

Confidence Building Measures

Canada

**2022 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)			
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: **April 11 2022**

State Party to the Convention: CANADA

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

National point of contact:

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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 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 (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 derived from biosafety level 2, 3 and 4 micro-organisms.

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

- | | |
|----------------------------|--------------------------------------|
| 1) <i>Filoviridae</i> | 8) <i>Bacillus anthracis</i> |
| 2) <i>Bunyaviridae</i> | 9) <i>Yersinia pestis</i> |
| 3) <i>Flaviviridae</i> | 10) <i>Francisella tularensis</i> |
| 4) <i>Arenaviridae</i> | 11) <i>Burkholderia pseudomallei</i> |
| 5) <i>Paramyxoviridae</i> | 12) <i>Burkholderia mallei</i> |
| 6) <i>Orthomyxoviridae</i> | 13) <i>Brucella sp.</i> |
| 7) <i>Coronaviridae</i> | |

CONFIDENCE BUILDING MEASURE A, Part 1 (i)

Exchange of Data on Research Centres and Laboratories - #2

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, toxicology, 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 2021, the amount spent on the Canadian biological defence program was approximately \$3,365,269 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 \$3,969,428 was spent on contracts with industry and universities, including investments from the IDEaS CBRN Program. This does not include the Innovation for Defence Excellence and Security (IDEaS) COVID effort, which had an investment of \$8,732,678.
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 Research Centre (DRDC SRC) and through contractors. The bulk of the program development is carried out from DRDC Corporate headquarters in Ottawa. An effort in the stand-off detection of biological agents is carried out at DRDC Valcartier Research Centre (VRC). Organizational charts of those parts of DRDC SRC and DRDC VRC 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 thirteen Calls for Proposals through which it has implemented 534 research projects representing an investment of \$415,000,000. 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 2020 CSSP Call for Proposals resulted in 2 new projects being approved for implementation in 2020. Those projects related, either directly or tangentially, to the BTWC have been added to Annex 1.

Annex 1: CRTI/CSSP projects, 2020

The participating departments, agencies and organizations are:

Animal and Plant Health Agency UK
 Animal Health and Veterinary Laboratories Agency UK
 Australian Centre for Disease Preparedness, Commonwealth Scientific and Industrial Research Organization
 Canadian Food Inspection Agency
 Defence Research and Development Canada
 Defence Science and Technology Laboratory Porton Down
 Department of National Defence
 Fredrich Loeffler Institute, Novel and Emerging Infectious Diseases
 Health Canada
 Pirbright Institute, Institute for Research on Animal Diseases
 Public Health Agency of Canada
 Public Health England
 Public Safety Canada
 Royal Canadian Mounted Police
 Sunnybrook Hospital
 United States Department of Agriculture
 United States Department of Homeland Security
 United States Environmental Protection Agency

This table includes all CSSP funded projects of the Biological Portfolio.

Project Number	Project Title	Project Status	Lead Government Department	CSS Funds	In-Kind
CSSP-2015-CP-2098	Understanding Antimicrobial Resistance Using a Complex Adaptive Systems Approach	Closed	Public Health Agency of Canada	\$249,600	\$150,000
CSSP-2015-CP-2099	Canadian Network for Public Health Intelligence (CNPHI) "on the go"	Closed	Public Health Agency of Canada	\$600,000	\$650,000
CSSP-2015-TI-2153	The Development of International Best Practices for Microbial Forensics	Closed	Public Health Agency of Canada	\$254,600	\$169,000
CSSP-2015-TI-2157	Integrated Microbiology Testing Laboratory Network	Closed	Canadian Food Inspection Agency	\$140,000	\$440,000
CSSP-2015-TI-2194	Evaluation of Cold Weather Decontamination	Closed	Defence R&D Canada - CSS	\$180,000	\$231,400
CSSP-2015-TI-2195	Workshop on Four-Eyes BSL4 Laboratory network	Closed	Canadian Food Inspection Agency	\$100,000	\$40,000
CSSP-2016-TI-2222	Whole Genome Sequencing of High Consequence Agents	Closed	Canadian Food Inspection Agency	\$400,000	\$520,000

