Confidence Building Measures

Canada

2012 Annual Report of
Confidence Building Measures
Biological and Toxin Weapons Convention

Government of Canada Gouvernement du Canada

Canada

Revised forms for the submission of the Confidence-Building Measures

At the Third Review Conference it was agreed that all States Parties present the following declaration, later amended by the Seventh Review Conference:

Declaration form on Nothing to Declare or Nothing New to Declare for use in the information exchange

Measure	Nothing to Declare	Nothing New to Declare	Last year of declaration if nothing new to declare
A, part 1 (i)		X	Submission repeated verbatim from 2011
A, part 1 (ii)	X		
A, part 2 (i)		X	Submission repeated verbatim from 2011
A, part 2 (ii)			
A, part 2 (iii)			
B			
C			
E		X	Submission repeated verbatim from 2011
F		X	Submission repeated verbatim from 2011
G		X	Submission repeated verbatim from 2011

(Please mark the appropriate box(es) for each measure with a tick, and fill in the year of last declaration in the last column where applicable.)

Date: 15 April 2012

State Party to the Convention: CANADA

Date of ratification/accession to the Convention: 18 September 1972

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Active promotion of contacts

The Third Review Conference agreed that States parties continue to implement the following:

> "Active promotion of contacts between scientists, other experts and facilities engaged in biological research directly related to the Convention, including exchanges and visits for joint research on a mutually agreed basis."

In order to actively promote professional contacts between scientists, joint research projects and other activities aimed at preventing or reducing the occurrence of ambiguities, doubts and suspicions and at improving international cooperation in the field of peaceful bacteriological (biological) activities, the Seventh Review Conference encouraged States parties to share forward looking information, to the extent possible,

> - on planned international conferences, seminars, symposia and similar events dealing with biological research directly related to the Convention, and
>
> - on other opportunities for exchange of scientists, joint research or other measures to promote contacts between scientists engaged in biological research directly related to the Convention, including through the Implementation Support Unit (ISU) within the United Nations Office for Disarmament Affairs.

CONFIDENCE BUILDING MEASURE A

Part 1: Exchange of data on research centres and laboratories

At the Third Review Conference it was agreed that States Parties continue to implement the following:

> "Exchange of data, including name, location, scope and general description of activities, on research centres and laboratories that meet very high national or international safety standards established for handling, for permitted purposes, biological materials that pose a high individual and community risk or specialize in permitted biological activities directly related to the Convention."

Modalities

The Third Review Conference agreed on the following, later amended by the Seventh Review Conference:

> Data should be provided by States Parties on each facility, within their territory or under their jurisdiction or control anywhere, which has any maximum containment laboratories meeting those criteria for such maximum containment laboratories as specified in the latest edition of the WHO Laboratory Biosafety Manual and/or OIE Terrestrial Manual or other equivalent guidelines adopted by relevant international organisations, such as those designated as biosafety level 4 (BL4, BSL4 or P4) or equivalent standards.
>
> States Parties that do not possess a facility meeting criteria for such maximum containment should continue to Form A, part 1 (ii).

CONFIDENCE BUILDING MEASURE A, Part 1 (i)

Exchange of Data on Research Centres and Laboratories - #1

1. Name(s) of the research centre and/or laboratory

National Microbiology Laboratory
Public Health Agency of Canada
Canadian Science Centre for Human and Animal Health

2. Responsible public or private organization or company

Public Health Agency of Canada

3. Location and postal address

Public Health Agency of Canada
1015 Arlington Avenue
Winnipeg, Manitoba
R3E 3R2

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence

Canadian Government - Public Health Agency of Canada

5. Number of maximum containment units within the research centre and/or laboratory, with an indication of their respective size (m^2)

Level 4 - 1 unit (185 m^2)

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate.

This laboratory is a national centre of expertise that provides diagnostic, reference and research services on human diseases mainly from biosafety level 3 and 4 micro-organisms.

Micro-organisms used and/or stored in this facility: Bacteria and viruses.
Toxins: SEB, Clostridium botulinum, Ricin.

CONFIDENCE BUILDING MEASURE A, Part 1 (i)

Exchange of Data on Research Centres and Laboratories - #1

1. Name(s) of the research centre and/or laboratory

National Centre for Foreign Animal Disease

2. Responsible public or private organization or company

Canadian Food Inspection Agency, Science Branch

3. Location and postal address

1015 Arlington Street
Winnipeg, Manitoba
R3E 3M4

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence

Canadian Government - Canadian Food Inspection Agency

5. Number of maximum containment units within the research centre and/or laboratory, with an indication of their respective size (m^2)

Level 4: 2 units ($65m^2$) and ($35m^2$)

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate.

The National Centre for Foreign Animal Disease within the Canadian Science Centre for Human and Animal Health conducts diagnostic testing and research on livestock and poultry diseases that are non-indigenous to Canada. The centre became operational in April 1998.

CONFIDENCE BUILDING MEASURE A, Part 1 (ii)

If no BSL4 facility is declared in Form A, part 1 (i), indicate the highest biosafety level implemented in facilities handling biological agents on a State Party's territory:

NOT APPLICABLE: Canada possesses two BSL4 laboratories

Biosafety level 3	yes / no
Biosafety level 2 (if applicable)	yes / no

Any additional relevant information as appropriate:

_____

_____

_____

_____

CONFIDENCE BUILDING MEASURE A, Part 2

Exchange of information on national biological defence research and development programmes

At the Third Review Conference it was agreed that States Parties are to implement the following:

In the interest of increasing the transparency of national research and development programmes on biological defence, the States Parties will declare whether or not they conduct such programmes. States Parties agreed to provide, annually, detailed information on their biological defence research and development programmes including summaries of the objectives and costs of effort performed by contractors and in other facilities. If no biological defence research and development programme is being conducted, a null report will be provided.

States Parties will make declarations in accordance with the attached forms, which require the following information:

(1) The objective and summary of the research and development activities under way indicating whether work is conducted in the following areas: prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination and other related research;

(2) Whether contractor or other non-defence facilities are utilized and the total funding provided to that portion of the programme;

(3) The organizational structure of the programme and its reporting relationships; and

(4) The following information concerning the defence and other governmental facilities in which the biological defence research and development programme is concentrated;

(a) location;

(b) the floor areas (sqM) of the facilities including that dedicated to each of BL2, BL3 and BL4 level laboratories;

(c) the total number of staff employed, including those contracted full time for more than six months;

(d) numbers of staff reported in (c) by the following categories: civilian, military, scientists, technicians, engineers, support and administrative staff;

(e) a list of the scientific disciplines of the scientific/engineering staff;

(f) the source and funding levels in the following three areas: research, development, and test and evaluation; and

(g) the policy regarding publication and a list of publicly-available papers and reports.

CONFIDENCE BUILDING MEASURE A, Part 2 (i)

National Biological Defence Research and Development Program Declaration

1. Is there a national program to conduct biological defence research and development within the territory of the State Party, under its jurisdiction and control anywhere? Activities of such a program would include prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxicology, physical protection, decontamination and other related research.

For CANADA, YES

CONFIDENCE BUILDING MEASURE A, Part 2 (ii)

National Biological Defence Research and Development Program

Defence Research & Development Canada (DRDC):

II. Description

1. The objective of the Canadian Biological Defence Program at Defence R&D Canada is to ensure that the Canadian Forces are provided with an adequate defence against biological warfare agents. No offensive studies of any kind are permitted by the Government of Canada. The Program is wholly funded by the Canadian Department of National Defence and Public Safety Canada on behalf of the Government. The principal research and development areas are the following:
   a. assessment of the hazards that may be faced by the Canadian Forces from biological agents and toxins;
   b. detection of biological agents and toxins using immunological, biochemical and physical detection methods;
   c. medical countermeasures against the infections or intoxications from biological agents and toxins;
   d. decontamination of biological agents and toxins;
   e. personal protection from biological agents and toxins;
   f. studies on the mode of action and toxicity of toxins and the mode of action and infectivity of biological agents; and
   g. provision of biological agent training for the Department of National Defence and the First Responder community.

2. In Canada, the biological and chemical defence programs are integrated; exact separation of the costs of the two programs would be very difficult without a detailed analysis of every purchase. It is estimated that in 2011/2012, the amount spent on the Canadian biological defence program was $5,039,000 including salaries. The source of this funding was the Government of Canada.

3. Yes.

4. See answer to question 2. About $2,060,100 was spent on contracts with industry and universities.

5. Contractors are used to support all of the various aspects of the program listed in paragraph 1 above.

6. In Canada, the research and development program in biological defence is the responsibility of the Defence R&D Canada (DRDC). Research and some development are carried out primarily at the Defence R&D Canada – Suffield (DRDC Suffield) and through contractors. The bulk of the development program is carried out from DRDC Corporate headquarters. A minor effort in the stand-off detection of biological agents is

carried out at DRDC Valcartier. Organizational chart of those parts of DRDC Suffield and DRDC Valcartier responsible for biological defence are included in Form A, part 2 (iii). Only those organisational elements working on Biological Defence are included.

CONFIDENCE BUILDING MEASURE A, Part 2 (ii)

National Biological Defence Research and Development Program

CBRNE Research and Technology Institute (CRTI):

1. The **Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Research and Technology Initiative (CRTI)** is mandated to strengthen Canada's ability to prevent, prepare for, respond to and recover from CBRNE threats through investment in science and technology.

2. CRTI is an ongoing program with Government of Canada funding of $350,000,000 between 2002 and 2012. Funds are for the CBRNE projects and it is not possible to know exactly the percentage specifically allocated to biological research alone as many of the projects respond to more than one of the CBRNE hazards. A portion of the funds are for overhead and overall management of the program.

3. Yes, aspects of this programme are conducted under contract with industry, academic institutions, or in other non-defence facilities.

4. Funds distributed to industry, government and academia can be seen in the following chart:

CRTI $ BY SECTOR	CRTI $M NINE ROUNDS	%
Industry	**$107M**	**42%**
Government	**$108M**	**42%**
Academia	**$41M**	**16%**
TOTAL	**$256M**	**100%**

5. Summarize the objectives and research areas of the programme performed by contractors and in other facilities with the funds identified under paragraph 4:

Since 2002, The CRTI Program has conducted 9 Calls for Proposals through which it has implemented 166 research projects representing an investment of $256M. The project partners have leveraged this investment by $256M of in-kind contribution, a one-to-one ratio. The 166 projects are summarized in *Annex 1*.

