurity" was much less frequently mentioned as an area of research interest compared to the two other research areas used to represent OCIPEP's scope.
- There is a notable overlap between people involved in emergency management and people involved in critical infrastructure protection.
- The bivariate relations between involvement in the three main areas of research and a variety of background variables generally did not provide significant or overly surprising results. To some degree, the question of significance is a function of small sample size. However, where significant results did occur, they tended to relate to the area of CIP research. Our data indicate that post-secondary institutions seem to be at one extreme or another in terms of likelihood of involvement in that area. This is also reflected in provincial patterns of research interest.
- Related to the above, a fairly major correlate of not wanting to be in a public database was the state of not being involved in CIP research. It is not an overwhelming effect, but, compared to some others in this report, it warrants some attention.

Appendix D – Note on Institutional Sampling Frame and Its Coverage

The main question to consider here is what, in a realistic sense, was the original sampling frame of institutions that defined the boundaries of our potential sample? This provides a basis for assessing just how good our coverage was. Returns were mostly driven from a list of about 240 researchers built up from lists provided by major granting agencies and one list provided by OCIPEP. The people in that list were associated with 42 post-secondary institutions or components of such institutions. To make the classification of the original list of researchers comparable to the one used in the classification in the main body of the report, we will reduce this to 40. This is because different parts of the University of Quebec system are coded as one entity in the table in the main text. Similarly, we treat all public university campuses in the New Brunswick system as being one entity. Our original list of individual researchers didn't cover every institution. An institutional list was developed that contained hundreds of references, some obviously relevant, some not, some just different branches of the same institution. In any event, that list did yield some potentially relevant institutions not covered in the individual list of researchers. When we add to the sampling frame relevant institutions from the institutional list that were not referenced in our individual researcher list, we increase the size of the institutional frame by 18 elements to a total of 58.

In the final analysis, of the 58 institutions that were contacted to respond to the Phase I form, 25 responded. This yields a conservative institutional response rate of 43%.

Given the logic of what has been presented above, what institutions are not represented in our final set of respondents but were parts of the sampling frame as we have defined it? In other words, what institutions could have potentially produced respondents but didn’t? The non-responding institutions were:

- Acadia University
- Augustana University College
- Bishop's University
- Brock University
- Camosun College
- Concordia University
- École de technologie supérieure
- École nationale d'administration publique
- École polytechnique de Montréal
- Lakehead University
- Laurentian University
- Lethbridge Community College
- McMaster University
- Mount Allison University
- Mount St. Vincent University
- New Brunswick Community College
- Okanagan University College
- Redeemer University College

- Seneca College of Applied Arts and Technology
- St. Francis Xavier University
- Trent University
- Trinity Western University
- University College of Cape Breton
- University of Lethbridge
- Université de Montréal
- University of Ontario Institute of Technology
- University of Prince Edward Island
- University of Regina
- University of Sherbrook
- University of Victoria
- University of Windsor
- University of Winnipeg
- Wilfred Laurier University

Many of the above are relatively small institutions that do not differ dramatically from the profile of small, undergraduate liberal arts institutions. Some are community colleges that typically do not have a major research orientation. However, this is not entirely the case. Institutions such as the University of Montreal are certainly major research institutions. McMaster University does have a strong medical epidemiology profile, and one might have expected them to be represented for that reason alone. A few of the other institutions above do have significant research profiles. However, in general, many of the institutions that did not produce respondents are very much on the margins of what is typically viewed as a research oriented institution. If they were to be excluded from our sampling frame, our percentage of institutional coverage would increase.

Appendix E – Survey Form

Note: This survey was presented via an online Web survey form that presented questions individually and adjusted the flow of questions appropriately according to the responses.

Academic Research in Emergency Management, Critical Infrastructure Protection, and Cybersecurity

Thank you for agreeing to complete this short questionnaire.

Awareness of or Involvement in Related Research Areas

1. Before you were contacted for this initiative, were you aware of the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP)?

   ☐ Yes ☐ No

IF YES:

2. How familiar were you with OCIPEP prior to being contacted for this initiative, including its mission for Canadians and its role in supporting research activities in Canada?