	at National Centre for Foreign Animal Disease (NCFAD)				
CSSP-2016-TI-2221	Biosafety Level 4 Zoonotic Network (BSL4ZNet): Implementing Strategic framework for international coordination	Closed	Canadian Food Inspection Agency	\$1,000,000	\$1,500,000
CSSP-2017-CP-2312	Mobile device for field detection of microbial threats in food	Active	Canadian Food Inspection Agency	\$971,974	\$1,077,000
CSSP-2018-TI-2405	Multi-agency high consequence pathogen exercise	Active	Public Health Agency of Canada	\$200,000	\$150,000
CSSP-2018-TI-2395	Hot Zone Biological Sample Collection for National Security Response	Active	Public Health Agency of Canada	\$223,327	\$84,500
CSSP-2018-TI-2389	Exercise CNPHI on-the-go mobile app	Closed	Public Health Agency of Canada	\$100,000	\$60,000
CSSP-2018-TI-2387	Biosafety Level 4 Zoonotic Laboratory Network (BSL4ZNet): Canadian-led exercise	Active	Canadian Food Inspection Agency	\$270,000	\$50,000
CSSP-2018-TI-2386	Integrated bio-forensic response to human and animal high consequence pathogens	Closed	Canadian Food Inspection Agency	\$341,250	\$84,000
CSSP-2018-TI-2372	CAPEX 2018	Closed	Royal Canadian Mounted Police	\$150,000	\$127,000
CSSP-2018-CP-2342	Portable Automated Biosensing of Potential Dual-Use Bio-threats to Water Systems	Active	Health Canada	\$995,000	\$153,000
CSSP-2018-CP-2341	Enhancing Canada's Biothreat Operator Preparedness and Response Capability	Active	Canadian Food Inspection Agency	\$860,000	\$725,000
CSSP-2018-CP-2340	Synthetic Biology Threats: Fighting fire with fire	Active	Canadian Food Inspection Agency	\$995,000	\$1,180,000
CSSP-2018-CP-2339	Enhancing Canada's Response Capability to High Priority and Unknown/Unexpected Viruses	Active	Canadian Food Inspection Agency	\$600,000	\$327,000
CSSP-2019-TI-2430	Biology Consolidated Risk Assessment	Active	DRDC CSS	\$0	\$10,000
CSSP-2019-TI-2416	S&T Roadmap for Radiological and Nuclear Security and Bio-security	Active	AECL	\$300,000	\$50,000
CSSP-2019-TI-2410	Best Practices for Microbial Forensic Investigations MI-PIF	Active	Public Health Agency of Canada	\$209,000	\$66,000

CSSP-2019-CP-2449	Developing rapid point-of-care diagnostics for high consequence zoonotic pathogen detection	Active	Public Health Agency of Canada	\$924,714	-
CSSP-2019-CP-2451	Agnostic metagenomics for identification of novel or synthetically modified microorganisms	In development	Public Health Agency of Canada	\$769,000	-
CSSP-2020-TI-2493	Pandemic preparedness capacity building	In development	Canadian Food Inspection Agency	\$760,000	-
CSSP-2020-TI-2469	Improving early warning of emerging threats	In development	Public Health Agency of Canada	\$435,000	-
				\$12,028,465	\$7,843,900

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

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 m²
CL3 - 159 m²
CL4 - 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 600 houses a biological training lab with approximately 50 m² of lab space. Building 10 is a vivarium and includes general laboratory space. The area of the vivarium is 1134 m². Building 601 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 1 January 2022³:

i. Total number of personnel: 25.8, including indeterminate, term, and casual positions; excluding student and vacant positions

ii. Division of personnel

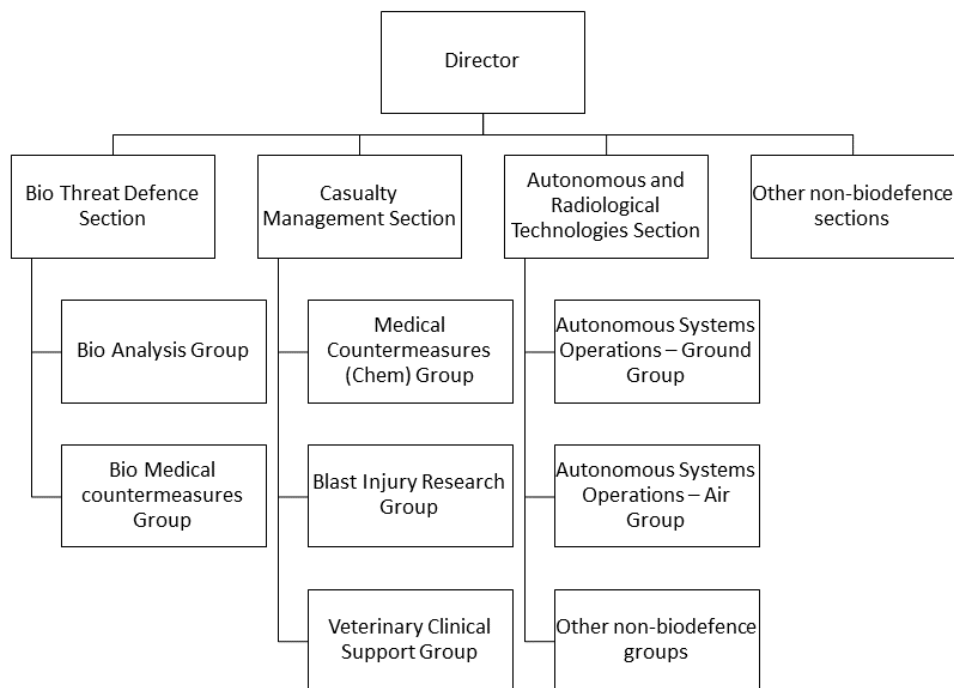
Civilian	25.8
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³ The biological defence program at this facility involves more than one section. The data presented herein is therefore a best estimate as to the portion that is affected to biological defence.