6. Provide a diagram of the organizational structure of the programme and the reporting relationships (include individual facilities participating in the programme).

The participating departments and agencies are:

- Department of National Defence/Defence R&D Canada
- Department of Public Safety
- Health Canada
- Public Health Agency of Canada
- Environment Canada
- Agriculture and Agri-Food Canada
- Canadian Food Inspection Agency
- Department of Fisheries and Oceans
- National Research Council
- Natural Resources Canada
- Royal Canadian Mounted Police
- Canadian Security Intelligence Service
- Atomic Energy of Canada Ltd.
- Industry Canada
- Canada Border Services Agency
- Canadian Nuclear Safety Commission
- Transport Canada
- Public Works and Government Services Canada
- Privy Council Office, and
- Treasury Board Secretariat.

7. Provide a declaration in accordance with Form A, part 2 (iii) for each facility, both governmental and non-governmental, which has a substantial proportion of its resources devoted to the national biological defence research and development programme, within the territory of the reporting State, or under its jurisdiction or control anywhere.

All projects under the CRTI are carried out in existing facilities that are covered in other sections of this report.

8. The latest CRTI Call for Proposals resulted in 12 new projects being approved for implementation in 2011. Those projects related, either directly or tangentially, to the BTWC have been added to Annex 1, where they can be identified by the prefix “CRTI 09-xxxxxx”, where “xxxxxx” is the project number.

Annex 1: CRTI projects, 2002-2012

Acronyms:

AAFC: Agriculture and Agri-Food Canada
CFIA: Canadian Food Inspection Agency
CPRC: Canadian Police Research Centre
CSIS: Canadian Security Intelligence Service
DRDC: Defence Research & Development Canada
EC: Environment Canada
HC: Health Canada
NRC: National Research Council Canada
NRCan: Natural Resources Canada
PHAC: Public Health Agency of Canada
PSC: Public Safety Canada
PWGSC: Public Works and Government Services Canada
RCMP: Royal Canadian Mounted Police
RMC: Royal Military College

Charter #	Project Title	Project Portfolio	Lead Federal Department	Current CSS Investment	In-Kind Contribution
CRTI 01-0006RD	Induction of innate and specific immunity at muscosal surfaces	BIO	PHAC	$1,199,135	$1,264,500
CRTI 01-0011TA	Unified Interoperability Solution set to Support CONOPS Framework Development - Municipal-Provincial-Federal Collaboration to CBRN Response	BIO	DRDC Suffield	$791,561	$535,000
CRTI 01-0064RD	New technologies for surveillance of biowarfare agents and identification of engineered virulence genes	BIO	PHAC	$2,423,221	$1,487,402
CRTI 01-0087RD	Therapeutic antibody therapy for Ebola virus	BIO	PHAC	$2,612,181	$1,607,262
CRTI 01-0091RD	Development of monoclonal antibodies for treatment and detection of bio-terrorism agents	BIO	PHAC	$2,556,575	$3,562,640
CRTI 01-0154RD	Rapid DNA based diagnostic tests to identify five bacterial bio-threat agents	BIO	DRDC Suffield	$2,594,393	$1,751,702
CRTI 01-0196TA	Development of rapid detection field tests for Vet first responders to address agro-terrorism with animal pathogens	BIO	CFIA	$4,824,099	$4,700,000
CRTI 02-0021RD	Direct detection and identification of bioweapon nucleic acids based on cationic polymers	BIO	NRC	$1,000,001	$1,090,801
CRTI 02-0035RD	Canadian Network for Public Health Intelligence (CNPHI)	BIO	PHAC	$3,653,497	$4,208,572
CRTI 02-0041TA	Deployable CBRN monitoring network	BIO	HC	$1,135,028	$562,000
CRTI 02-0066RD	Risk analysis preparedness and management of bioterrorism of animal and zoonotic disease	BIO	CFIA	$1,321,069	$3,614,378
CRTI 02-0069RD	Molecular epidemiology of biothreat agents	BIO	PHAC	$1,654,769	$889,872
CRTI 02-0091TA	*Clostridium botulinum* genomic DNA microarray	BIO	HC	$391,723	$617,131
CRTI 03-0005RD	Sensor Technology for the Rapid Detection and Identification of Pathogens used as Bioweapons	BIO	NRC	$2,200,000	$4,524,943

CRTI 03-0021TD	Assay development and production team (ADAPT) for the development, validation, production, and distribution of assays for the identification of bioterrorism	BIO	PHAC	$2,000,000	$1,799,242
CRTI 03-0060RD	Protective Markers for Anthrax Serodiagnosis	BIO	DRDC Suffield	$982,073	$754,677
CRTI 04-0004RD	Canadian Animal Health Surveillance Network	BIO	CFIA	$3,715,775	$3,793,200
CRTI 04-0045RD	Development of Collections, Reference DNA Databases and Detection Systems to Counter Bioterrorism Against Agriculture and Forestry	BIO	AAFC	$2,000,000	$1,439,000
CRTI 04-0052RD	On Site Composting for Bio-Containment and Safe Disposal of Infectious Animal Carcasses and Manure in the Event of a Bio-Terrorist Attack	BIO	CFIA	$2,000,000	$3,438,641
CRTI 05-0078RD	Development of live replicating viruses as vaccines and therapies for Viral Hemorrhagic Fever viruses	BIO	PHAC	$2,010,000	$4,708,494
CRTI 05-0090TA	Adaptation of recently developed DNA microarrays to Nanochip microarray technology for detection of agro-terrorism agents	BIO	PHAC	$875,000	$642,000
CRTI 05-0106TA	Development of fieldable nucleic acid detection techniques for category 1 and 2 biological agents	BIO	PHAC	$780,000	$945,754
CRTI 06-0138RD	Development of Canadian diagnostic capability for Rift Valley Fever Virus (RVFV)	BIO	CFIA	$1,759,545	$1,863,980
CRTI 06-0187TD	Portable biological agent detection system	BIO	NRC	$2,500,000	$4,244,928
CRTI 06-0218RD	Pre-clinical development of a nasal adenovirus-based vaccine against Ebola virus.	BIO	PHAC	$652,979	$566,617
CRTI 06-0301TD	Development of Nasal Spray Formulated Antiviral Drug against Avian Influenza Virus	BIO	DRDC Suffield	$1,892,961	$1,060,000
CRTI 07-0109RD	Development and Application of Foresight and Future Visioning to Support Capability Based Planning for Animal Disease Emergency Management in Canada	BIO	CFIA	$1,917,000	$2,528,000
CRTI 07-0234RD	Mitigating dissemination of bioterrorism agents in Canadian food systems	BIO	AAFC	$1,569,865	$2,256,587
CRTI 07-0132TA	Portable Electronic Microarrays For Agro-bioterrorism: Detection and Typing of High Consequence Agents	BIO	CFIA	$1,375,675	$1,075,356
CRTI 08-0190RD	Data Fusion Solutions for Monitoring CBRNE Threats	BIO	NRC	$2,072,310	$3,659,663
CRTI 08-0203RD	Science and Technology Solutions to Mitigate Vulnerabilities in Canada's Food Supply	BIO	CFIA	$2,500,000	$1,341,335
CRTI 08-0112TA	Human monoclonal antibodies against ricin	BIO	DRDC Suffield	$1,200,000	$1,182,755
CRTI 08-0122TD	Validation of decontamination processes in the Agri-Food context	BIO	CFIA	$1,060,000	$874,482
CRTI 08-0181TD	Detection and Identification Assay Validation Program for Biothreat Agents	BIO	PHAC	$3,171,300	$1,711,932
CRTI 09-0403TA	Portable Electronic Microarrays for Agrobioterrorism: Detection and Typing of High Consequence Agents in Swine	BIO	CFIA	$1,321,570	$946,226

CRTI 09-0453TD	Final Development and production of clinically approved broad-spectrum anti viral treatment	BIO	PHAC	$1,380,659	$1,704,740
CRTI 09-0462RD	Next generation sequencing, direct detection and genotyping of fungi; bacteria and nematodes in the agri food system	BIO	AAFC	$1,999,000	$1,655,000
CRTI 09-0481TD	An Optical Imaging Device for a Rapid Assessment of Tissue Viability and Wound Healing	BIO	NRC	$1,810,328	$1,215,035
Biology Total	**38 Projects**			**$70,903,292**	**$75,823,847**

CRTI 01-0004TA	Development of MEMS-based Biological Agent Sensing Technology	CHEM	DRDC Suffield	$49,892	$25,000
CRTI 01-0019TA	Real-Time Confirmatory Bio Detection and Identification	CHEM	DRDC Suffield	$2,400,965	$3,073,146
CRTI 01-0029RD	Protecting the First Responder Against CB Threats (Developing New Standards for Broad Spectrum…)	CHEM	RMC	$2,952,604	$2,846,170
CRTI 01-0060TA	Rapid Triage Management Workbench	CHEM	NRC	$1,167,679	$1,145,626
CRTI 01-0100TA	CB Plus Chamber	CHEM	DRDC Ottawa	$1,649,722	$1,795,278
CRTI 01-0120RD	Development of Two Dimensional Molecular Imprinting Techniques (for use in Sensing and Screening Devices)	CHEM	NRC	$1,638,183	$1,647,328
CRTI 01-0131TA	HI-6 Nerve Agent Antidote System (International Collaboration on the Licensing of HI-6)	CHEM	DRDC Ottawa	$4,531,099	$15,000,000
CRTI 01-0161TA	CBRN Blast Protective Helmet	CHEM	RCMP	$1,160,000	$631,080
CRTI 02-0007TA	Medical countermeasures against ricin	CHEM	DRDC Suffield	$1,607,376	$1,086,600
CRTI 02-0043TA	Accelerated Consequences Management	CHEM	DRDC Suffield	$1,962,121	$1,839,704
CRTI 02-0053TA	Simulation based decision aid for the optimization of detection protection and decontamination systems with team structure and procedures	CHEM	DRDC Ottawa	$1,312,481	$1,157,889
CRTI 02-0067RD	Restoration of Facilities and Areas After a CBRN Attack	CHEM	EC	$1,973,032	$1,943,359
CRTI 02-0093TA	Advanced Polymer Research for Application to Personnel Protective Clothing	CHEM	DRDC Ottawa	$1,026,911	$597,000
CRTI 03-0009RD	Caring About Healthcare Workers at First Responders: Enhancing Capacity for Gender-Based Support Mechanisms in Emergency Preparedness Planning	CHEM	HC	$1,089,817	$1,095,839
CRTI 03-0013TD	Early CBRN Attack Detection by Computerized Record Surveillance (ECADS)	CHEM	NRC	$1,764,799	$900,000
CRTI 03-0019TD	Real-time Bio-surveillance and response readiness	CHEM	PHAC	$1,798,592	$2,898,000
CRTI 03-0023TD	Portable and Collapsible Chem/Bio Isolators	CHEM	CSIS	$514,260	$581,543
CRTI 04-0018RD	Development of standards for chemical and biological decontamination of buildings and structures affected by terrorism	CHEM	EC	$2,710,000	$2,822,224

