

Confidence Building Measures

Canada

**2017 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 2016
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 2016
F		X	Submission repeated verbatim from 2011
G			

(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: 7 April 2017

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 WHO¹ Laboratory Biosafety Manual and/or OIE² 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).

¹ World Health Organization

² Office Internationale des Épidémiologies (commonly known as the World Organization for Animal Health)

CONFIDENCE BUILDING MEASURE A, Part 1 (i)

Exchange of Data on Research Centres and Laboratories - #1

1. Name(s) of the facility

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 (m²)

Level 4 - 1 unit (185 m²)

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 derived from biosafety level 3 and 4 micro-organisms.

Micro-organisms used and/or stored in this facility:

- 1) *Filoviridae*
- 2) *Bunyaviridae*
- 3) *Flaviviridae*
- 4) *Arenaviridae*
- 5) *Paramyxoviridae*
- 6) *Orthomyxoviridae*
- 7) *Coronaviridae*

CONFIDENCE BUILDING MEASURE A, Part 1 (i)

Exchange of Data on Research Centres and Laboratories - #1

1. Name(s) of the facility

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 (m²)

Level 4: 2 units (65m² and 35m²)

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 programs

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 Armed 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 Armed 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 2016, the amount spent on the Canadian biological defence program was approximately \$4,465,000 including salaries, but excluding contracts to external entities. The source of this funding was the Government of Canada.
3. Yes, contractor and other non-defence facilities are utilized.
4. About \$ 498,000 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 Defence R&D Canada (DRDC). Research and some development is carried out primarily at Defence R&D Canada – Suffield (DRDC Suffield) and through contractors. The bulk of the development program is carried out from DRDC Corporate headquarters in Ottawa. A minor effort in the stand-off detection of biological agents is carried out at DRDC Valcartier. Organizational charts 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

Canadian Safety and Security Program (CSSP):

1 and 2. The **Canadian Safety and Security Program (CSSP)** is a federally-funded program, which has been allocated \$43.5 million annually to strengthen Canada's ability to anticipate, prevent/mitigate, prepare for, respond to, and recover from natural disasters, serious accidents, crime and terrorism through the convergence of science and technology (S&T) with policy, operations and intelligence.

The CSSP is led by the Defence Research and Development Canada, Centre for Security Science (CSS) on behalf of the Government of Canada and its partners across all levels of government, response and emergency management organizations, non-governmental agencies, industry and academia. The majority of the testing and evaluation component of the CSSP will be delivered through the Emergency Responder Test and Evaluation Establishment in Regina, Saskatchewan.

CSSP funds are distributed amongst a number of Communities of Practice, including Chemical, Biological, Radiological-Nuclear and Explosives (CBRNE) projects that are engaged in research and development on Biological, Chemical and Radiological subjects. 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 are distributed to industry, government and academia through a Call for Proposals. Since 2002, the CBRNE Research and Technology Initiative (CRTI) and follow-on CSSP programs have conducted eleven Calls for Proposals through which it has implemented 317 research projects representing an investment of \$391,000,000. The project partners have leveraged this investment by a similar amount of in-kind-contribution with a total, on a 10 years average, of a one-to-one the contribution ratio. However a number of projects have more than 1 to 1 leveraging, with the CSSP providing a greater proportion of the funds. The Biological Portfolio projects have been summarized in Annex 1.

5. The CSSP amalgamates the mandates of three former CSS-led programs, building on their successes, lessons learned and best practices:

- The CRTI, which focused primarily on CBRNE counter-terrorism;
- The Public Security Technical Program, which expanded S&T efforts into other areas like critical infrastructure protection, cyber-security, surveillance, intelligence, interdiction, border security, emergency management systems (people, tools and processes) and interoperability; and
- The Canadian Police Research Centre, which focused on harnessing S&T for the benefit of police, fire and emergency medical services across Canada.

