Confidence Building Measures

Canada

2018 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 WHO[1] Laboratory Biosafety Manual and/or OIE[2] 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 Épizooties (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 (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 derived from biosafety level 2, 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*
8) *Bacillus anthracis*
9) *Yersinia pestis*

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 (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 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 primarily funded by the Canadian Department of National Defence 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, its allies, and the First Responder community.

2. In Canada, the biological, chemical, and radiological defence programs are integrated; exact separation of the costs of the three programs would be very difficult without a detailed analysis of every purchase. However, it is estimated that in 2017, the amount spent on the Canadian biological defence program was approximately $3,939,856 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 $ 1,646,356 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, 601 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
      PO Box 4000 Station Main
      Medicine Hat, Alberta T1A 8K6
      CANADA

   b. Floor area of laboratory areas by containment level:

CL2 - 542 m^2
CL3 - 159 m^2
CL4 - 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 600 houses a biological training lab with approximately 50 m^2 of lab space. Building 10 is a vivarium and includes general laboratory space. The area of the vivarium is 1134 m^2. Building 601 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 1 January 2018[3]:

i. Total number of personnel 33.0, including vacant positions

ii. Division of personnel

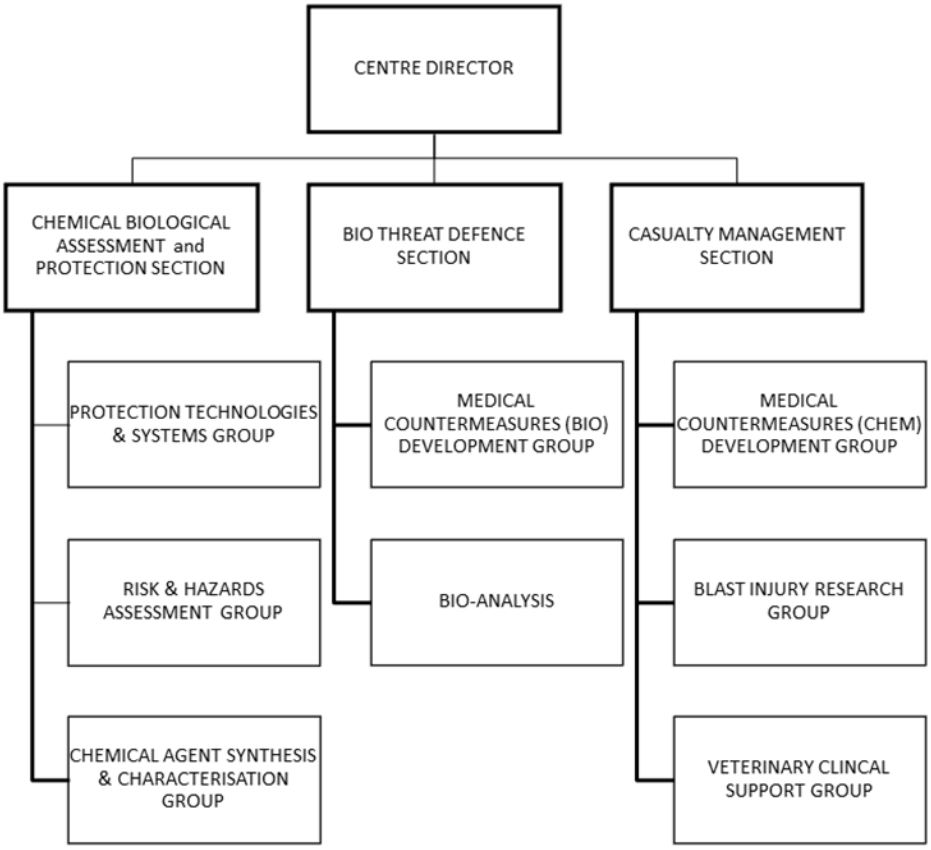
Military	1.0
Civilian	32.0

[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 category[4]

Scientists	16.0
Engineers	0.0
Technicians	11.5
Administrative and support staff	2.0

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. These numbers include vacant positions that are currently being staffed.

v. The research in this facility is primarily 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): $3,939,856

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

Research, development, test and evaluation: $1,646,356

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. Currently, outdoor studies use BG as well as Male-specific Coliphage 2 and *Pantoea agglomerans* (formerly *Erwinia herbicola*).

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

a. The facility is located in building 14 and a new aerosol chamber for Lidar measurements is located on the south side of research center. The postal address is:

Centre Director
DRDC Valcartier Research Centre
2459 Bravery Road
Québec, QC, G3J 1X5
CANADA