CRTI 04-0019TD	Field Demonstration of Advanced CBRN Decontamination Technologies	CHEM	EC	$811,165	$1,223,604
CRTI 04-0022RD	Rapid Separation and Identification of CBW Agents and Consumer Matrices using FAIMS Technology	CHEM	NRC	$448,499	$750,118
CRTI 04-0082TA	RF and ECM Compatible CB-Blast Protective Helmet	CHEM	RCMP	$400,000	$391,522
CRTI 05-0016RD	Development of Canadian Standard for Protection of First Responders from CBRN events	CHEM	PWGSC	$549,978	$1,072,014
CRTI 05-0069RD	Development of PEGylated Granulocyte-Macrophage Colony Stimulating Factor for Acute Radiation Syndrome	CHEM	HC	$1,370,852	$1,279,986
CRTI 05-0092TA	Integrated Personal Cooling for Chemical-Biological Protective Undergarments	CHEM	RCMP	$260,000	$185,628
CRTI 06-0169TA	Universal Surface Decontamination Formulation	CHEM	EC	$1,666,428	$1,292,316
CRTI 06-0170RD	Organophosphorus agent decontamination	CHEM	EC	$1,946,043	$1,629,769
CRTI 06-0192TD	CBRN respiratory fit-testing program development	CHEM	RMC	$1,022,505	$592,707
CRTI 06-0234TA	Advanced Syndromic Surveillance and Emergency Triage (ASSET)	CHEM	NRC	$2,000,000	$1,251,717
CRTI 06-0255TA	Medical and Casualty Management Command Post and Temporary Treatment Center (MedPost)	CHEM	DRDC Ottawa	$2,085,018	$1,419,479
CRTI 06-0283RD	Addressing deficiencies in All-Hazard Respiratory Protection for First Responders	CHEM	RMC	$ -	$ -
CRTI 06-0299TA	Polymer Nanocomposite Barrier Fabric for First Responder Protection and Containment Operations	CHEM	DRDC Suffield	$581,700	$294,706
CRTI 07-0150TD	Casualty Care Continuum (from event scene to emergency department)	CHEM	HC	$1,893,000	$1,086,129
CRTI 08-0233TD	An HI-6 based intravenous product for nerve-agent post-treatment	CHEM	DRDC Suffield	$1,660,000	$1,216,984
CRTI 08-0234TD	Modelling the Effects of Public/Animal Health Emergencies on Laboratories	CHEM	PHAC	$444,000	$795,722
CRTI 09-0438TA	Approval of CBRN personal protective equipment	CHEM	RMC	$1,999,053	$1,386,164
CRTI 09-0509TD	First Responder Immersive Training Simulation Environment	CHEM	DRDC Suffield	$1,982,927	$1,558,569
Chemistry Total	**36 Projects**			**$52,430,701**	**$58,512,920**

CRTI 04-0030TD	Nuclear Forensics Response Capabilities and Interoperability	Forensic	DRDC Ottawa	$283,160	$407,600
CRTI 04-0047TD	Chemical, Biological, Radiological and Nuclear Incident Database	Forensic	RCMP	$1,662,749	$1,251,145
CRTI 04-0112TD	Container Intrusive Sampling System	Forensic	RCMP	$137,805	$214,500
CRTI 05-0053TA	Deployable RN Incident Area Network: Wireless Mesh Topology	Forensic	HC	$ -	$ -
CRTI 05-0058TD	Unified Interoperability Solution set to Support CONOPS Framework Development - Municipal-Provincial-Federal Collaboration to	Forensic	DRDC Ottawa	$1,500,000	$2,042,616

	CBRN Response				
CRTI 05-0121RD	Evidence-Based Risk Assessment of Improvised CB weapons	Forensic	CSIS	$658,939	$768,796
CRTI 05-0122TD	CBRN Crime Scene Modeler (C2SM)	Forensic	RCMP	$1,601,328	$858,639
CRTI 05-0123TD	All-Hazards Sample Receiving Storage	Forensic	DRDC Suffield	$2,300,400	$1,752,162
CRTI 06-0202TD	Short-Range BioSpectra: A Device for the Surveillance of Bioaerosol in Large Indoor, Semi-Enclosed and Outdoor Spaces	Forensic	DRDC Valcartier	$1,187,524	$747,109
CRTI 06-0275TD	Integrated Two-Way Radio Radiation Sensors	Forensic	RCMP	$2,248,463	$1,327,014
CRTI 06-0317TD	PROBE –Crime Scene Support Tool for Police, Hazmat & EMS	Forensic	RCMP	$3,469,390	$1,734,695
CRTI 06-0318TD	Higher Education Cooperative for Hazardous Materials and Equipment Tracking (HECHMET)	Forensic	RCMP	$3,873,704	$2,202,890
CRTI 06-0319TD	Guidelines for Combined Air Demand and Heat Strain Management of First Responders	Forensic	DRDC Toronto	$1,631,790	$1,102,224
CRTI 07-0148TD	Decontamination and Mitigation Techniques for C,B and E Agents and the Effect on Forensic Evidence	Forensic	DRDC Suffield	$1,141,200	$764,804
CRTI 07-0216TA	Fast CBRNE Crime Scene Modeler (fC2SM)	Forensic	RCMP	$2,095,660	$1,199,482
CRTI 07-0193RD	A Compton Gamma Imager for Criminal and National Security Investigation	Forensic	NRCan	$1,425,258	$1,536,880
CRTI 07-0219RD	Microbial Forensics Project	Forensic	PHAC	$2,740,000	$1,523,376
CRTI 08-0105RD	The Development of a Canadian CBRNE Recommended Equipment List	Forensic	CPRC	$800,000	$755,984
CRTI 08-0116RD	Forensic Attribution of CBRNE Materials: A Chemical Fingerprint Database	Forensic	PSC	$1,500,000	$861,000
CRTI 08-0192TD	Emergency Resource Inventory Network (ERIN)	Forensic	PSC	$1,850,000	$959,131
CRTI 08-0197TD	Capability Based Planning Validation Project / CBRN-E Rapid Assessment Team	Forensic	PSC	$400,000	$205,800
CRTI 08-0226TD	Capability Based Planning Validation Project / CBRN Mass Decontamination	Forensic	PSC	$400,000	$204,840
Forensic Total	**22 Projects**			**$32,907,370**	**$22,420,687**

CRTI 02-0080RD	Psychological Risk Assessment and Management (9RAM) Tools to Enhance Response to CBRN Attacks and Threats in Canada	Psycho-social	PHAC	$2,314,729	$1,866,320
CRTI 06-0259TD	Psychosocial Risk Manager (PRiMer): Computer-based Pre-Event Training	Psycho-social	PHAC	$1,968,790	$2,522,500
CRTI 07-0135RD	Building Resilience and Rural Health System Capability for Pre-disaster Planning and Preparedness	Psycho-social	PHAC	$1,930,500	$1,431,041
CRTI 08-0180TD	Establish an integrated National CBRNE Training System for Health, Psychosocial and Communication Responders	Psycho-social	PHAC	$2,260,000	$1,307,000

CRTI 08-0176RD	Enhancing Resilience Among High Risk Populations to Maximize Disaster Preparedness	Psycho-social	PHAC	$1,922,250	$1,135,000
CRTI 08-0114RD	Mainstreaming Psychosocial Considerations and Emergency Management Planning Building Confidence and Changing Culture	Psycho-social	HC	$2,217,513	$1,418,091
CRTI 09-0428RD	National security data initiative enhancing the Canadian evidence base for policy and operations	Psycho-social	PSC	$1,310,000	$1,554,000
Psychosocial Total	**7 Projects**			**$13,923,782**	**$11,233,952**

Total Listed	**103 Projects**	**$170,165,145**	**$167.991,406**
Grand Total (all CRTI projects)	**166 Projects**	**$256,442,447**	**$257,340,450**

CONFIDENCE BUILDING MEASURE A, Part 2 (iii)

National Biological Defence Research and Development Program

Facilities

1. **Defence Research and Development Canada – Suffield (DRDC Suffield)**

A. The facility is located in Buildings 1, 10, 60, 600, 610 and the Colin Watson Aerosol Layout (CWAL) and associated minor structures, all co-located with Canadian Forces Base Suffield near the village of Ralston, Alberta, Canada. The postal address is

Director General
DRDC Suffield
Box 4000 Station Main
Medicine Hat, Alberta T1A 8K6
CANADA

B. Floor area of laboratory areas by containment level:

BL2 - 492 m^2
BL3 - 159 m^2
BL4 - 0 m^2

The total laboratory floor area in Building 1 used for biological defence work is 868 m^2. An Aerosol Test Facility containing 38 m^2 of lab space is located next to Building 1; another aerosol test facility containing 33 m^2 of lab space is located at the CWAL field site. Building 10 is a vivarium and includes general laboratory space. The area of the vivarium is 1134 m^2. Building 610 occupies 76 m^2 of space. Field facilities for biological agent training exist in the vicinity of Building 60.