6. The Biological portfolio projects and the participating departments and agencies have been summarized in Annex 1. All projects under the CRTI/CSSP are carried out in existing facilities that are covered in other sections of this report. The 2015 CSSP Call for Proposals resulted in 6 new projects being approved for implementation in 2015. Those projects related, either directly or tangentially, to the BTWC have been added to Annex 1. In 2016 there were two calls for proposals. The first call approved two additional projects in the biological domain but implementation is not yet confirmed. The second 2016 call recently closed and proposals are being reviewed. Of the CRTI/CSSP projects listed in Annex 1, investment in biological related projects is estimated to be \$100M over ten years.

Annex 1: CRTI/CSSP projects, 2016

The participating departments, agencies and organizations are:

Agriculture and Agri-Food Canada
 Canadian Food Inspection Agency
 Canadian Grain Commission
 Defence Research and Development Canada
 Defence Science and Technology Laboratory Porton Down
 Department of National Defence
 Environment and Climate Change Canada
 Health Canada
 National Research Council of Canada
 Public Health Agency of Canada
 Royal Canadian Mounted Police
 Royal Military College of Canada
 Canadian Animal Health Coalition
 Canadian Cooperative Wildlife Health Centre
 Health Science Centre Winnipeg
 Kent Imaging Inc.
 Sunnybrook Hospital
 TDV Global Inc.
 The [Toronto] Hospital for Sick Children
 United States Department of Agriculture
 United States Department of Homeland Security
 United States Environmental Protection Agency
 University of Guelph

This table include the two remaining active CRTI projects and all CSSP funded projects of the Biological Portfolio.

Project Number	Project Title	Project Status	Lead Government Department	CSS Funds	In-Kind
CSSP-2014-TA-2047	Application of Next Generation Sequencing (NGS) methods for Plant Pathogen Diagnostics and Research at the Sidney Laboratory, Centre for Plant Health (CPH).	Completed in FY 15/16	Canadian Food Inspection Agency	\$177,000.00	\$0.00
CSSP-2014-TA-2048	FilmArray Biodefense Systems for Multiplexed Biological Detection and Identification	Completed in FY 15/16	Defence R&D Canada - Suffield	\$124,520.00	\$0.00
CSSP-2014-TA-2049	"Center for Excellence in Emergency Preparedness User-Management Tool (Membership Management System)"	Completed in FY 15/16	Public Health Agency of Canada	\$50,000.00	\$0.00

CSSP-2014-TA-2050	Acquisition of a MALDI TOF mass spectrometer (MS) to detect and type botulinum neurotoxins	Completed in FY 15/16	Health Canada	\$143,000.00	\$0.00
CSSP-2014-TA-2051	Atmospheric Pressure Plasma Decontamination System	Completed in FY 15/16	Public Health Agency of Canada	\$80,000.00	\$0.00
CSSP-2014-TA-2052	Acquisition of a Droplet Digital PCR (ddPCR) system for detection of foodborne pathogens	Completed in FY 15/16	Health Canada	\$102,000.00	\$0.00
CSSP-2015-TA-2124	Illumina NeoPrep system for the Advancement of Next Generation Sequencing (NGS) methods for Plant Pathogen Diagnostics and Research	Active	Canadian Food Inspection Agency	\$62,500	\$20,000
CSSP-2015-TA-2125	Unified Rapid Genomic Sequencer-based Surveillance for Foodborne Disease Outbreak Detection and Response	Active	Public Health Agency of Canada	\$1,000,000	\$1,814,520
CSSP-2015-TA-2126	Rapid Whole-Genome Sequencing Capacity for Microbial Pathogens to Frontline Food Testing Laboratories	Active	Canadian Food Inspection Agency	\$200,000	\$320,000
CSSP-2015-TA-2129	ChemiDoc MP Imager for Rapid Detection of Living Pathogens for the Safety and Security of Canadian Food and Water.	Active	National Research Council Canada	\$36,000	\$220,506
CSSP-2016-TA-2210	Automation of Next Generation Sequencing (NGS) Library Preparation to Enhance Infectious Disease Diagnosis and Outbreak Response in Canada	Active	Canadian Food Inspection Agency	\$180,000	\$45,000
09-0462RD	Next generation sequencing, direct detection and genotyping of fungi, bacteria and nematodes in the agri-food system	Active	Agriculture and Agri-Foods Canada	\$1,999,000.00	\$1,655,000.00
09-0481TD	An Optical Imaging Device for a Rapid Assessment of Tissue Viability and Wound Healing	Active	National Research Council of Canada	\$1,810,328.00	\$1,215,035.00
CSSP-2015-CP-2098	Understanding Antimicrobial Resistance Using a Complex Adaptive Systems Approach	Active	Public Health Agency of Canada	\$249,600.00	\$150,000.00
CSSP-2015-CP-2099	Canadian Network for Public Health Intelligence (CNPHI) "on the go"	Active	Public Health Agency of Canada	\$600,000.00	\$650,000.00