iii. Division of personnel by category⁴

Scientists	12.8
Engineers	0.0
Technicians	12.5
Administrative and support staff	0.5

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 represents the percentage of the workload of a full-time employee. These numbers do not include vacant positions, but do include students.

- v. The research in this facility is primarily funded by the Department of National Defence and under contract to, or through collaborative agreements, with other government departments and industry.

Funding level estimates (including salaries): \$7,334,696⁵

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

Research, development, test and evaluation: \$4,322,669⁶

Research, development, test and evaluation under IDEaS COVID effort: \$8,732,678⁷

- 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 *suus*), *Burkholderia* species (*mallei*, *pseudomallei*) *Francisella tularensis*, *Mycobacterium tuberculosis*, *Yersinia enterocolitica*, *Yersinia pestis*, various influenza virus strains, Western Equine Encephalitis Virus, Eastern Equine Encephalitis Virus, Venezuelan Equine Encephalitis, Highlands J virus, Sindbis virus, dengue virus (serotypes 1-4), and SARS-CoV-2. Toxins used include Diphtheria toxin, Epsilon toxin, Shiga Toxins 1 and 2, Aflatoxin, T2 Toxin, Tetrodotoxin, Maitotoxin, Pertussis toxin, Ricin, Ricin B Chain, Botulinum toxin, Cholera toxin, and *Staphylococcus enterotoxins*. 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*).

⁵ This number includes funding allocated to DRDC Suffield, DRDC Valcartier, and IDEaS CBRN due to the

integration of Program across research centres.

⁶ This number includes funding allocated to DRDC Suffield, DRDC Valcartier, and IDEaS CBRN due to the integration of Program across research centres. Additionally, this number includes contracts.

⁷ The IDEaS Program pivoted during COVID to allow investment in counter-COVID R&D. Since this was a unique occurrence, it is listed separately.

2. Defence Research and Development Canada (DRDC) – 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 the research centre. The postal address is:

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 m²

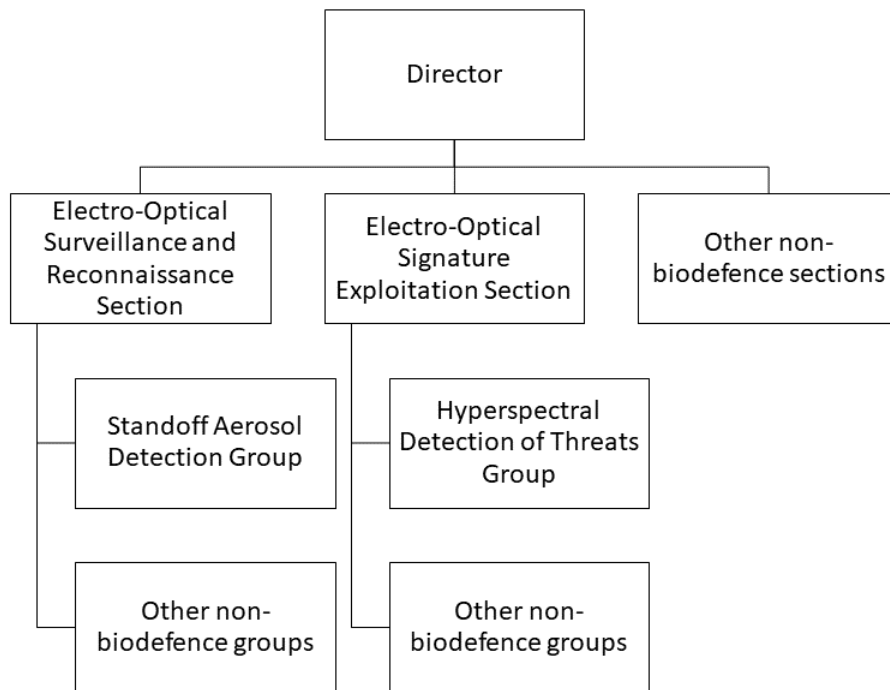
The aerosol chamber (2.5m x 2.5m x 24m) located on the south side of the research centre is used to characterize standoff biodetection systems under development with fluorescing aerosols simulating bioaerosols.