C. The organizational structure of each facility at 30 November 2011[1]:

(i) Total number of personnel 51.3

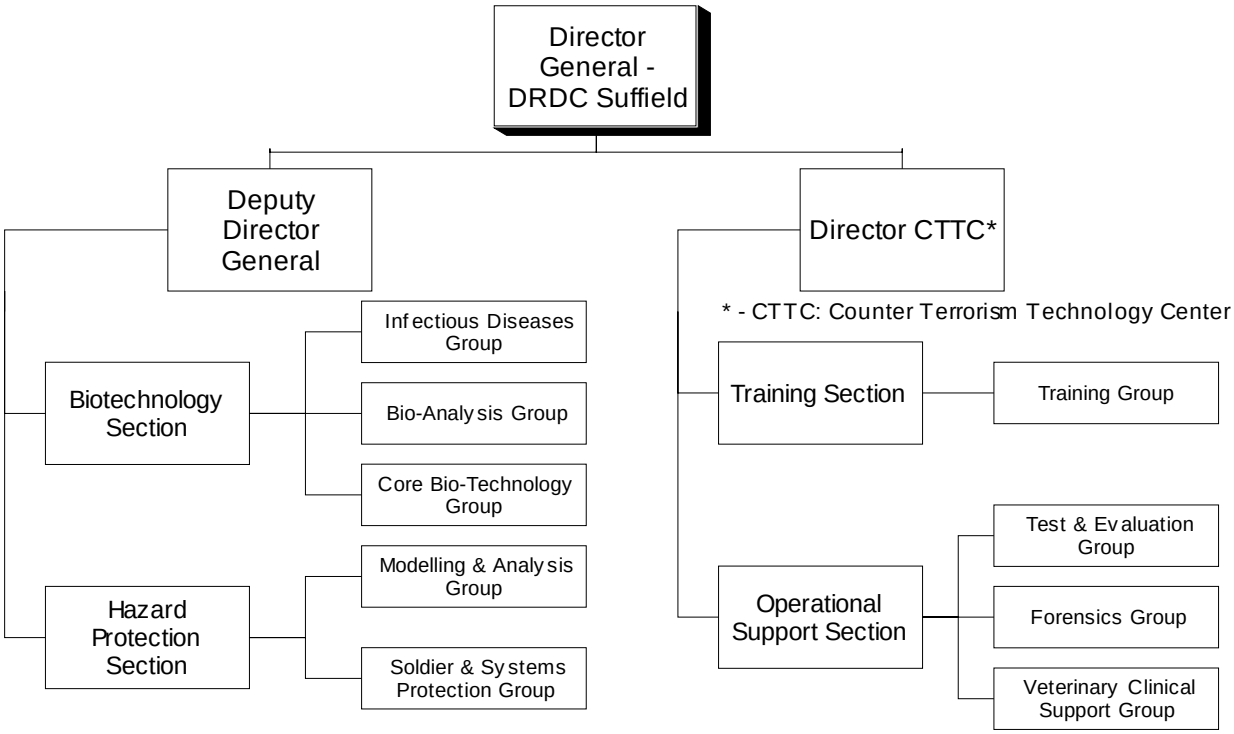
(ii) Division of personnel
Military 1.9
Civilian 49.4

(iii) Division of personnel by category
scientists 22.0

[1] The chemical and biological defence programs at this facility are fully integrated. The data presented herein is therefore a best estimate as to the portion that is affected to biological defence.

Engineers	0.0
Technicians	24.2
Admin. and support staff	3.2

(iv) Organization Chart and disciplines represented in the DRDC Suffield program in biological defence



Disciplines

Bacteriology
Microbiology
Chemistry
Biotechnology
Human Medicine
Immunology
Virology
Biochemilstry
Veterinary Medicine
Pharmacology

Elements not part of the biodefence program not shown

(v) There are two contractor staff working in biological defence at this facility, working to develop medical countermeasures to, and detection of BW agents and toxins. A list of contractors carrying out R&D in biological defence is attached.

(vi) The research in this facility is 100% funded by the Departments of National Defence and Public Safety Canada and under contract to, or through collaborative agreements, with other government departments and industry.

Funding level estimates (including salaries): $5,039,000

(vii) Estimate of funding levels for the following program areas:

Research	$4,459,000
Development	$115,000
Test and Evaluation	$464,100

(viii) All staff are encouraged to publish the results of their research in the open literature whenever not precluded by security or intellectual property considerations. There is also an internal publication system which is used for publications regardless of content. See attached list of publications (Form C).

(ix) A list of publicly-available papers and reports is annexed.

D. The biological defence program at DRDC Suffield is outlined in Form A, part 2, (ii), paragraph 1 and additional details follow. Assessment of the hazards from biological agents and toxins involves research to understand the dispersion of such agents and is carried out by mathematical modelling techniques. Part of the work in detection involves R&D leading to the production of field portable chemical/biological agent detection systems. In medical countermeasures, research is carried out on new drugs and vaccines and delivery systems, for example microencapsulated antibiotics and vaccines. Microorganisms other than Newcastle disease virus (NDV) and *Bacillus subtilis var. niger* (formerly *Bacillus globigii* (BG)) which have been used in the biological defence program are *Bacillus anthracis*, *Brucella* species (*abortus*, *melitensis*, *neotomae*, *ovis* and *suis*), *Burkholderia* species (*mallei*, *pseudomallei*) *Francisella tularensis*, *Mycobacterium tuberculosis*, *Yersinia enterocolitica*, *Yersinia pestis*, various influenza virus strains, Western Equine encephalitis, Eastern Equine Encephalitis, Venezuelan Equine, Encephalitis and Chikungunya. Toxins used include botulinum toxin, staphylococcal enterotoxin B, ricin and various venoms from marine organisms, reptiles and insects. In the early to mid-1980s, outdoor studies have involved only NDV middle through 1980's and BG.

2. Defence R&D Canada – Valcartier (DRDC Valcartier)

A. The facility is located in buildings 14 and 25 and an aerosol chamber for Lidar measurements is located at about 300 m from building 25 (also on the main laboratory area complex). The postal address is:

Director General
DRDC Valcartier
2459 Boul. Pie XI Nord
Québec, Québec, G3J 1X5
CANADA

B. Floor area of laboratory areas in Building 14 and 25 by containment level:

BSL1 - 165 m^2

A new BSL1 laboratory has been inaugurated in July 2011 to support the standoff biodetection program. The aerosol chamber (2m x 2m x 22m) located outside of building 25 is used to characterize standoff biodetection systems under development with fluorescing aerosols simulating bioaerosols.

C. The organizational structure of the personnel contributing to this activity is:

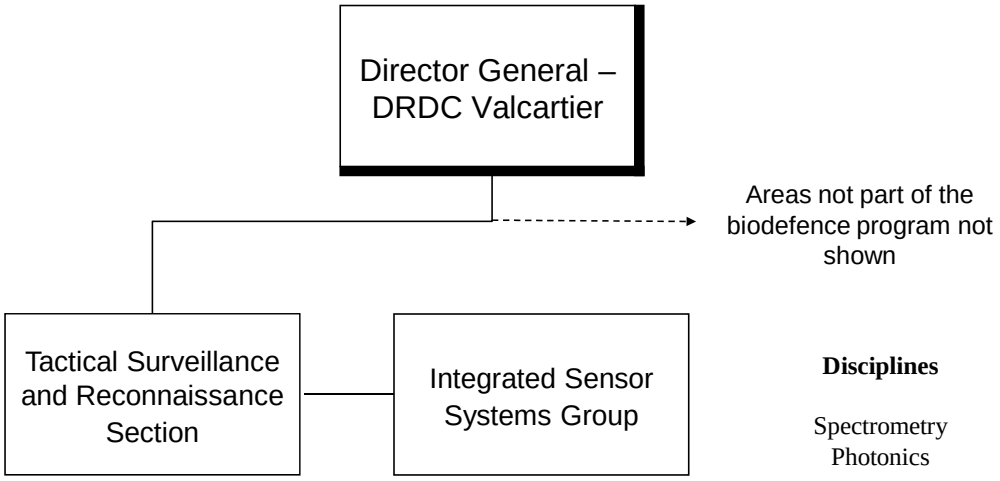
i. total number of personnel 3

ii. division of personnel
civilian 3

iii. division of personnel by category

scientists	2
managers	0
technicians	1
admin. and support staff	0

iv. Organization Chart and disciplines represented in the DRDC Suffield program in biological defence



v. There are one contractor staff and one postdoctoral fellow working in biological defence at this facility. The contractor is working in management support to the standoff biodetection program and the postdoctoral fellow is a microbiologist who, in collaboration with the laboratory in aerology of hospital Laval, investigates standoff biodetection concepts. A list of contractors carrying out R&D in biological defence is attached.

vi. The research in this facility is 100% funded by the Departments of National Defence and Public Safety Canada and under contract to, or through collaborative agreements, with other government departments and industry.

vii. Funding level estimates (including salaries): $840,000

viii. All staff are encouraged to publish the results of their research in the open literature whenever not precluded by security or intellectual property considerations. There is also an internal publication system which is used for publications regardless of content.

ix. See attached list of publications (Form C).

D. The biological defence program at DRDC Valcartier is focused on the detection of biological agents and toxins using photonic detection methods. This involves R&D leading to the production of field portable biological agent detection systems.