CSSP-2015-TI-2153	The Development of International Best Practices for Microbial Forensics	Active	Public Health Agency of Canada	\$254,600.00	\$169,000.00
CSSP-2015-TI-2157	Integrated Microbiology Testing Laboratory Network	Active	Canadian Food Inspection Agency	\$140,000.00	\$440,000.00
CSSP-2015-TI-2194	Confirmation study on Ebola Surface Persistence and Decontamination and the Evaluation of Cold Weather Decontamination	Active	Defence R&D Canada - CSS	\$180,000.00	\$231,400.00
CSSP-2015-TI-2195	Workshop on Four-Eyes BSL4 Laboratory network	Active	Canadian Food Inspection Agency	\$100,000.00	\$40,000.00
CSSP-2016-TI-2222	Whole Genome Sequencing of High Consequence Agents at National Centre for Foreign Animal Disease (NCFAD)	Active	Canadian Food Inspection Agency	\$400,000	\$520,000
CSSP-2016-TI-2221	Biosafety Level 4 Zoonotic Network (BSL4ZNet): Implementing Strategic framework for international coordination	Active	Canadian Food Inspection Agency	\$1,000,000	\$1,500,000
				\$10,433,548	\$10,959,682

CONFIDENCE BUILDING MEASURE A, Part 2 (iii)

National Biological Defence Research and Development Program

III. Facilities

1. Defence Research and Development Canada – Suffield Research Centre

- 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

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

- b. Floor area of laboratory areas by containment level:

BL2 - 492 m²
BL3 - 159 m²
BL4 - 0 m²

The total laboratory floor area in Building 1 used for biological defence work is 868 m². An Aerosol Test Facility containing 38 m² of lab space is located next to Building 1; another aerosol test facility containing 33 m² 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 m². Building 610 occupies 76 m² of space. Field facilities for biological agent training exist in the vicinity of Building 60.

c. The organizational structure of each facility at 31 December 2015³:

i. Total number of personnel 25.0

ii. Division of personnel

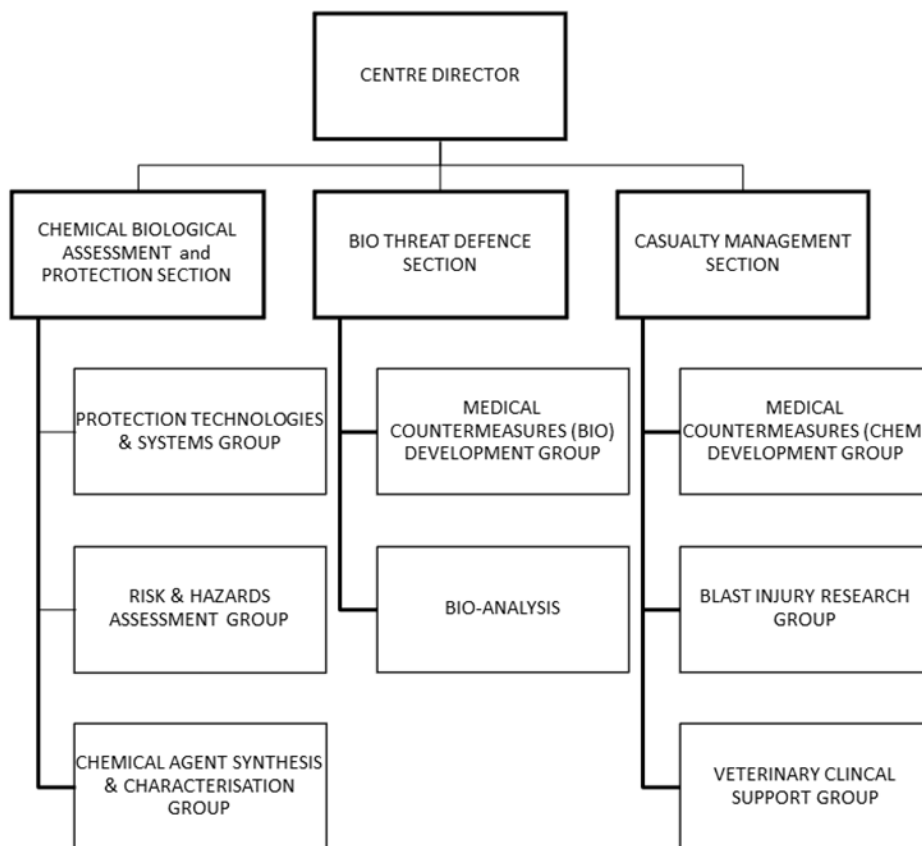
Military	1.0
Civilian	28.0

³ 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.

iii. Division of personnel by category⁴

Scientists	15.0
Engineers	0.0
Technicians	10.5
Admin. and support staff	3.5

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



Disciplines represented:

- | | |
|---------------|---------------------|
| Bacteriology | Immunology |
| Microbiology | Virology |
| Chemistry | Biochemistry |
| Biotechnology | Veterinary Medicine |
| Medicine | Pharmacology |

⁴ The decimal represent the percentage of the workload of a full-time employee.

- v. 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): \$3,852,801

- vi. Estimate of funding levels for the following program areas (excluding salaries):

Research, development, test and evaluation: \$1,366,844

- vii. All staff members 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).
- 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 biological agent detection systems. In medical countermeasures, research is carried out on new drugs and vaccines, for example humanized antibodies, antivirals, antibiotics and vaccines. Microorganisms other than Newcastle disease virus (NDV) and *Bacillus atrophaeus* (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, Highlands J virus, Sindbis virus and dengue virus (serotypes 1-4). Toxins used include botulinum toxin, staphylococcal enterotoxin B and ricin. In the early to mid-1980s, outdoor studies have involved only NDV middle through 1980's and BG.

2. Defence Research and Development Canada (DRCD) – Valcartier Research Centre

- a. The facility is located in building 14 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:

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

- b. Floor area of laboratory areas in Building 14 by containment level:

BSL1 - 91 m²

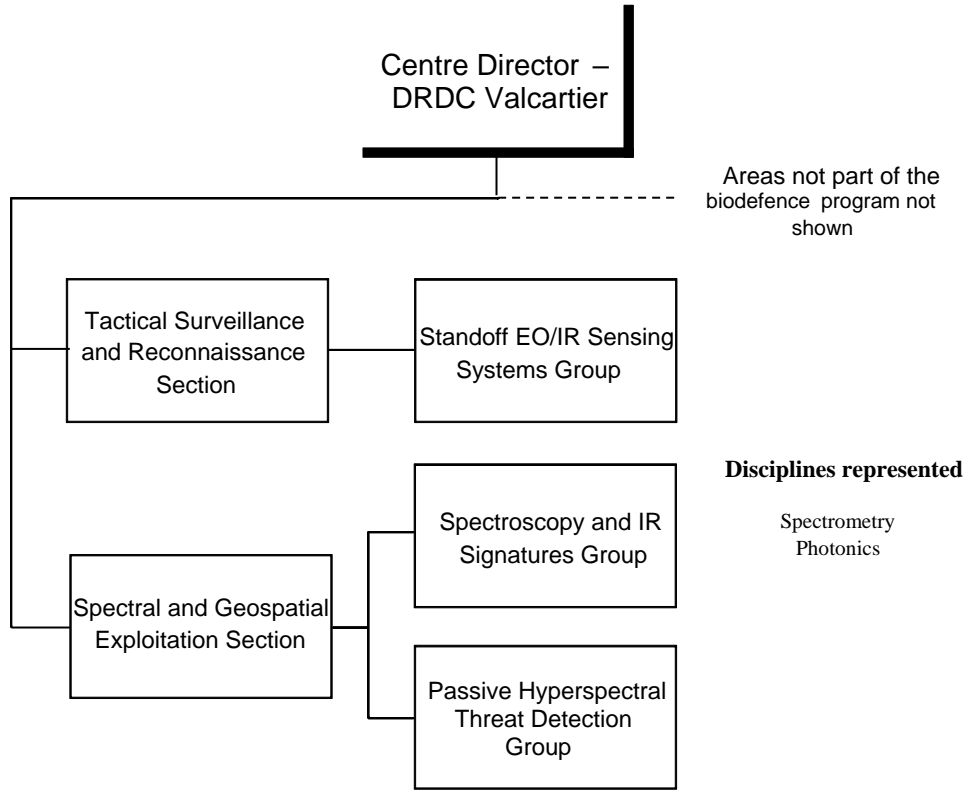
The aerosol chamber (2m x 2m x 22m) located outside of building 25 is used to characterize standoff biodetection systems under development with fluorescing aerosols simulating bioaerosols.