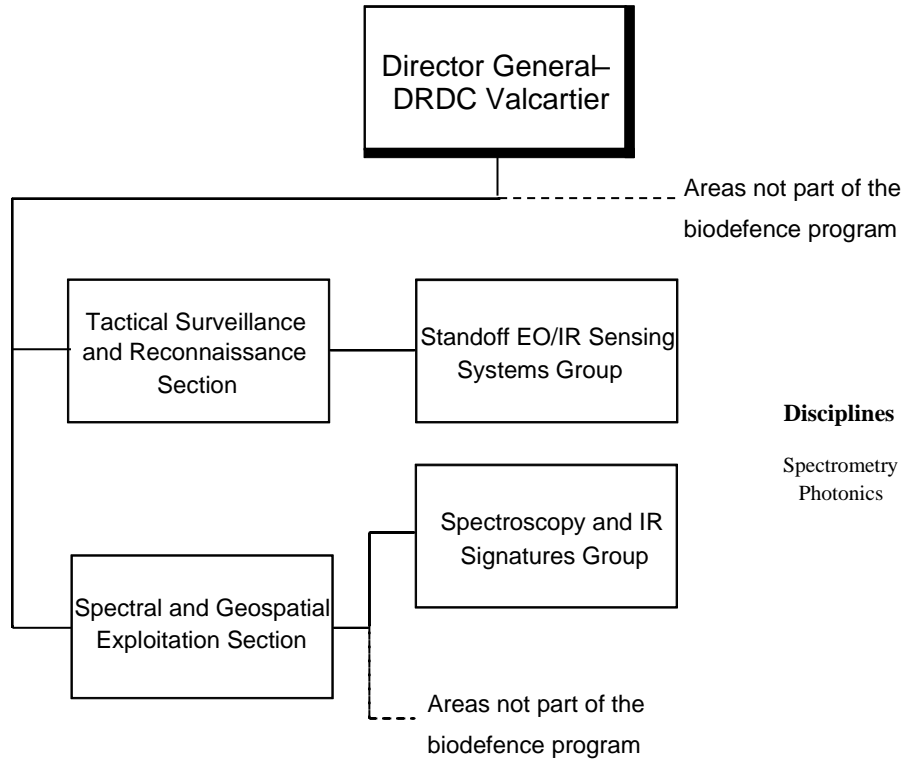
- c. The organizational structure of the personnel contributing to this activity is⁵:

- i. Total number of personnel 3
- ii. Division of personnel
 - civilian 3
 - military 0
- iii. Division of personnel by category
 - scientists 1.1
 - technicians 1.9
 - admin. and support staff 0

⁵ The decimal represents 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): See funding levels listed in previous section for DRDC Suffield Research Centre
 - 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 – 2020

Contractors listed in the table below include those from the DRDC CBRN Program, IDEaS CBRN Challenge, and IDEaS COVID contribution agreements. The latter are in blue text.

<u>Title</u>	<u>Contractor</u>
LIF library update for BioSense	Aerex Avionics
BioSense interaction software	Aerex Avionics
Super sanitize: Cleaning sensitive equipment and workspaces by vortex gun.	Afel Technologies Incorporated
Soldier Portable Unmanned Aerial Vehicle (UAV) Payload for CBRN Agent Detection	Amtech
CBRN UAV Trial Support 2021	Amtech
A scenario-based framework for generating locally relevant forecasts of COVID-19 infections and deaths based on best available science	Apex Resource Management Solutions Ltd.
Short-cycle Community Transmission Modelling for Economic Restart	Black Arcs Inc.
Community Outbreak Analysis & Impact Modelling System (COAIMS)	CommunityLogiq Software Inc.
Locating emerging COVID19 hotspots in Ontario after community transmission by time-correlated, geostatistical analysis	Cytognomix Inc
High Temperature Sanitizing Heating Apparatus	DEW Engineering and Development ULC
Host-directed therapies	Dstl Porton Down
Optimizing GermStopSQ	Envision SQ Inc.
Indoor light-activated, self-cleaning surfaces for continuous decontamination of transparent and non-transparent PPE in the field	Evercloak Inc.
Syndrome Anomaly Detection System (SADS)	GoodLabs Studio Inc.
COVID-19 AI: An Augmented-Intelligence System for COVID-19	Governors of the University of Calgary
The Utilization of the Sanozone Technology for Pathogen Deactivation and Sanitization	Ground Effects Environmental Services
5D Visualization and analysis solution for CBRN threats	Hexagon Geospatial
Assessment of a standoff surface bio-contamination detection concept	Institut Nationale d'Optique
Robust, lightweight, medium range optical standoff detection, identification and tracking of warfare bio-agent clouds	Institut Nationale d'Optique
Easy-Clean, Easy-Apply, Durable, Antiviral and Antimicrobial Coating	Integran Technologies Inc.
Predict, prevent and manage moral injuries in frontline healthcare workers and leaders facing the COVID-19 pandemic: solutions involving improvements of psychosocial working conditions and individuals' coping skills	Laval University
Rapid City Planner for CBR hazard detection and planning	Martec Limited