List of Contractors
Carrying Out Research and Development in Biological Defence
for the Department of National Defence of Canada - 2011

Contractor	Title
AEREX Avionics Inc. Breakeyville, QC	Managing support to BioSense TDP
Advanced Integrated Microsystems Ltd, Vancouver, BC	Micro-Based Sample Processing for Bioanalysis and Mass Spectrometry
Alberta Ingenuity Centre for Carbohydrate Science, University of Alberta, Edmonton, AB	Production of Recombinant Conjugate Vaccine Candidates against *Burkholderia pseudomallei*
Canada West Biosciences Inc, Calgary, AB	Preclinical Evaluation of Nucleic Acid-Based Antiviral Agents Screening of Mimetic Peptide Inhibitors of Neurotoxins and Fragment Fingerprint Analysis of Neurotoxins by Capillary Electrophoresis Development of Protein Suspension Array Technology for Characterization of Immune Responses and Identification of Biothreat (BT) Agents Detection and Identification of Microbes Using Microarray to Support Continuing Development of Microarray Investigating the Mechanisms of Neurotoxin Toxicity and Screening for Inhibitors Against Neurotoxins in Cultured Rat Cortical Neurons Investigating Novel, Universal Therapeutics Against All Serotypes of Botulinum Neurotoxins Stem Cell Production Facility - Swine Stem Cell Facility Setup
Chronix Biomedical, San Jose, CA, USA	Diagnostic Biomarkers from Circulating Nucleic Acids
College of Veterinary Medicine China Agriculture University, China	Avian Influenza Infections and Cytokine Storm
Holliston Pharmatest Inc, Saskatoon, SK	Development, Validation and Production of a Mouse Strain Deficient in Carboxylesterase
Laboratory for Advanced Genome Analysis, The Prostate Centre at Vancouver General Hospital, Vancouver, BC	Genetic Screening (Microarray Analysis) for Detectable Biomarkers in Early Stages of Acute Infection
MacDonald Dettwiler and associates Ltd, Richmond, BC	Processing of the data produced during the BioSense TD trials, and production of the performance parameters of the BioSense sensor Construction of the BioSense demonstrator (standoff biodetection)

Contractor	Title
Microarray Facility at the Prostate Centre, University of BC, Vancouver, BC	Microarray Analysis Following Nucleic Acid-Based Drug Treatment
Northern Lipids Inc., Vancouver, BC	Nasal Spray Against Avian Influenza
Oncovir Inc., Washington, DC, USA	Development of Nasal Spray Formula
Thompson Tang, Medicine Hat, AB	Microfluidic Devices for Genetic Analysis and Molecular Biology Microfluidic Flow Cytometer for Bacterial Analysis
Toxtest - RnRx - Alberta Innovates - Technology Futures, Vegreville, AB	Preclinical Trials and Long Term Animal Studies
University of Alberta, Research Services Office, Edmonton, AB	Production and Purification of Monoclonal Antibodies to Biothreat Agents for Incorporation in Suspension Arrays
University of Guelph, Guelph, ON	Supply of Neutralization Antibodies Against Botulinum Neurotoxins
University of Ottawa, Research Partnerships, Technology Transfer & Business Enterprise, Ottawa, ON	Immunological Support for Biothreat Agent Detection Using Novel Antibodies
University of Saskatchewan, Saskatoon, SK	Antiviral Drug Test in a Ferret
WebGenii Consulting, Redcliff, AB	Development and Support of Computerized Process and Data Management Systems for Complex Biological Research

CONFIDENCE BUILDING MEASURE B

Exchange of information on outbreaks of infectious diseases and similar occurrences caused by toxins

At the Third Review Conference it was agreed that States Parties continue to implement the following:

> Exchange of information on outbreaks of infectious diseases and similar occurrences caused by toxins, and on all such events that seem to deviate from the normal pattern as regards type, development, place, or time of occurrence. The information provided on events that deviate from the norm will include, as soon as it is available, data on the type of disease, approximate area affected, and number of cases.

The Seventh Review Conference agreed the following:

> No universal standards exist for what might constitute a deviation from the normal pattern.

Modalities

The Third Review Conference agreed on the following, later amended by the Seventh Review Conference:

1. Exchange of data on outbreaks that seem to deviate from the normal pattern is considered particularly important in the following cases:

> - when the cause of the outbreak cannot be readily determined or the causative agent10 is difficult to diagnose;
>
> - when the disease may be caused by organisms which meet the criteria for risk groups III or IV, according to the classification in the latest edition of the WHO Laboratory Biosafety Manual;
>
> - when the causative agent is exotic to a given geographical region;
>
> - when the disease follows an unusual pattern of development;
>
> - when the disease occurs in the vicinity of research centres and laboratories subject to exchange of data under item A; and
>
> - when suspicions arise of the possible occurrence of a new disease.

2. In order to enhance confidence, an initial report of an outbreak of an infectious disease or a similar occurrence that seems to deviate from the normal pattern should be given promptly after cognizance of the outbreak and should be followed up by annual reports. To enable States Parties to follow a standardized procedure, the Conference has agreed that Form B should be used, to the extent information is known and/or applicable, for the exchange of annual information.

3. The declaration of electronic links to national websites or to websites of international, regional or other organizations which provide information on disease outbreaks (notably outbreaks of infectious diseases and similar occurrences caused by toxins that seem to deviate from the normal pattern) may also satisfy the declaration requirement under Form B.

4. In order to improve international cooperation in the field of peaceful bacteriological (biological) activities and in order to prevent or reduce the occurrence of ambiguities, doubts and suspicions, States Parties are encouraged to invite experts from other States Parties to assist in the handling of an outbreak, and to respond favourably to such invitations, respecting applicable national legislation and relevant international instruments.

Background information of nationally notifiable diseases: Animal Health

DEFINITION: Reportable diseases

These diseases are listed in the Health of Animals Act and Regulations and are usually of significant importance to human or animal health or to the Canadian economy.

The list of "reportable" diseases includes all of the previously called OIE List A diseases. Reportable diseases are transmissible diseases which have the potential for very serious and rapid spread, irrespective of national borders, which are of serious socio-economic or public health consequence and which are of major importance in the international trade of animals and animal products.

DEFINITION: Notifiable diseases

In Canada, there is a second list of diseases, called "notifiable", which also need to be reported to the veterinary administration (CFIA) on an immediate or annual basis. In general, immediately notifiable diseases are diseases exotic to Canada for which there are no control or eradication programs. Notifiable diseases are the transmissible diseases which are considered to be of socio-economic and/or public health importance within countries and which are significant in the international trade of animals and animal products.

The reports to OIE are posted on the new World Animal Health Information Database (WAHID) Interface website: http://www.oie.int/wahid-prod/public.php?page=home. Any additional written reports to the OIE will also be posted directly on the CFIA website.

CONFIDENCE BUILDING MEASURE B

Information on outbreaks of infectious diseases and similar occurrences, that seem to deviate from the normal pattern

Public Health Agency of Canada

The Public Health Agency of Canada has provided information on disease rates that deviate from the normal pattern for the last several years, rather than just 2011.

Measles

Within the last 10 years, the number of measles cases reported globally has decreased significantly; however, there have been a number of large outbreaks recently, mostly in Africa but also in Europe. The Americas, including Canada, are also experiencing outbreaks of measles linked to importation of the measles virus from other regions. With total number of confirmed cases at 101, 61 and 15 for 2007, 2008 and 2009 respectively, the 2010 case number was 99 and the current 2011 case number is 770.

As of October 19, 2011, there have been 751 confirmed and probable measles cases associated with an outbreak in the province of Quebec[2]. The outbreak began on April 3, 2011 and in currently ongoing. There has been one secondary case in New Brunswick associated with this outbreak. Generally, PHAC would only become involved in the direct response to a provincial or territorial outbreak if requested by the province or territory, and Quebec has not requested assistance. PHAC has, however, submitted a publication in the Canadian Medical Association Journal (CMAJ) targeted at front line health professionals to assist in identification of measles cases and to remind them of the preferred specimens to collect for accurate diagnosis and molecular characterization, as many physicians experience with measles is dated. This outbreak constitutes the most significant outbreak in the Americas since 2002 when the region received its measles free status. As such, Quebec is taking steps to control the outbreak and in November 2011 the province launched a "catch-up" vaccination campaign in its schools.

Influenza H1N1[3]

In April 2009, the world saw the emergence of a novel influenza strain now formally called influenza A(H1N1)pdm09 that spread very quickly around the globe. In Canada, the first six cases of the pandemic H1N1 strain were reported on April 26th 2009 and marked the beginning of the first wave of the pandemic. Cases continued to increase across the country and the first wave peaked during the first three weeks of June 2009. Influenza activity declined throughout

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[2] For more information please visit Santé et services sociaux – Quebec at http://www.msss.gouv.qc.ca/sujets/prob_sante/rougeole/rougeole.php

[3] NACI Statement on Season Trivalent Inactivated Influenza Vaccine (TIV) for 2010-2011: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/10vol36/acs-6/index-eng.php#toc2

Helferty M, et al. Incidence of hospital admissions and severe outcomes during the first and second waves of pandemic (H1N1) 2009. CMAJ Dec. 14, 2010 vol. 182 no. 18

summer 2009 and began to increase again across the country starting in mid-September, marking the start of the second wave of the pandemic. The second wave peaked from late October to mid-November and decreased dramatically by mid-December. In comparing the differences in magnitude between the two pandemic waves, the second wave was substantially larger with four to five times more hospitalized and fatal cases than the first wave.

From April 12, 2009 to July 17, 2010 (encompassing the first and second waves), the number of laboratory-confirmed pandemic H1N1 cases was 40,204; however, an additional 12,363 cases were positive for un-subtyped influenza A, for which the large majority is considered to be due to influenza A(H1N1)pdm09 since only a small proportion of other influenza subtypes were circulating at the time of the pandemic. The per capita influenza testing rate for Canada during the pandemic period was 956 influenza tests per 100,000 population. The largest proportion of cases was observed in those aged 5-14 years (26%), 25-44 (22%) and 15-24 (18%).
While most illnesses caused by the virus were acute and self-limited, a number of severe outcomes were reported. There were a total of 8,678 hospital admissions (including 1473 ICU admissions) and 428 deaths related to pandemic (H1N1) influenza that were reported between April 12, 2009 to April 3, 2010. Hospitalization rates were highest for children under 5 years of age; however, the highest mortality rate occurred in adults aged 45 and older. These hospitalizations and deaths were only those that were laboratory confirmed, and the true number of hospitalizations and deaths due to influenza A(H1N1)pdm09 are considered to be much more.

Lessons learned from the pandemic include: the need to further strengthen federal/ provincial/territorial capacity to prepare for and respond to pandemic influenza; and the need for pre-existing Memorandums of Understanding for information sharing during public health emergencies between provinces, territories and the federal government.

Listeria

In August of 2008, a nation-wide outbreak of listeriosis led to the largest recall of contaminated food products in recent Canadian history. The health impact was significant: a total of 57 cases of illness were confirmed and 23 deaths were linked to the outbreak. Following the recall, reviews of Canadian public health and food safety protocols were conducted by the federal agencies involved in the response, a Senate Standing Committee and an independent investigator, Sheila Weatherill. Lessons learned documents were compiled by the federal agencies and Weatherill completed her Report of the Independent Investigator into the 2008 Listeriosis Outbreak[4]in July of 2009.