- c. The organizational structure of the personnel contributing to this activity is⁵:

- | | |
|--|-----|
| i. Total number of personnel | 3.5 |
| ii. Division of personnel | |
| civilian | 3.5 |
| military | 0 |
| iii. Division of personnel by category | |
| scientists | 2.3 |
| managers | 0.2 |
| technicians | 1 |
| admin. and support staff | 0 |

⁵ The decimal represent the percentage of the workload of a full-time employee.

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



- v. There are contractor staff working in biological defence at this facility. Contractors are working in technical support to the standoff biodetection program. 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.
 - vii. Funding level estimates (including salaries): \$615,000
 - viii. All staff are encouraged to publish the results of their research in open literature whenever not precluded by security, export control, or intellectual property considerations. There is also an internal publication system which is used for publications regardless of content. See attached the 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 – 2016

Contractor	Title of project
AEREX Avionics Inc. Breakeyville, QC	Improving treatment functionality of the database
AEREX Avionics Inc. Breakeyville, QC	Development of a software strategy optimized for detection of biological threats at large distances – Part 1
AEREX Avionics Inc. Breakeyville, QC	Development of a visualization tool to permit connectivity of BioSense and ICATSI detectors to the SI&DS system
AEREX Avionics Inc. Breakeyville, QC	Development of a software strategy for detection of biological aerosol from a distance with an electro-optical instrument
AEREX Avionics Inc. Breakeyville, QC	Software integration of a new detector in the BioSense platform
AEREX Avionics Inc. Breakeyville, QC	Modification and development of BioSense software in support of “Curbes” – Phase 1
Thales	Integration of DRDC Sensors with OSUS
Canada West Biosciences, Camrose, AB	Characterization and comparison of anti-ricin therapeutics in vitro and in vivo.
University of Alberta, Edmonton, AB	Evaluation of bioinformatics platforms.
University of Calgary, Calgary, AB	Characterization of self-assembled monolayer (SAM) electrochemical sensor for potential use as a diagnostic test device for messenger RNA.
Lady Davis Institute for Medical Research, Jewish General Hospital Montreal, QB	Computational drug repurposing for antitoxin and antibacterial targets and characterization of preliminary drug candidates
University Health Network Toronto, ON	Effect of diesel exhaust exposure on pre-symptomatic biomarker diagnostic candidates of acute infection
University of Alberta, Edmonton, AB	Support for animal research at University of Alberta
China Agriculture University Beijing, China	Cytokine storm mitigator against viral infections
CNA Diagnostics Inc. Calgary, AB	Advanced development of biomarkers of sepsis
University of Calgary, Calgary, AB	Improve electrochemical (EC) sensor chip performance and establish baseline parameters for aerosol EC detection
University of Alberta, Edmonton, AB	Chikungunya virus and antiviral screening
Specific Technologies LLC Mountain View, CA, USA	Development of diagnostic tools for microbial infection using volatile organic compound sensors
iSense LLC West Palm Beach, FL, USA	High-dimensionality colorimetric arrays for microbial and environmental detection-identification
National Research Council, National Institute for Nanotechnology	Nanofabricated electrodes and electrochemical platform to classify pathogens using electrode arrays and Toll-like receptor recognitions

Contractor	Title of project
Edmonton, AB	
University of Alberta, Edmonton, AB	Poxviruses

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 agent⁶ 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.