Breath Analytics using Cavity Ring Down Spectroscopy to Detect SARS-CoV-2 Virus	McMaster University
RepelWrap: a self-cleaning plastic wrap for keeping sensitive equipment and workplaces pathogen-free	McMaster University
Cold Plasma for Super Sanitizing Indoor Workplace and Sensitive Equipment	McMaster University
Pandemic Outlook in Remote Areas	MDA Systems Ltd
Use of biocompatible nanomolecules for multi-surface decontamination	Nanotess Inc.
Integrating EIS detection with digital microfluidic sample preparation – nanofabricated electrode	National Research Council
Molecularly Imprinted Electrochemical Sensors for the Detection of Aerosol Opioid Compounds	National Research Council
Syndromic Surveillance from Pharmacy Medication Sales	OKAKI Health Intelligence Inc.
A Capability to Identify an Emerging Health Emergency and Estimate its Community-Level Disease Transmission Patterns	OODA Technologies Inc.
Hydroxyl Radical Sterilization Method and Portable Generator for this Process.	Parole Laboratories Inc. (PO-Laboratories)
COVID-19 Predictor: Identifying effective countermeasures, predicting turning points and flattening the epidemic curve	Queen's University
Fast Disinfection of Personal Protective Equipment Exploiting the Microwave Resonance Properties of Pathogens	Queen's University
Advanced multiplex technology for pathogen detection and recognition	Queen's University
Infectious Disease Impact and Response Explorer - COVID-19 and Beyond	Risk Sciences International Inc.
Multi-Robot Germicidal System	Ryerson University
“Geiger counter” for the detection and destruction of aerosolized droplets with genetic material	Ryerson University
Operationalizing the Concept of Moral Injury within Canadian Frontline Healthcare Workers: An Inductive, Grounded Theory Analysis	Saskatchewan Health Authority
Scrubless scrubs: 3D printed materials, clothing, and coatings for self-sterilizing PPE and OCE	Simon Fraser University
Développement d'un pulvérisateur électrostatique bipolaire sans fil	Siozen inc.
A Low-Cost, Versatile, Mobile Disinfection Multi-purpose System	Spectronix Inc.
A continuously active antimicrobial coating effective against Human Coronavirus 229E	TerraVerdae Bioworks Inc.
Sprayable Anti-Viral and Repellent treatment for Reusable Personal Protective Equipment (SAVRR-PPE)	Texavie Technologies Inc.
Telemonitoring Remote OUTbreak (TROUT)	Thales Digital Solutions
Wastewater-based population infection ML models for early pandemic warning and forecast	Thales Digital Solutions
Rechargeable, self-decontaminating Personal Protective Equipment and Operational Clothing and Equipment for	The Governors of the University of Alberta