Following these reviews, the Government of Canada committed to addressing the gaps that had been identified within the country's food safety systems. The federal agencies with jurisdiction over food safety and foodborne illness drafted Action Plans to guide their response to both Weatherill's Report and the federal agency Lessons Learned documents. Since the 2008 outbreak, a number of initiatives have been carried out to improve Canada's preparedness for dealing with a serious foodborne illness outbreak. One key item was the revision of Canada's Foodborne Illness Outbreak Response Protocol (FIORP) in 2010. This collaborative effort between federal, provincial and territorial (FPT) governments across the health and agriculture sectors resulted in a number of new roles, responsibilities and information exchange processes

[4] http://www.listeriosis-listeriose.investigation-enquete.gc.ca/index_e.php?s1=rpt&page=tab

being incorporated into the Protocol. Following the completion of the 2010 revisions, the FIORP was then exercised in each of Canada's thirteen provinces and territories, allowing for relationship-building and increased knowledge related to collaborative investigation processes among FPT and local officials.

General Trends

Trends in the rates of sexually transmitted infections and hepatitis have been changing recently for a variety of reasons, outlined below.

Chlamydia: Reported rates of chlamydia have been increasing steadily since 1997, when more sensitive laboratory tests were introduced in Canada. Thus, part of the increase in rates can be attributed to improved detection of infections among those who are tested. Other postulated reasons for the increase in reported chlamydia rates include increased case finding (through contact tracing and improved screening), and an actual increase in incidence due to changes in behaviour at the population level. Data to support any of these theories are limited. However, there have been no recent reports of chlamydia outbreaks in any Canadian jurisdiction to explain the increase. The observed increase in reported chlamydia rates in 2008 is in line with the longer-term trend.

Hepatitis B: Recent increases in hepatitis B reported rates are probably attributable to changes in case counting and reporting to the Public Health Agency of Canada. The increase in 2008 seems to be largely driven by Alberta, where a change in reporting practices (from reporting only acute cases to including both acute and chronic) caused a dramatic increase in reported rates. In fact, data from enhanced hepatitis B surveillance indicate that the reported rate of acute hepatitis B infections is decreasing, from 0.97 per 100,000 in 2005 to 0.49 per 100,000 in 2010. Routine childhood immunization for hepatitis B in Canada has reduced the occurrence of large-scale outbreaks; occasional sporadic transmission of hepatitis B infections has been limited to small groups (e.g. a small 2006 outbreak limited to household transmission in several families in New Brunswick).

Hepatitis C: Reported rates of hepatitis C have decreased since 2005.

Infectious syphilis: The reported rate of infectious syphilis was maintained below 1.0 per 100,000 for several years prior to 2002, when rates started to increase due to outbreaks in several jurisdictions. In recent years, sustained high reported rates of infectious syphilis have been documented in British Columbia, Alberta, Ontario, and Québec, concentrated mainly in large urban centres, suggesting that syphilis is once again becoming endemic in much of Canada. More recent outbreaks have occurred or are in progress in the Northwest Territories, Saskatchewan, Nova Scotia, and New Brunswick. Outbreaks are often associated with travel between jurisdictions in Canada or outside of the country. Men who have sex with men are one of the most affected groups; however, outbreaks have also been seen in heterosexual men and women, with resulting increases in congenital syphilis in infants. Injection drug use and involvement in the sex trade have been implicated in some jurisdictions. Public health response to the increase in infectious syphilis has included communication to health care providers to raise awareness and increase testing, internet-based awareness campaigns directed at the general population, and testing "blitzes" among the populations most affected.

CONFIDENCE BUILDING MEASURE C

Encouragement of publication of results and promotion of use of knowledge

At the Third Review Conference it was agreed that States parties continue to implement the following:

> Encouragement of publication of results of biological research directly related to the Convention, in scientific journals generally available to States parties, as well as promotion of use for permitted purposes of knowledge gained in this research.

Modalities

The Third Review Conference agreed on the following:

> 1. It is recommended that basic research in biosciences, and particularly that directly related to the Convention should generally be unclassified and that applied research to the extent possible, without infringing on national and commercial interests, should also be unclassified.
>
> 2. States parties are encouraged to provide information on their policy as regards publication of results of biological research, indicating, *inter alia*, their policies as regards publication of results of research carried out in research centres and laboratories subject to exchange of information under item A and publication of research on outbreaks of diseases covered by item B, and to provide information on relevant scientific journals and other relevant scientific publications generally available to States parties.
>
> 3. The Third Review Conference discussed the question of cooperation and assistance as regards the safe handling of biological material covered by the Convention. It concluded that other international forums were engaged in this field and expressed its support for efforts aimed at enhancing such cooperation.

CONFIDENCE BUILDING MEASURE C

Encouragement of Publication of Results and Promotion of Use of Knowledge

Note: Publication and knowledge sharing is strongly encouraged and a cornerstone of the CRTI.

Public Health Agency of Canada

Kobinger GP, Leung A, Neufeld J, Richardson JS, Falzarano D, Smith G, Tierney K, Patel A, and Weingartl HM. Replication, Pathogenicity, Shedding and Transmission of Zaire ebolavirus in Pigs. *Journal of Infectious Diseases*, 2011 Jul;204(2):200-8.

Fagone P, Shedlock DJ, Bao H, Kawalekar OU, Yan J, Gupta D, Morrow MP, Patel A, Kobinger GP, Muthumani K, Weiner DB. Molecular adjuvant HMGB1 enhances anti-influenza immunity during DNA vaccination. *Gene Therapy*. 2011 May 5.

Abed, Y, Pizzorno A, Hamelin ME, Leung A, Joubert P, couture C, Kobasa D, Boivin G. The 2009 pandemic H1N1 D222G hemagglutinin mutation alters receptor specificity and increases virulence in mice but not in ferrets. *J Infect Dis. 2011 Oct 1;204(7):1008-16.*

Richardson JS, Abou MC, Tran KN, Kumar A, Sahai BM, Kobinger GP. Impact of systemic or mucosal immunity to adenovirus on ad-based ebola virus vaccine efficacy in Guinea pigs. *Journal of Infectious Diseases,* 2011 Nov;204 Suppl 3:S1032-42.

Meunier I, Embury-Hyatt C, Stebner S, Gray M, Bastien N, Li Y, Plummer F, Kobinger GP, von Messling V. Virulence differences of closely related pandemic 2009 H1N1 isolates correlate with increased inflammatory responses in ferrets. *Virology*. 2012 Jan 5;422(1):125-31.

Co-administration of certain DNA vaccine combinations expressing different H5N1 influenza virus antigens can be beneficial or detrimental to immune protection. Patel A, Gray M, Li Y, Kobasa D, Yao X, Kobinger GP. *Vaccine*. 2011 Nov 22.

A Single Sublingual Dose of an Adenovirus-Based Vaccine Protects against Lethal Ebola Challenge in Mice and Guinea Pigs Jin Huk Choi, Stephen C Schafer, Lihong Zhang, Gary P Kobinger, Terry Juelich, Alexander N. Freiberg, and Maria A. Croyle. *Molecular Pharmaceutics*, 2012 Jan 1;9(1):156-67. Epub 2011 Dec 15.

Pause on avian flu transmission research. Fouchier RA, García-Sastre A, Kawaoka Y, Barclay WS, Bouvier NM, Brown IH, Capua I, Chen H, Compans RW, Couch RB, Cox NJ, Doherty PC, Donis RO, Feldmann H, Guan Y, Katz J, Klenk HD, Kobinger G, Liu J, Liu X, Lowen A, Mettenleiter TC, Osterhaus AD, Palese P, Peiris JS, Perez DR, Richt JA, Schultz-Cherry S, Steel J, Subbarao K, Swayne DE, Takimoto T, Tashiro M, Taubenberger JK, Thomas PG, Tripp RA, Tumpey TM, Webby RJ, Webster RG. *Science*, 2012 Jan 27;335(6067):400-1.

The cellular antiviral protein APOBEC3G interacts with HIV-1 reverse transcriptase and inhibits

its function during viral replication. Wang X, Ao Z, Chen L, Kobinger G, Peng J, Yao X. *Journal of Virology*. 2012 Feb 1.

A strategy to simultaneously eradicate the natural reservoirs of rabies and Ebola virus. Wong G, Kobinger G. *Expert Review of Vaccines*. 2012 Feb;11(2):163-6.

A computerized data-capture system for animal biosafety level 4 laboratories. Bente DA, Friesen J, White K, Koll J, Kobinger GP. *Journal American Association of Laboratory Animal Science*. 2011;50(5):660-4.

Canadian Food Inspection Agency

Scientific Papers

Arzt, J., Juleff, N., Zhang, Z., & Rodriguez, L. L. (2011). The pathogenesis of foot-and-mouth disease I: Viral pathways in cattle. Transboundary and Emerging Diseases, 58(4), 291-304.

Awadin, W., Hussein, H., Elseady, Y., Babiuk, S., & Furuoka, H. (2011). Detection of lumpy skin disease virus antigen and genomic DNA in formalin-fixed paraffin-embedded tissues from an egyptian outbreak in 2006. Transboundary and Emerging Diseases, 58(5), 451-457.

Babiuk, S., Masic, A., Graham, J., Neufeld, J., van der Loop, M., Copps, J., et al. (2011). An elastase-dependent attenuated heterologous swine influenza virus protects against pandemic H1N1 2009 influenza challenge in swine. Vaccine,

Bray, M., & Babiuk, S. (2011). Camelpox: Target for eradication? Antiviral Research, 92(2), 164-166.

Kobinger, G. P., Leung, A., Neufeld, J., Richardson, J. S., Falzarano, D., Smith, G., et al. (2011). Replication, pathogenicity, shedding, and transmission of zaire ebolavirus in pigs. Journal of Infectious Diseases, 204(2), 200-208.

Lung, O., Fisher, M., Beeston, A., Hughes, K. B., Clavijo, A., Goolia, M., et al. (2011). Multiplex RT-PCR detection and microarray typing of vesicular disease viruses. Journal of Virological Methods, 175(2), 236-245.