   ☐ Very familiar
   ☐ Moderately familiar
   ☐ Not very familiar
   ☐ Not familiar at all / only heard the name

3. Please indicate which of the following best describes your research activities in areas of relevance to OCIPEP. While you provided us with this information earlier in the Researcher Reporting Form, we are asking for it again since prior information will not be linked in any way to survey responses to ensure confidentiality. (PLEASE IDENTIFY ALL THAT APPLY.)

   ☐ Critical Infrastructure Protection (CIP) – Work related to the safety, security, reliability, dependability or resilience of critical infrastructure. Canada's critical infrastructure includes energy and utilities, transportation, telecommunications, safety services (fire, police, etc.), essential government services, and critical services such as financial, food and water, and health.

   ☐ Emergency Management (EM) – Work related to the management of emergencies and disasters of all types.

   ☐ Cybersecurity – Work related to studying or improving computer or information security.

4. In Phase 1, you reviewed OCIPEP's research definitions in the areas of CIP, EM and cybersecurity to determine their applicability to your activities, and completed the reporting form for the Inventory of Researchers. After having gone through this process, how well do you think you understand OCIPEP's role and its research requirements?

   ☐ Very well
   ☐ Moderately well
   ☐ Not very well
   ☐ Not at all

5. How willing would you be to devote part of your time/resources to the following activities? Please use a five-point scale, where 1 is not willing at all, and 5 is very willing.

   __ Attending an OCIPEP-sponsored conference or workshop focused on CIP, EM, or cybersecurity.
   __ Presenting at an OCIPEP-sponsored conference or workshop focused on CIP, EM, or cybersecurity.
   __ Preparing and submitting a paper to an OCIPEP-sponsored journal focusing on CIP, EM, or cybersecurity.
   __ Participating in a Network of Centres of Excellence (NCE) focusing on CIP, EM, or cybersecurity.
   __ Being a research chair/coordinator for a centre of excellence in CIP, EM, or cybersecurity.

Funding Research

6. In the future, OCIPEP may put in place new funding programs for research related to CIP, EM, and cybersecurity. In your view, what are the most effective funding mechanisms that OCIPEP could use to encourage future research in these areas? Please rate each of the following methods using a five-point scale, where 1 means a very ineffective way to encourage future research, and 5 means a very effective way to encourage future research in OCIPEP's areas of interest.

   __ Funding councils (i.e. NSERC/SSHRC/CIHR)
   __ Networks of Centres of Excellence (NCEs)
   __ Canada Research Chairs
   __ Canadian Foundation for Innovation (CFI)
   __ Short-term (1-year) contract-based research
   __ OCIPEP-specific grants and contributions mechanism

7. If more funding was available for research in Critical Infrastructure Protection, Emergency Management, or Cybersecurity, do you think that you personally would: (PLEASE CHECK ONE RESPONSE ONLY)

   ☐ Conduct much more research in this area?
   ☐ Conduct a little more research in this area?
   ☐ Not change the amount of research you do in this area?

   FOR Q7, USE A SKIP FROM Q3 AND ASK SPECIFICALLY ABOUT EACH OF THE THREE AREAS THAT THEY HAVE CHECKED. (SO THIS QUESTION WOULD BE Q7A, Q7B, Q7C):

8. There are various ways that Canadian research in CIP/EM/cybersecurity could be promoted. Please rate each of the following in terms of where you think OCIPEP efforts should be directed, using a five-point scale, where 1 means you think it should be a very low priority, and 5 means you think it should be a very high priority.

   __ Increased university/department budget for new faculty members.
   __ Increased number of research grants available through the funding councils.
   __ Increased size of research grants available through the funding councils.
   __ Support/coordination for international links or exchanges.
   __ Scholarships for graduate and doctoral students.
   __ Coordination of conferences, workshops, symposia, etc., in these areas.
   __ Newsletters, mailing lists, and other researcher networking tools.
   __ Development of a refereed journal or journals in these areas.

9. How interested would you be in working with OCIPEP in a process to determine what the research priorities should be in the areas of CIP/EM/cybersecurity?

   ☐ Very interested
   ☐ Moderately interested
   ☐ Not interested

Comments

If you have any additional comments that you would like to direct to OCIPEP concerning promoting Canadian research in the areas of CIP/EM/Cybersecurity, please include them here.

_____
_____
_____
_____
_____
_____
_____
_____