personnel responding to events involving biological hazards	
Multi-modular Motion-Assisted Memory Desensitization and Reconsolidation (3MDR) with Essential Service Providers: Treating Moral Injuries Sustained in the Course of Service	The Governors of the University of Alberta
Worn down by "Wicked Moral Problems": Digitally-delivering a group moral injury intervention to frontline COVID-19 service personnel	The Governors of the University of Alberta
Development of an Air Surveillance Tool for Population-Wide COVID-19 Detection and Prediction	The University of British Columbia
An AI-based Tool for the Analysis of Public Health Policy Options in Response to COVID-19 and other Infectious Diseases	The University of British Columbia
Modular Personal Protective Ensembles utilizing omniphobic and antimicrobial coatings for enhanced protection against COVID-19	The University of British Columbia
Multidimensional assessment of COVID-19-related moral injury: From wounded psyche to brain, mind and body	The University of Western Ontario
Could Digital Interventions Help Understand And “Flatten The Curve” Of Distress Due To Moral Injury Among Health Care Workers During The COVID Pandemic?	Unity Health Toronto
Addressing Moral Injury and Extreme Stress Responses on the Frontline—Further Development of a Transdiagnostic Internet-Delivered Intervention for Mental Health Symptoms Related to COVID-19: RESTORE	University Health Network (UHN)
Research Support for Vaccine Delivery of Chikungunya, Mayaro and yellow fever vaccines	University of Alberta
EC Sensor chip performance aerosol detection	University of Calgary
Electromagneto-oxidative disinfection system for PPE, operational clothing and solid objects	University of Guelph
kitatipithitamak mithwayawin: Real-Time Data, Mobile Health, and Indigenous-Led Countermeasures to COVID-19	University of Manitoba
Moral Injury in Long-Term Care Staff During the COVID-19 Pandemic: Assessment & Intervention Development Using An Innovative Multi-Method Approach	University of Manitoba
Reusable Masks with Self-Disinfecting Filter	University of New Brunswick
Nanowire Based Biochemical Identification Device Development	University of Toronto
Hiltonol animal efficacy study against SARS-CoV-2	VIDO

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 World Animal Health Information System (WAHIS) Interface website: <https://wahis.oie.int/#/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 (PHAC)

Measles

Since the elimination of measles in Canada in 1998, large outbreaks of measles (greater than 10 cases) are rare. No large outbreaks of measles occurred in 2018, 2020 and 2021. In 2019, three large outbreaks were reported. In the first outbreak, three cases were exposed together in Vietnam and attended two schools in British Columbia while infectious. These cases caused transmission of measles within the schools and the community, and a total of 13 cases were eventually involved in this outbreak with onset dates ranging from January to March. Of the 13 cases involved in this outbreak, only three (23%) were up to date for measles vaccination. In the second outbreak, the index case was exposed while travelling in Europe before coming back to New Brunswick and infecting a secondary case in a hospital. This secondary case infected a further 10 cases in a Saint John-area school and in the community between May and June. Of the twelve cases involved in this outbreak, nine (75%) were up to date for measles vaccination. In the third outbreak, the index case was exposed while travelling to a non-immunizing religious community in the state of New York, USA, and caused two chains of measles transmission upon return to Quebec. Transmission related to this outbreak occurred in the general community as well as within a non-immunizing religious community near Montreal. This outbreak included a total of 34 cases in Quebec, of which only one (3%) was up to date for measles vaccination.

Swine origin influenza A(H1N2)v

On April 26, 2021, PHAC was notified of a confirmed case of swine variant influenza A(H1N2)v in a Manitoba (MB) resident, marking the 29th influenza A(H1N2)v case reported to the WHO since 2005 and the second from Canada. PHAC reported the case to the Pan American Health Association (PAHO)/World Health Organization (WHO) under Article 7 of the International Health Regulations (IHR) (2005) on April 28, 2021. The case developed influenza-like illness (ILI) on April 1, 2021, and recovered. Public health, animal health and laboratory authorities completed thorough investigations into the case and their immediate household members as well as retrospective and prospective laboratory surveillance of the geographic area including animal investigations. The case had no known animal contact; however, the case resided in a rural community with nearby agricultural operations and Manitoba had reported potential cases of swine influenza in a pig barn in the region. In addition, a household contact worked as a contractor for barn restoration and had occupational exposure to swine. One contact was symptomatic but tested negative for influenza and SARS-CoV-2. The other contacts were asymptomatic and were not tested for influenza. Laboratory investigations confirmed the isolate designated A/Manitoba/01/2021 (H1N2)v. The Basic Local Alignment Search Tool (BLAST) analysis of the whole genome showed that all 8 gene segments were more closely related to swine influenza. Full sequencing results indicated many of the virus' internal genes were either related to H1N2 or H3N2 circulating in Manitoba swine and the hemagglutinin (HA) gene and the neuraminidase (NA) genes were closely related to A/Swine/Iowa/A02245578/2020 (H1N2). The sequence data was deposited to the Global Initiative on Sharing Avian Influenza Data (GISAID) in May 2021.