Myskiw, C., Arsenio, J., Hammett, C., van Bruggen, R., Deschambault, Y., Beausoleil, N., Babiuk, S. (2011). Comparative analysis of poxvirus orthologues of the vaccinia virus E3 protein: Modulation of protein kinase R activity, cytokine responses, and virus pathogenicity. Journal of Virology, 85(23), 12280-12291.

Nfon, C., Berhane, Y., Zhang, S., Handel, K., Labrecque, O., & Pasick, J. (2011). Molecular and antigenic characterization of triple-reassortant H3N2 swine influenza viruses isolated from pigs, turkey and quail in canada. Transboundary and Emerging Diseases, 58(5), 394-401.

Nfon, C. K., Berhane, Y., Hisanaga, T., Zhang, S., Handel, K., Kehler, H., et al. (2011).

Characterization of H1N1 swine influenza viruses circulating in canadian pigs in 2009. Journal of Virology, 85(17), 8667-8679.

Parmley, E. J., Soos, C., Breault, A., Fortin, M., Jenkins, E., Kibenge, F., Pasick, J. et al. (2011). Detection of low pathogenic avian influenza viruses in wild ducks from canada: Comparison of two sampling methods. Journal of Wildlife Diseases, 47(2), 466-470.

Ping, J., Keleta, L., Forbes, N. E., Dankar, S., Stecho, W., Tyler, S., Weingartl, H.M. et al. (2011). Genomic and protein structural maps of adaptive evolution of human influenza a virus to increased virulence in the mouse. PLoS ONE, 6(6)

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Berhane, Y., Leith, M., Embury-Hyatt, C., Neufeld, J., Babiuk, S., Hisanaga, T., et al. (2010). Studying possible cross-protection of canada geese preexposed to north american low pathogenicity avian influenza virus strains (H3N8, H4N6, and H5N2) against an H5N1 highly pathogenic avian influenza challenge. Avian Diseases, 54(SUPPL. 1), 548-554.

Ming Yang, Alfonso Clavijo, John Pasick, Tim Salo, Zhiliang Wang, Yanling Zhao, Dongxia Zheng and Yohannes Berhane, Serologic detection of Avian influenza H5 antibodies using a competitive enzyme-linked immunosorbent assay (ELISA). Journal of Veterinary Medicine and Animal Health Vol. 3(4), pp. 56-61, August 2011

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Oral Presentations

Name of Speaker: Soren Alexandersen
Title of Presentation: "Canadian Perspective on Impact of FADs"
Date: January 25, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Kathleen Hooper-McGrevy
Title of Presentation: "Basic Immunology"
Date: January 26, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Kathleen Hooper-McGrevy
Title of Presentation: "Diagnostic Test Result Interpretation & Diagnostic Principles"
Date: January 26, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Christiaan Kranendonk
Title of Presentation: "Sample Collection & Submission"
Date: January 26, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Soren Alexandersen
Title of Presentation: "Vesicular Diseases"
Date: January 27, 2011
Event: Foreign Animal Disease Course

Name of Speaker: John Pasick
Title of Presentation: "Newcastle Disease"
Date: January 27, 2011
Event: Foreign Animal Disease Course

Name of Speaker: John Pasick
Title of Presentation: "Avian Influenza"
Date: January 28, 2011
Event: Foreign Animal Disease Course
Name of Speaker: John Pasick
Title of Presentation: "Classical Swine Fever, African Swine Fever"
Date: January 28, 2011
Event: Foreign Animal Disease Course

Name of Speaker: John Pasick
Title of Presentation: "Pseudorabies"
Date: January 28, 2011
Event: Foreign Animal Disease Course

Name of Speaker: John Copps
Title of Presentation: "Agrobioterrorism"
Date: January 29, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Shawn Babiuk
Title of Presentation: "Sheep Pox, Goat Pox & Lumpy Skin Disease"
Date: January 30, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Hana Weingartl
Title of Presentation: "Emerging Diseases"

Date: January 31, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Carissa Embury-Hyatt
Title of Presentation: "Rinderpest & Peste des petits ruminants"
Date: February 1, 2011
Event: Foreign Animal Disease Course

Name of Speaker: Hana Weingartl
Title of Presentation: "Rift Valley Fever"
Date: February 1, 2011
Event: Foreign Animal Disease Course

Name of Speaker: John Copps
Title of Presentation: "NCFAD CFIA, The Last 13 Years"
Date: June 6, 2011
Event: Canadian Animal Health Laboratorians Network Conference

Name of Speaker: Soren Alexandersen
Title of Presentation: "Communication during Outbreak/HVI Situations"
Date: January 12-13, 2011
Event: Science Branch Executive Committee Face to Face Meeting in Ottawa

Name of Speaker: Soren Alexandersen
Title of Presentation: "The Global Situation of Foot-and-Mouth Disease and an Overview of International Networks"
Date: January 30 to February 5, 2011
Event: Visited high containment animal health labs in Columbia, Ecuador, Peru and Bolivia

Name of Speaker: Soren Alexandersen
Title of Presentation: "Vesicular Diseases (FMD) – Testing Protocols"
Date: March 8-9, 2011
Event: FMD Exercise in Ottawa
Name of Speaker: Soren Alexandersen
Title of Presentation: "Vesicular Diseases" and "Exercise 'Silver Birch' – A Major Great Britain/UK Exercise to Test the Ability to Deal with a Significant Outbreak/Epidemic of Foot-and-Mouth Disease"
Date: March 9-10, 2011
Event: Canadian Veterinary Reserve Course in Ottawa

Name of Speaker: Soren Alexandersen
Title of Presentation: "CFIA/OIE Reference Lab and Collaborating Centres Review and Strategy Development"
Date: April 12-14, 2011
Event: CFIA Lab Executive Director Meeting and Science Branch Executive Committee Face to Face Meeting in Ottawa

Name of Speaker: Soren Alexandersen
Title of Presentation: "FMD Activities at NCFAD Winnipeg, Canada"
Date: November 15, 2011
Event: 7th OIE/FAO FMD Reference Laboratory Network Meeting, Pirbright, UK.

Name of Speaker: Ming Yang
Title of Presentation: "Development and validation of a competitive ELISA for avian influenza H5 antibody detection" and "Generation and diagnostic application of mAbs against Seneca Valley Virus (SVV)"
Date: December 29, 2011
Event: National Diagnostic Center for Exotic Animal Diseases, China Animal Health and Epidemiology Centers, Qingdao, China

Defence Research & Development Canada

Scientific Literature:

1. C. Laflamme, J.R. Simard, S. Buteau, P. Lahaie, D. Nadeau, B. Déry, O. Houle, P. Mathieu, G. Roy, J. Ho, C. Duchaine, "Effect of growth media and washing on the spectral signatures of aerosolized biological simulants" *Applied Optics*, Vol. 50 Issue 6, pp.788-796 (2011).
2. J.R. SIMARD, J. McFee, S. Buteau, P. Lahaie, P. Mathieu, G. Roy, D. Nadeau, J. Ho, S. Rowsell, N. Hô, F. Babin, D. Cantin, D. Healey, J. Robinson, S. Wood, J. Hsu, "BioSense/SR-BioSpectra, Demonstrations of Wide Area/Early Warning for Bioaerosol Threats: Program Description and Early Test and Evaluation Results", Proceedings of SPIE Vol. 8189, Optics and Photonics for Counterterrorism and Crime Fighting, SPIE + Defence 2011, Prague, Czech Republic, 19-23 September 2011, 11 pages, presented by J.R. Simard. SL-2011-298
3. S. Buteau, Simard, J.-R. and Nadeau, D., 'Characterization of Laser Induced Fluorescence from Background Aerosols in a Maritime Environment' paper presented at the Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XII conference (SPIE Defense, Security, and Sensing 2011), Orlando, USA, April 2011, pp. 801803-1 - 801803-10, SL-2011-189
4. Kournikakis, B., Martinez, K.F., McCleery, R.E., Shadomy, S.V., and Ramos, G., Anthrax letters in an open office environment: Effects of selected CDC response guidelines on personal exposure and building contamination, J. Occup. Environ. Hyg., 2011, 8, 113–122.
5. Swayze, R.D., Bhogal, H.S., Barabé, N.D., McLaws, L.J., and Wu, J.Q., Envelope protein E1 as vaccine target for western equine encephalitis virus, Vaccine, 2011, 29, 813–820.
6. Yee, E. and Skvortsov, A., Scalar fluctuations from a point source in a turbulent boundary layer, Phys. Rev. E, 2011, 84, 036306.
7. Postma, J.V., Wilson, J.D., and Yee, E., Comparing Two Implementations of a Micromixing Model. Part I: Wall Shear-Layer Flow, Bound.-Lay. Meteorol., 2011, 140, 207–224.
8. Postma, J.V., Wilson, J.D., and Yee, E., Comparing Two Implementations of a Micromixing Model. Part II: Canopy Flow, *Bound.-Lay. Meteorol.*, **2011**, *140*, 225–241.

Internal publications

1. N.W.C. Chan and S.L. Hayward, Countering the Biological Threat in an Asymmetric World: A Way Forward in Biological Detection, Identification and Diagnostics, DRDC Suffield TM 2011-172.
2. Chan, N.W.C., Lee, W.E., Wood, C., Gebremedhin, M., and Mah, D., Identification of receptors and antagonists to botulinum toxin A, DRDC Suffield TR 2011-182.
3. Chan, N.W.C., Lee, W.E., Crichton, M., Wong, J., Song, Y. and Mah, D.C.W., Small Molecule Inhibitors of Botulinum Neurotoxin A Light Chain Activity, DRDC Suffield TM 2011-229.

