

Canada

This document is a compilation of all questions, justifications, and sources used to determine the 2021 Global Health Security Index scores for Canada. For a category and indicator-level summary, please see the Country Profile for Canada.

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Category 1: Preventing the emergence or release of pathogens with potential for international concern

1.1 ANTIMICROBIAL RESISTANCE (AMR)

1.1.1 AMR surveillance, detection, and reporting

1.1.1a

Is there a national AMR plan for the surveillance, detection, and reporting of priority AMR pathogens?

Yes, there is evidence of an AMR plan, and it covers surveillance, detection, and reporting = 2, Yes, there is evidence of an AMR plan, but there is insufficient evidence that it covers surveillance, detection, and reporting = 1, No evidence of an AMR plan = 0

Current Year Score: 2

Canada has a national Antimicrobial Resistance (AMR) plan for the surveillance, detection and reporting of priority AMR pathogens. The Minister of Health and the Minister of Agriculture and Agri-Food jointly released the Pan-Canadian Framework for Action on AMR in September 2017. The Framework is based on the One Health approach and is designed to "ensure cross-sectoral collaboration and accountability" and involve the federal, provincial and territorial levels of government. The Framework primarily focuses on bacterial resistance to antibiotics, although it mentions all types of antimicrobials. The Framework comprises four components: surveillance, infection prevention and control, stewardship, and research and innovation. Each component includes corresponding "opportunities for action". The Framework's first strategic goal focuses on "the monitoring, detection and tracking of resistant organisms to develop and monitor interventions". The fourth strategic goal deals with the "identification, characterization and real time detection of microorganisms including resistant bacteria". "Information sharing" is one of seven principles of the Framework, and is defined as "a concerted response demands that information and best practices are shared and leveraged across jurisdictions and sectors for a cohesive pan-Canadian approach to AMR (Antimicrobial Resistance) and AMU (Antimicrobial Use)". [1] The second phase of the implementation of the Framework will result in the creation of a pan-Canadian action plan for AMR. The action plan has not yet been issued. [2] According to the Framework, "The Pan-Canadian AMR Framework is the first phase in Canada's response to AMR and provides a foundation to identify and develop steps to address AMR and AMU challenges. The second phase will focus on the development of a corresponding pan-Canadian action plan. This action plan will further define roles and responsibilities of [national and subnational] governments, lay out the details of concrete deliverables, timelines, measurable outcomes, priorities and allow for the tracking of progress against actions". [1] The Pan-Canadian Framework for Action on AMR was preceded by a Federal Framework and Federal Action Plan on AMR issued in 2015 that focused exclusively on the federal government. The 2017 Framework integrates the provincial and territorial governments, along with the federal government, in a single strategy. [1] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the existence of the Pan-Canadian Framework for Action on AMR as the main relevant national plan. [3]

[1] Government of Canada. 2017. "Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action". [<https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html>]. Accessed 17 August 2020.

[2] Government of Canada. 26 November 2019. "Pan-Canadian Action Plan on AMR". [https://www.ahwcouncil.ca/pdfs/3%20-%20CFIA_ACIA%20-%2012437688%20-%20v1%20-%20NFAHWC%20-%20AMR%20Presentation%20-%20November%202019_Aline%20Dimitri.pdf]. Accessed 17 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62->

eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 21 August 2020.

1.1.1b

Is there a national laboratory/laboratory system which tests for priority AMR pathogens?