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

BSL1 - 91 m^2

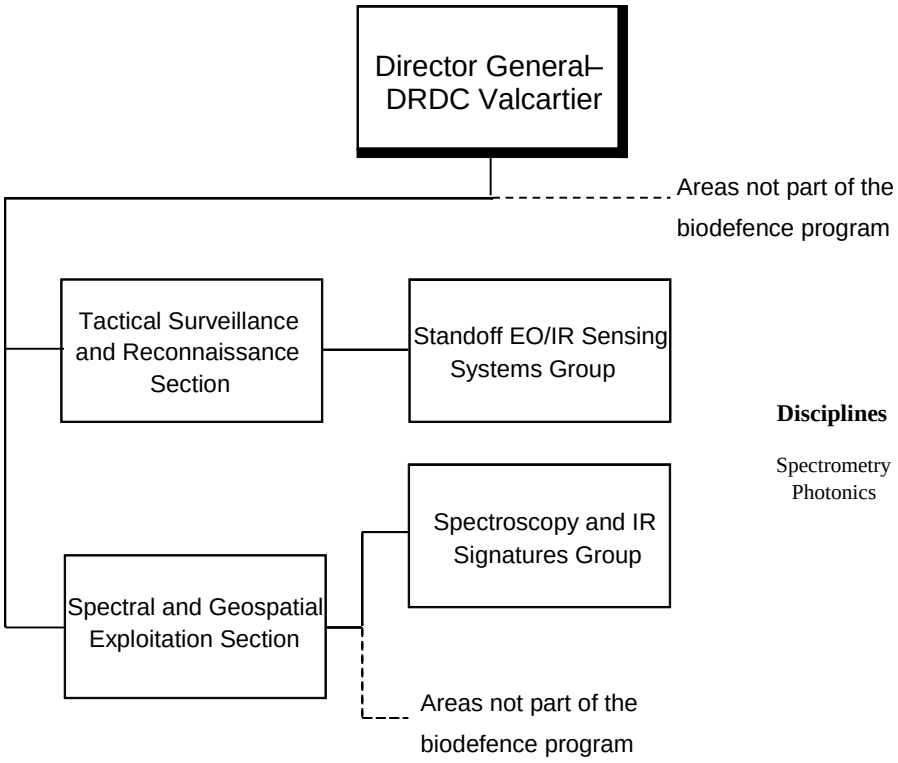
The aerosol chamber (2m x 2m x 22m) located on the south side of the research center is used to characterize standoff biodetection systems under development with fluorescing aerosols simulating bioaerosols.

c. The organizational structure of the personnel contributing to this activity is[5]:

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): $1,055,000

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 – 2017

Contractor	Title of contracted activity
AEREX Avionique Inc.	Improvement of data processing including calibration of the LIF spectral database.
AEREX Avionique Inc.	Development of CB visualization tool for alarm transfer from BioSense and ICATSI detectors to the SI&DS system.
AEREX Avionique Inc.	Development of an OPC control software and integration into CB visualisation tool.
AEREX Avionique Inc.	Software development for BioSense to support CURBES - Phase II.
AEREX Avionique Inc.	Improvement of situational awareness functions of BioSense.
INO	BioSpectra upgrades phaseII and classification improvements 2017
AntoXa Corporation	5g Plant Anti-Ricin Antibody
Clermark Inc.	FilmArray Pouches
International Safety Research	Task Authorization - TTX on CBRN surveillance info requirements
Lady Davis Institute for Medical Research, Jewish General Hospital	Computational Drug Repurposing for Antitoxin and Antibacterial Targets and Characterization of Preliminary Drug Candidates
Life Technologies Inc	Server Upgrade - ION Torrent GPM
National Institute for Nanotechnology	NINT R&D collaboration via Annex A 15-002 - Nanofabricated electrodes and electrochemical platform to classify pathogens using electrode arrays and Toll-like receptor recognition
National Institute for Nanotechnology	Nanowire based biochemical identification device development
University of Alberta	Chikungunya Virus and Antiviral Screening
University of Alberta	Evaluation of bioinformatics platforms - Amendment to W7702-155715/001/EDM
University of Alberta	Support for Animal Research at University of Alberta

University of Calgary	Characterization of Self-Assembled Monolayer (SAM) Electrochemical Sensor for Potential Use as a Diagnostic Test Device for Messenger RNA
University of Calgary	EC sensor chip performance aerosol EC detection

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 agent[6] 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 asgenetic 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

Measles

Since the elimination of measles in Canada in 1998, large outbreaks of measles are rare. However, a multi-provincial outbreak was reported in 2017, resulting in 29 cases between March and June. The index case was imported from India in March. The case travelled while communicable and as a result, five secondary cases involving exposure in air travel /airport settings were confirmed in four provinces. The index case was hospitalized, which resulted in transmission to and amongst healthcare workers. Cases ranged in age from 9 to 52 years, with a median age of 30 years. In this outbreak, 9 (31 %) cases had documentation of two doses of measles-containing vaccine.

Avian Influenza A(H7N9)

Two travel-related cases of Avian Influenza A(H7N9) were reported in Canada in January 2015. Both cases were between 50-60 years of age, one male and one female. Prior to return to Canada and onset of symptoms, both cases travelled in Hong Kong/China/Taiwan and they recalled seeing live poultry and copious droppings during their China visit. Neither of the cases were hospitalized and both cases recovered.

There have been 1,567 human cases of H7N9 infection, including at least 613 deaths, globally since 2013. Infections with H7N9 in humans were associated with exposure to poultry or contaminated environments that most often resulted in clinically severe disease. The risk to Canadians is low, as there is no evidence of sustained human-to-human transmission.