Oral Presentations

Conference	Date	Presentation	Speaker(s)
9th Annual ASM Biodefense and Emerging Diseases Research Meeting, Washington, DC	6-9 Feb 11	Influence of Growth Media and Washing on the Spectral Laser Induced Fluorescence Signature of Biological Simulant in a Standoff Detection Context	C. Laflamme
		Flow Cytometric Quantification of Lung Natural Killer Cell Activity Associated with TLR-3 Signaling Pathway Activation	X. Dai, L. McLaws, G. Schnell, S. Viswanathan, C. Hu, H. Bhogal and J.P. Wong
		Development and Characterization of Novel Mabs to C. burnetii	S. Hayward, J. Ranches and R.E. Fulton
CMC workshop on Microfluids and Nanofluids, University of Alberta, Edmonton, AB	19 Apr 11	A microfluidics collaboration: Suffield and University of Alberta	A. Jemere, T. Tang, W. Lee and Jed Harrison
Matinées Scientifiques, DRDC Valcartier, QC, Canada	11 May 11	Détection de Menaces Biologiques en Retrait: Défis et Solutions	J.R. Simard
Public Security S&T Summer Symposium, Ottawa, ON	14-16 Jun 11	Human Monoclonal Antibodies against Ricin	J. Cherwonogrodzky, W-G. Hu, L.M. Negrych, J. Yin, D. Chau, S.J. Jager, D. Lillico and J. Yu
		Detection and Identification Assay Validation Program for	B. Solylo, T. Tang, M. Thomas, D. Lambert,C. Guan,

Conference	Date	Presentation	Speaker(s)
		Biothreat Agents	K. Antonation, D. Bader; K. Amoako, J. Austin, M. Gilmour and C. Corbett
		Development of Nasal Spray Formulated with Antiviral Drug Against Avian Influenza Virus	D. Van Loon, X. Dai and J. Wong
American Society for Virology Annual Meeting, University of Minnesota, Minneapolis, MN	16-20 Jul 11	Adenovirus-mediated Interferon-gamma Gene Therapy against Western Equine Encephalitis Virus	J.Q.H. Wu, N.D. Barabé and D. Chau
51st Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), Chicago, IL	17-21 Sep 11	Activation of Innate Cytokines and Natural Killer Cells in Mouse Respiratory Tract Induced by Toll-Like Receptor-3 Agonists	X. Dai, L. McLaws, C. Hu, G. Schnell and J. Wong
Imaging Lidar Technology and algorithm for tactical applications (RTG-072), Québec, CAN	Oct 11	Biological Standoff Detection work at DRDC	S. Buteau
Biodefense 2011 Conference, Munich, Germany	25-28 Oct 11	Vaccines and Therapeutics to the Alphaviruses	L. Nagata, J. Wu, J. Wong, and W.-G. Hu
9th International Drug Discovery Science & Technology Conference, Shenzhen, China	3-6 Nov 11	Toll-Like Receptor Agonists as Broad-Spectrum Antivirals Against Respiratory Viruses	J.P. Wong, A.M. Salazar, L.Q. Sun, M. Wang, S. Viswanathan, M.E. Christopher and G. Schnell
16th International Conference on Human Antibodies & Hybridomas, Cannes, France	7-9 Nov 11	Anti-Ricin Neutralizing Monoclonal Antibodies	W-G. Hu, J.W. Cherwonogrodzky, J. Yin, L.M. Negrych, D. Chau, C.C. Hu, D. Lillicon and J. Yu

CONFIDENCE BUILDING MEASURE E

Declaration of Legislation, Regulations and Other Measures

At the Third Review Conference the States parties agreed to implement the following, later amended by the Seventh Review Conference:

> As an indication of the measures which they have taken to implement the Convention, States parties shall declare whether they have legislation, regulations or other measures:
>
> (a) To prohibit and prevent the development, production, stockpiling, acquisition or retention of the agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, within their territory or anywhere under their jurisdiction or under their control anywhere;
>
> (b) In relation to the export or import of micro-organisms pathogenic to man, animals and plants or of toxins in accordance with the Convention;
>
> (c) In relation to biosafety and biosecurity.
>
> States parties shall complete the attached form (Form E) and shall be prepared to submit copies of the legislation or regulations, or written details of other measures on request to the Implementation Support Unit (ISU) within the United Nations Office for Disarmament Affairs or to an individual State party. On an annual basis States parties shall indicate, also on the attached form, whether or not there has been any amendment to their legislation, regulations or other measures.

Relation to	Legislation	Regulations	Other Measures	Amended since Last Year
a) Development, production stockpiling, acquisition or retention of microbial or other biological agents, or toxins, weapons, equipment and means of delivery specified in Article I.	YES	YES	YES	NO
b) Exports of microorganisms* and toxins.	YES	YES	YES	NO
c) Imports of microorganisms* and toxins.	YES	YES	YES	NO

* Microorganisms pathogenic to man, animals and plants in accordance with the Convention.

For more information, please consult the Canadian report entitled Biosafety, Biosecurity, and Biological Non-Proliferation Legislation, found on the website of Foreign Affairs and International Trade Canada, at http://www.international.gc.ca/arms-armes/non_nuclear-non_nucleaire/bio_legislation-bio_lois.aspx, and on the website of the Implementation Support

Unit, at www.unog.ch/bwc.

CONFIDENCE BUILDING MEASURE F

In the interest of increasing transparency and openness, States parties shall declare whether or not they conducted any offensive and/or defensive biological research and development programmes since 1 January 1946.

If so, States parties shall provide information on such programmes, in accordance with Form F.

Declaration of Past Activities in Offensive and/or Defensive Biological Research and Development Programs

1. Date of Entry into Force - 26 March 1975 (Deposit 18 September 1972)

2. Past offensive biological R&D programs:

a. Yes.
b. 1 Jan 46 to 30 Jun 58
c. In the above period offensive work undertaken by Canada included: studies of improved procedures for production of certain toxins (eg. botulinum and diphtheria); studies on the use of insects as vectors for pathogenic bacteria and viruses; test and evaluation of munitions, including performance in cold weather; studies of weapon-produced aerosols of potential BW agents; fundamental work related to field trials, dealing with the dispersion and properties of solid particulates, preparation of finely divided solids for munitions charging and sampling of toxic particulates; development of tissue culture processes for large scale cultivation of viruses; and development of *Burkholderia mallei* and *Burkholderia pseudomallei* as new potential BW agents and continued work on *Brucella suis* and *Pasteurella tularensis* as BW agents. There was no large scale production, stockpiling or weaponization of BW agents. When necessary, BW agents were destroyed by autoclaving.

3. Past defensive biological R&D programs:

a. Yes.
b. 1 Jan 46 to present
c. A key factor in biological defence work is that it is only through a thorough understanding of the properties and behaviour of potential BW agents that the potential threat can be appreciated, and work on suitable defensive measures can be undertaken. Accordingly, in the past there was much basic research on such agents, as well as studies of their characteristics and behaviour as aerosols. The aerosol work included studies to delineate the factors responsible for the losses of viability in airborne bacteria and viruses during long-distance aerosol transport. The aim was to better understand the feasibility of large scale use of BW agents. Medical work in biological defence has covered research and development, and in some cases production of toxoids, antitoxins and vaccines for various potential BW agents including *Botulinum* toxin, Rinderpest virus, Newcastle Disease virus, *B. mallei*, *F. tularensis* and Diphtheria toxin. More recent work in biological defence is summarized in Form A, part 2.

CONFIDENCE BUILDING MEASURE G

Declaration of Production Facilities

To further increase the transparency of biological research and development related to the Convention and to broaden scientific and technical knowledge as agreed in Article X, each State party will declare all facilities, both governmental and non-governmental, within its territory or under its jurisdiction or control anywhere, producing vaccines licensed by the State party for the protection of humans. Information shall be provided on Form G attached.

List of Veterinary Biologics (vaccine) Manufacturing Facilities in Canada

Includes facilities that are currently licensed to manufacture veterinary biologics under a *Veterinary Biologics Establishment Licence*, issued by the Veterinary Biologics Section of the Canadian Food Inspection Agency, under the *Health of Animals Act and Regulations*.

Name of Facility	Location(s)	Activity
Artemis Technologies Inc. Can. Vet. Biol. Estab. Lic. No. 50	Guelph, Ontario	Manufacturer of veterinary vaccines for use in animals.
Bioniche Life Sciences Inc. Can. Vet. Biol. Estab. Lic. No. 8	Belleville, Ontario	Manufacturer of veterinary vaccines and antibody products for use in animals.
Biovet Inc. Can. Vet. Biol. Estab. Lic. No. 49	Saint-Hyacinthe, Québec	Manufacturer of *in vitro* diagnostic test kits for diagnosis of animal diseases.
Gallant Custom Laboratories Inc. Can. Vet. Biol. Estab. Lic. No. 45	Cambridge, Ontario	Manufacturer of autogenous veterinary vaccines for use in animals.
Intervet Canada Corp. Can. Vet. Biol. Estab. Lic. No. 51	Kirkland, Quebec	Facility for labelling of veterinary vaccines for use in animals.
Pfizer Animal Health, Pfizer Canada Can. Vet. Biol. Estab. Lic. No. 4	Saanichton, British Columbia	Manufacturer of veterinary vaccines for use in aquaculture.
Novartis Animal Health Canada Inc. Can. Vet. Biol. Estab. Lic. No. 40	Mississauga, Ontario	Manufacturer of veterinary vaccines for use in farm animals.
Novartis - Aqua Health Can. Vet. Biol. Estab. Lic. No. 40	Charlottetown (PEI) and Victoria (PEI)	Manufacturer of veterinary vaccines for use in aquaculture.

Nutratech Inc. Can. Vet. Biol. Estab. Lic. No. 58	Winnipeg, Manitoba	Manufacturer of egg antibody products for use in animals.
Saskatchewan Research Council, Fermentation Technologies Branch Can. Vet. Biol. Estab. Lic. No. 57	Saskatoon, Saskatchewan	Manufacturer of veterinary vaccines for use in animals.
Saskatoon Colostrum Co. Ltd. Can. Vet. Biol. Estab. Lic. No. 44	Saskatoon, Saskatchewan	Manufacturer of bovine colostrum products for administration to animals.
Vetcovac Ltée. Can. Vet. Biol. Estab. Lic. No. 48	Saint-Hyacinthe, Québec	Manufacturer of autogenous veterinary vaccines for use in animals.
Vetech Laboratories Inc. Can. Vet. Biol. Estab. Lic. No. 23	Guelph, Ontario	Manufacturer of veterinary vaccines for use in poultry.
Vétoquinol N.A. Inc. Can. Vet. Biol. Estab. Lic. No.34	Lavaltrie, Québec	Facility for packaging and labelling of veterinary vaccines for use in animals.