On November 10, 2021, health authorities from the province of Manitoba contacted PHAC to indicate the possibility of a case of swine-origin variant influenza in a Manitoba resident. The National Microbiology Laboratory (NML) sent samples to the United States Centers for Disease Control and Prevention (US CDC) for subtyping and further characterization. On November 29, 2021, the NML confirmed that the US CDC detected A(H1N2)v by real-time PCR, marking the 39th influenza A(H1N2)v case reported to the WHO since 2005 and the third from Canada. No sequencing results were shared. PHAC reported the case to PAHO/WHO under Article 7 of the International Health Regulations (IHR) (2005) on December 1, 2021. Public health, animal health and laboratory authorities completed thorough investigations into the case and their immediate household members and determined this was a sporadic infection. The case was exposed to swine through the workplace. The case developed non-severe symptoms of cough, headache, fever, and rhinorrhea on October 2, 2021, and recovered without requiring hospitalization.

Swine origin influenza A(H1N1)v

On April 28, 2021, PHAC was notified of one confirmed case of variant influenza A(H1N1)v in a Manitoba (MB) resident, marking the 32nd influenza A(H1N1)v case reported to the WHO since 2005 and the second from Canada. PHAC reported the case to PAHO/WHO under Article 7 of the International Health Regulations (IHR) (2005) on April 29, 2021. The case had an onset of mild symptoms on April 8, 2021, and recovered without being hospitalized. Public health, animal health, and laboratory authorities completed thorough investigations into the case and their immediate household members as well as retrospective and prospective laboratory surveillance of the geographic area including animal investigations. Public health investigations revealed that this case and family members had direct contact with swine. No other influenza-like illness (ILI) cases were reported from the close contacts and the community. Laboratory investigations confirmed the isolate designated A/Manitoba/02/2021 (H1N1)v. Blast analysis of the hemagglutinin (HA) gene showed that the isolate was more closely related to A/Swine/Manitoba/SD0265/2018 (H1N1). Blast analysis of all 8 gene segments showed they were more closely related to influenza A(H1N1) and A(H1N2) swine virus isolates from Manitoba in recent years. The subtype of the isolate is H1N1 from swine origin (H1N1)v, therefore it was a different influenza subtype than the H1N2v confirmed notified on April 26, 2021. There was no epidemiological link (human or animal) between these two cases. The sequence data was deposited to GISAID in May 2021.

Swine origin influenza A(H3N2)v

On June 15, 2021, PHAC was notified of one confirmed case of variant influenza A(H3N2)v in a Manitoba (MB) resident, marking the 439th influenza A(H1N1)v case reported to the WHO since 2005 and the second from Canada. As required under Article 7 of the International Health Regulations (IHR) (2005) PHAC notified WHO/PAHO of the case on June 17, 2021. The case developed cough and sore throat on June 3, 2021, tested negative for SARS-CoV-2 on June 4, and presented to a hospital emergency department on June 5, 2021, due to worsening symptoms where he tested positive for influenza A. He did not require hospitalization and recovered. Public health, animal health and laboratory authorities completed thorough investigations into the case and their immediate household members as well as retrospective and prospective laboratory surveillance of the geographic area including animal investigations. There were no influenza-like illness

symptoms in the other household members. Neither the case nor his parents reported any exposure to swine. Laboratory investigations confirmed the isolate designated A/Manitoba/03/2021 (H3N2)v. The Basic Local Alignment Search Tool (BLAST) analysis of the whole genome showed that all 8 gene segments were more closely related to swine influenza. Full sequencing results indicated that many of the virus' internal genes either related to circulating Manitoba swine H1N2, H3N2 or H1N1 and the hemagglutinin (HA) gene, polymerase acidic (PA) gene and polymerase basic 2 (PB2) genes were closely related to A/swine/Iowa/A02478764/2019(H3N2). The sequence data was deposited to GISAID in June 2021.

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. In 2020, two cases of diphtheria were reported in a Saskatchewan First Nation. In 2019, two cases of diphtheria were reported in Canada, one in Alberta and the other in Ontario, and neither resulted in further transmission.

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.

Pertussis outbreaks were declared in Ontario (North Bay Parry Sound District) and Saskatchewan (Saskatoon) in late 2018, in New Brunswick (Fredericton) in early 2019, and in Alberta (South Zone), Ontario (Timiskaming District), and Nunavut in late 2019. One death associated with the pertussis outbreak in Nunavut was reported. More recently, a pertussis outbreak that was first detected in Nunavut in May 2020 was officially declared over in September 2020. The Northwest Territories Chief Public Health Officer declared an outbreak of pertussis in January 2021, the second year in a row that the territory has declared a pertussis outbreak.