Swine Influenza A(H3N2)v

One locally-acquired case of swine influenza A(H3N2)v was reported in Canada in December 2016. The case was a child who developed respiratory infection symptoms on October 24, 2016, was hospitalized on November 8, 2016 with the diagnosis of pneumonia, and recovered. The infection was associated with exposure to swine.

Diphtheria

Diphtheria occurs worldwide, and is endemic in many countries, but rare in Canada. Both respiratory and cutaneous diphtheria are highly contagious. Cutaneous diphtheria is more common in developing countries.

Canada, November 2017

The province of Alberta reported a case of cutaneous diphtheria in a school-aged child. There were no other cases associated with this case.

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. In 2017, six provinces and territories reported increased mumps activity. Throughout the year, numbers have continued to increase, with one jurisdiction having more than 1,400 cases as of December 1, 2017. This is well above the national average of 100 mumps cases reported nationally between 2011 and 2015. In this jurisdiction, cases were initially reported in university students between 18 to 29 years of age involved in sports; however the outbreak spread to all ages and was widespread to the province by the end of 2017.

Invasive Group A Streptococcal Disease (iGAS)
Increased iGAS activity
Since 2000, a steady increase in the number of cases and corresponding incidence rates has been observed nationally. More recently, since 2016, several iGAS outbreaks have occurred across Canada in various risk settings, particularly affecting congregate housing settings, such as homeless shelters. Most jurisdictions have reported increasing incidence of iGAS in recent years.

Invasive Meningococcal Disease
IMD associated with serogroup W is rare in Canada with less than 30 cases annually. From June 2017 to December 2017, there were five confirmed cases of meningococcal disease due to serogroup W reported in a Canadian province among those aged 16 to 19 years. In this region, vaccination clinics were put in place to offer the quadrivalent meningococcal vaccine to the 15 to 19 years old in order to reduce the risk of this disease.

Cyclosporiasis
In the summer of 2017, 158cases of locally-acquired cyclosporiasis were investigated in British Columbia, Ontario, and Québec, and Nova Scotia with no reported hospitalizations or fatalities. Although a common source was not confirmed, imported fresh cilantro and blackberries were food items of interest. Cyclosporiasis is not endemic in Canada and is often associated with travel to countries where *Cyclospora* is endemic. However, a proportion of illnesses are locally-acquired and an annual increase in the number of locally-acquired cases of cyclosporiasis is typically observed in the spring and summer months. Previous Canadian outbreaks of locally-acquired cyclosporiasis have been linked to fresh produce, imported from countries where Cyclospora is endemic. Between 2011 and 2015, an average of 190 cases of cyclosporiasis were reported annually to the Notifiable Disease Surveillance System. 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 A (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 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. 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 2015, 19,845 cases of gonorrhea were reported in Canada, with a corresponding rate of 55.4 per 100,000.

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 4,741 cases of hepatitis B (acute, chronic and unspecified combined) reported in 2015, for a rate of 13.2 per 100,000.

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 2015, 10,890 cases of hepatitis C were reported in Canada, a rate of 30.4 per 100,000.

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 2015, 3,321 cases of infectious syphilis were reported in Canada, for a rate of 9.3 per 100,000.

<u>Report from the Canadian Food Inspection Agency</u>

In 2017 the Canadian Food Inspection Agency continued its investigation into the discovery of bovine TB in Alberta.

The Canadian Food Inspection Agency (CFIA) investigation is nearing completion.

There have been no additional cases of bovine TB beyond the six animals from the one infected herd. All of the infected animals were infected with the same strain of bovine TB. No source of infection has been identified.

All premises with cattle have been tested and released from quarantine.

A total of approximately 11,500 animals have been destroyed. This includes animals that were ordered destroyed from the infected herd and co-mingled herds and animals that required post-mortem testing.

The producers whose herds were depopulated and have completed the cleaning and disinfection of their premises have restocked their herds. Those producers have completed the first of two rounds of testing to verify that the restocked animals are free from bovine TB. The second round of testing will take place in the fall of 2018. These herds are not under quarantine.

All information of detections and outbreaks of nationally regulated disease in animals in 2017 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.

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 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

Name of Facility	Location(s)	Activity
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
Immunovaccine	Halifax, Nova Scotia	Manufacturer of vaccines (pending license to manufacture vaccine for use in humans)
Medicago	Québec City, Québec	Manufacturer of vaccines (pending license to manufacture vaccine for use in humans)
InventVac	Vancouver, British Columbia	Manufacturer of vaccines for use in clinical trials in humans.
National Research Council of Canada	Ottawa, Ontario	Manufacturer of vaccines for use in clinical trials 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*.

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
Biovet Inc. Can. Vet. Biol. Estab. Lic. No. 49	Saint-Hyacinthe, Québec	Manufacturer of *in vitro* 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
Nutratech Inc. Can. Vet. Biol. Estab. Lic. No. 58	Winnipeg, Manitoba	Manufacturer of egg antibody products for use in animals.
Prevtec Microbia Inc. Can. Vet. Biol. Estab. Lic. No. 60	Saint-Hyacinthe, Québec	Labelling and storage of veterinary vaccines for use in pigs.
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