⁶ It is understood that this may include organisms made pathogenic by molecular biology techniques, such as genetic engineering.

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 seems to deviate from the normal pattern

Report from the Public Health Agency of Canada

Pertussis

Pertussis is an endemic disease in Canada, and outbreaks are not systematically reported. It is a cyclical disease, with peaks occurring every two to five years.

Nunavut, 2016

The territory of Nunavut reported a multi-community outbreak of pertussis, with over 140 cases. The outbreak started in May 2016. No deaths associated with this outbreak have been reported.

Mumps

Mumps is an endemic disease in Canada and outbreaks are not systematically reported. It is a cyclical disease, with peaks every 2 to 5 years.

British Columbia, 2016

The province of British Columbia reported an outbreak of mumps, which started in Whistler and spread into Squamish and Vancouver. Over 40 cases of mumps were associated with this outbreak; the average age of cases was 33 years old.

Manitoba, 2016

The province of Manitoba reported a spike in the number of mumps cases, with over 60 cases reported. The majority of cases were between 17 and 29 years of age. Some of the cases were connected to several university settings in Manitoba. The province of Manitoba typically reports four to five mumps cases annually.

Invasive Meningococcal Disease

World Youth Day, 2016

Austrian and Italian Public Health Officials confirmed that an Italian participant of World Youth Day 2016, held in Krakow, Poland July 25 -31, 2016, died of invasive meningococcal disease, serogroup C. This event attracted 1-2 million participants. Approximately 4,000 Canadians attended this event. No Canadian cases of invasive meningococcal disease associated with this event were reported.

Cyclosporiasis

In the summer of 2016, 87 cases of locally-acquired cyclosporiasis were investigated in British Columbia, Alberta, Ontario, and Quebec, with one reported hospitalization and no fatalities. No common source was confirmed, although blackberries were a food item of interest. Cyclospora is not endemic in Canada. Illness due to Cyclospora is more frequent in the spring and summer months. Previous Canadian outbreaks of cyclosporiasis have been linked to travel and fresh produce, imported from countries where Cyclospora is endemic. Approximately 150-220 cyclosporiasis cases are reported annually to national surveillance (2010-2012). There are unique

challenges in detecting and investigating outbreaks due to a lack of laboratory sub-typing methods (no DNA fingerprint typing available) that limit the ability to link cases and food samples through molecular characterization.

Avian Influenza A(H5N1)

The first confirmed case of influenza H5N1 was reported in Canada on January 8, 2014. The onset of symptoms was December 27, 2013, followed by admission to hospital on January 1, 2014. The case died on January 3, 2014. The case travelled to China during December 2013, but did not visit any farms or markets. The source of exposure is unknown at this time. Close contacts at home or in the hospital have not shown symptoms.

There have been 649 human cases of H5N1 in 16 countries over the last decade, primarily in people who were exposed to infected birds. The risk to Canadians is very low, as there is no evidence of sustained human-to-human transmission.

General Trends in Sexually Transmitted Infections and Hepatitis

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

Chlamydia

Rates of reported cases 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 behavior at the population level. Data to support any of these theories are limited. Chlamydia is endemic in Canada, with high rates of reported cases across the country, particularly among those under 30. There were 103,868 cases reported in 2013, for a rate of 295.7 per 100,000 population (preliminary data).

Gonorrhea

Trends in gonorrhea demonstrate an increase in rates of reported cases starting in 1997; reasons for this increase are similar to those for chlamydia. Since 2009, the rate of increase of new cases has begun to slow down. Antimicrobial resistance in gonorrhea is a serious concern, with recent data showing decreasing susceptibility to current first-line treatments. Resistant gonorrhea infections can result in treatment failure, with a possible consequent resurgence in cases. In 2013, 13,786 cases of gonorrhea were reported in Canada, with a corresponding rate of 39.2 per 100,000 (preliminary data).