Mumps

Mumps is an endemic disease in Canada and outbreaks are not systematically reported. In response to a surge in mumps activity in 2016, provinces and territories were surveyed to gain an understanding of the pan-Canadian epidemiology of mumps. Between January 12016, and July 31, 2018, a total of 25 outbreaks resulting in 885 cases were reported to PHAC. Outbreak data collected revealed that outbreaks during this time period were predominately associated with community and social gatherings (75%). When vaccination status was provided, approximately half of all cases received two doses of mumps-containing vaccine (48%) and 79% received at least one dose of mumps-containing vaccine. Not included in the survey was one large outbreak which resulted in 2,175 cases and lasted between September 1, 2016, and November 6, 2018. In the affected 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 became widespread to the province.

Invasive Group A Streptococcal Disease (iGAS)

Increased iGAS activity

Outbreaks of iGAS are not systematically reported in Canada. 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, such as in nursing homes or long-term care facilities, health care facilities, military facilities and congregate housing settings (for e.g., homeless shelters). Most jurisdictions have reported increasing incidence of iGAS in recent years.

Invasive Meningococcal Disease

In 2017, one community outbreak was reported and affected predominantly individuals 15 to 19 years of age. The outbreak lasted three months and resulted in five cases and one death. Serogroup W (serotype 2a) was identified as the cause of the outbreak. In response to the outbreak, a vaccination program was initiated using the quadrivalent vaccine. In 2021, an outbreak was reported in a remote First Nations community in Alberta. The outbreak lasted from September 2020 to February 2021 and resulted in 11 confirmed cases (ST-11 serogroup W) and 4 deaths. The median age of cases was 6.5 years (range was 0 to 56 years) and 64% of cases were females. Initial public health actions were treatment of cases with antibiotics, in addition to contact tracing to identify close contacts to be offered prophylactic antibiotic treatment and immunoprophylaxis through vaccination. No other outbreaks have been reported to the National Enhanced Invasive Meningococcal Disease Surveillance System (eIMDSS) since.

Cyclosporiasis

In the summer of 2021, 75 cases of locally-acquired cyclosporiasis were investigated in British Columbia, Ontario, Québec, and Newfoundland and Labrador with two reported hospitalizations and no fatalities. The food source or sources of illnesses were not identified. 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 in Canada. Previous Canadian outbreaks of locally-acquired cyclosporiasis have been linked to fresh produce, imported from countries where *Cyclospora* is endemic. Between 2015 and 2019, an average of 383 cases of cyclosporiasis were reported annually to the Canadian Notifiable Disease Surveillance System. In 2020, the National Microbiology Laboratory (NML) began genotyping *Cyclospora* samples collected during investigations using a novel typing method developed by The Centers for Disease Control and Prevention (US-CDC). This laboratory advancement is expected aid in outbreak investigations by supplementing the current epidemiological activities with improved ability to link cases by molecular characterization.

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, and continues to be the most commonly reported STI with reported rates increasing by 33% over the last decade. The highest relative rate increase, nearly 64%, occurred among males. Most cases and the highest rates occurred among those under 30, however, rates were increasing faster over time as age increases. There were 139,386 cases reported in 2019, for a rate of 370.8 per 100,000 population.

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 2019, 35,443 cases of gonorrhea were reported in Canada, with a corresponding rate of 94.28 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. There were 4,787 cases of hepatitis B (acute, chronic and unspecified combined) reported in 2019, for a rate of 0.5 per 100,000 for acute hepatitis B and 10.2 per 100,000 for chronic hepatitis B.

Hepatitis C

From 2014 to 2018, national hepatitis C rates rose by 14.4% from 29.6 to 33.9 per 100,000 population. However, from 2018 to 2019, the national rate dropped by 10.2% to 30.4 per 100,000 population, the lowest rate in the last five years (11,441 cases). Transmission within Canada is due primarily to sharing of contaminated injection drug equipment.

Infectious syphilis

The reported rate of infectious syphilis was maintained at low levels 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. Many provinces and territories have reported recent or ongoing outbreaks of infectious syphilis.

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 2020, 9,382 cases of infectious syphilis were reported in Canada

through enhanced surveillance, for a rate of 24.7 per 100,000. In 2019, in Canada, the number of congenital syphilis cases were the highest ever reported (53 confirmed cases, compared to 17 confirmed cases in 2018 and 7 cases in 2017). There were 50 cases of congenital syphilis reported through enhanced surveillance in 2020.

Report from the Canadian Food Inspection Agency

All information of detections and outbreaks of nationally regulated disease in animals in 2021 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.
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*.

<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 test kits for <i>in vitro</i> diagnosis of infectious diseases in animals.
Centre for Aquaculture Technologies Canada Can. Vet. Biol. Estab. Lic. No. 61	Souris, PEI and Victoria (PEI)	Quality control testing of aquaculture vaccines under contract from authorized manufacturers.
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.