Hepatitis B

Trends in acute hepatitis B (a better indicator of endemic transmission than overall cases) indicate a decrease in the rate of reported cases. 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). There were 5,341 cases of

hepatitis B (acute and chronic combined) reported in 2013, for a rate of 15.2 per 100,000 (preliminary data).

Hepatitis C

Rates of reported cases of hepatitis C have decreased since 2005. Transmission within Canada is due primarily to sharing of contaminated injection drug equipment. In 2013, 10,379 cases of hepatitis C were reported in Canada, a rate of 29.5 per 100,000 (preliminary data).

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 various regions across Canada, concentrated mainly in large urban centres, suggesting that syphilis is once again becoming endemic in much of the country. More recent outbreaks have occurred or are in progress in Nunavut, 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. In 2013, 2,129 cases of infectious syphilis were reported in Canada, for a rate of 6.1 per 100,000 (preliminary data).

Report from the Canadian Food Inspection Agency

In 2016, there were no outbreaks of animal diseases that deviated from normal patterns.

All information of detections and outbreaks of nationally regulated disease in animals in 2016 is available in the monthly reports on the CFIA web site, www.inspection.gc.ca and on the World Organization for Animals Health (OIE) web site for those diseases where Canada has an obligation to notify the OIE (www.oie.int).

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:

- 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.
- 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.
- 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

Publications :

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

Public Health Agency of Canada

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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.

<u>Relation to</u>	<u>Legislation</u>	<u>Regulations</u>	<u>Other Measures</u>	<u>Amended since Last Year</u>
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 produced for the Implementation Review initiative, found in Eighth Review Conference Document BWC/CONF.VIII/WP.27 - "BWC Implementation Review Initiative – Canada's report of the visit to Ottawa"

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 Human Vaccine Manufacturing Facilities in Canada

<u>Name of Facility</u>	<u>Location(s)</u>	<u>Activity</u>
ID Biomedical Corporation of Quebec (GlaxoSmithKline Inc.)	Québec City, Québec	Manufacturer of vaccines for use in humans
Sanofi Pasteur Limited	Toronto, Ontario	Manufacturer of vaccines for use in humans
Medicago	Québec City, Québec	Manufacturer of vaccines (pending license to manufacture vaccine for use in humans)
Immunovaccine	Halifax, Nova Scotia	Manufacturer of vaccines (pending license to manufacture vaccine for use in humans)

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 Canadian Centre for Veterinary Biologics of the Canadian Food Inspection Agency, under the *Health of Animals Act and Regulations*.

<u>Name of Facility</u>	<u>Location(s)</u>	<u>Activity</u>
Artemis Technologies Inc. Can. Vet. Biol. Estab. Lic. No. 50	Guelph, Ontario	Manufacturer of veterinary vaccines for use in animals
Biovet Inc. Can. Vet. Biol. Estab. Lic. No. 49	Saint-Hyacinthe, Québec	Manufacturer of <i>in vitro</i> diagnostic test kits for diagnosis of animal diseases
Ceva Animal Health Inc. (Formerly Vetech Laboratories Inc.) Can. Vet. Biol. Estab. Lic. No. 23	Guelph, Ontario	Manufacturer of veterinary vaccines for use in poultry.
Elanco Canada Limited – Aqua Health (Formerly, Novartis - Aqua Health) Can. Vet. Biol. Estab. Lic. No. 40	Charlottetown (PEI) and Victoria (PEI)	Manufacturer of veterinary vaccines for use in aquaculture.
Gallant Custom Laboratories Inc. Can. Vet. Biol. Estab. Lic. No. 45	Cambridge, Ontario	Manufacturer of autogenous veterinary vaccines for use in animals
Nutratch Inc. Can. Vet. Biol. Estab. Lic. No. 58	Winnipeg, Manitoba	Manufacturer of egg antibody products 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
Vacci-Vet Inc. Can. Vet. Biol. Estab. Lic. No. 59	Saint-Hyacinthe, Québec	Manufacturer of autogenous veterinary vaccines for use in animals