All 7 + 1 priority pathogens = 2 , Yes, but not all 7+1 pathogens = 1 , No = 0

Current Year Score: 1

Canada's national laboratory system uses sentinel sites to test for some priority Antimicrobial resistance (AMR) pathogens: *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Neisseria gonorrhoeae*, *Mycobacterium tuberculosis* and *Salmonella* spp. The Canadian Public Health Laboratory Network (CPHLN) is the country's national laboratory network and is overseen by the National Microbiology Laboratory (NML), which is the country's national reference laboratory. [1] The Public Health Agency of Canada (PHAC) supervises surveillance activities in coordination with CPHLN and the NML. According to PHAC, CPHLN tests for priority AMR pathogens via sub-networks that are part of the national laboratory network. The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) gathers data from CPHLN using provincial and territorial public health laboratories as sentinel sites that test for priority AMR pathogens. In terms of *Staphylococcus aureus*, PHAC carries out "limited surveillance" which includes epidemiological and laboratory data from laboratory tests for methicillin-resistant *Staphylococcus aureus* infections, which has been ongoing since 1995. In terms of *Streptococcus pneumoniae*, as a nationally notifiable disease, PHAC monitors positive tests for it via the Canadian Notifiable Disease Surveillance System (CNDSS). In addition, an "enhanced case-based surveillance system" was launched in 2011 to monitor positive cases of *Streptococcus pneumoniae* that are detected in the public health system. PHAC also monitors *Neisseria gonorrhoeae* via the CNDSS as a notifiable disease; around one-third of infections are cultured by provincial and territorial laboratories for AMR testing. As a notifiable disease, *Mycobacterium tuberculosis* is subject to specialised surveillance via the Canadian Tuberculosis Reporting System (CTBRS) and the Canadian Tuberculosis Laboratory Surveillance System (CTBLSS). Laboratories from all provinces and territories in the country participate as sentinel sites that test for the pathogen. In terms of *Salmonella* spp., it is monitored via the CNDSS as a notifiable disease and additional active surveillance occurs via weekly data from tests for all enteric organisms to identify outbreaks, as well as active AMR surveillance via sentinel sites at farms, slaughterhouses, and retail meats. FoodNet Canada also carries out active surveillance of *Salmonella* from humans, food and farm animals using laboratory sentinel sites in Ontario, British Columbia and Alberta. [2] *Shigella* is subject to surveillance via provincial and territorial public health laboratories and positive tests are reported to the PHAC, but reports on AMR in Canada note that *Shigella* has so far not been included in specific AMR surveillance programs. [3, 4, 5] According to PHAC, CIPARS compiles data on AMR in *E. coli* and *K. pneumoniae* from tests carried out on retail food, animals and hospital intensive care units, but there is not a programme to monitor resistance in "generic or pathogenic *E. coli* or *Klebsiella* in humans". [1] The 2017 Pan-Canadian Framework for Action on AMR does not contain additional information regarding if the national laboratory system uses sentinel sites to test for priority AMR pathogens. [6] Canada's Joint External Evaluation (JEE) report, published in 2019, states that Canada "Strong diagnostic capacity and reference capacity for human and animal health systems" and notes that Canada has identified "priority pathogens for AMR surveillance, periodically revised to reflect data needs or changes in developments of AMR". [7] The JEE describes the Canadian Antimicrobial Resistance Surveillance System Report as the current source for information on Canada's AMR surveillance. [7,5]

[1] Public Health Agency of Canada. 2017. "The Canadian Public Health Laboratory Network (CPHLN)". [<https://web.archive.org/web/20170823140642/https://www.nml-lnm.gc.ca/cphln-rlspsc/index-eng.htm>]. Accessed 17 August 2020.

[2] Pan-Canadian Public Health Network. 2015. "Antimicrobial Resistance Surveillance Data Requirements for Priority Organisms". [<http://www.phn-rsp.ca/pubs/arsdrpo-dsecrao/index-eng.php>]. Accessed 17 August 2020.

[3] Martin, L. J., Flint, J., Ravel, A., Dutil, L., Doré, K., Louie, M., Jamieson, F., & Ratnam, S. 2006. "Antimicrobial resistance among *Salmonella* and *Shigella* isolates in five Canadian provinces (1997 to 2000)". *The Canadian journal of*

infectious diseases & medical microbiology. [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2095080/>]. Accessed 17 August 2020.

[4] Public Health Agency of Canada. 2017. "Canadian Antimicrobial Resistance Surveillance System Report 2017". [<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2017-report-executive-summary/CARSS-Report-2017-En.pdf>]. Accessed 17 August 2020.

[5] Public Health Agency of Canada. 2018. "Canadian Antimicrobial Resistance Surveillance System Report 2018". [<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2018-report-executive-summary/pub1-eng.pdf>]. Accessed 17 August 2020.

[6] Government of Canada. 2017. "Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action". [<https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html>]. Accessed 17 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.1.1c

Does the government conduct environmental detection or surveillance activities (e.g., in soil, waterways) for antimicrobial residues or AMR organisms?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that the government of Canada conducts environmental detection or surveillance activities (e.g. in soil, waterways, etc.) for antimicrobial residues or Antimicrobial Resistance (AMR) organisms. According to Canada's 2017 Pan-Canadian Framework for Action on AMR, "there is very little data regarding AMR in the environment (e.g. soils, waterways, wildlife) or on AMR or Antimicrobial Use (AMU) in plant agriculture". The Framework states that it will initially focus on the human and animal health aspects of the One Health approach and that the environmental aspect will be included in the future. [1] The government's informational webpage on AMR describes how it monitors AMR, but does not mention any environmental monitoring. [2] The Public Health Agency of Canada's (PHAC) Laboratory for Foodborne Zoonoses mentions that it "looks at the public health risks of antibiotic resistance that come from interactions between humans, animals and the environment". A photo on the laboratory webpage states that it shows a "laboratory technician analysing bacteria from food, animals, and the environment for antimicrobial resistance". However, the laboratory's webpage provides no additional specific information regarding environmental surveillance of AMR. [3] According to Canada's 2018 progress report on AMR, the Canadian Institute of Health Research (CIHR) is funding research grants for projects related to implementing environmental monitoring of AMR, with target completion dates of 2019 and 2021 for the grant programmes. However, environmental monitoring is in the research phase and has not been implemented. [4] The Canadian Antimicrobial Resistance Surveillance System Update 2018, does not mention environment detection or surveillance activities for AMR. [5] The 2020 update, the most recent, says that while the Public Health Agency of Canada (PHAC) "is committed to applying a One Health perspective on the emergence of AMR, there is limited data regarding environmental surveillance – a necessary component of any One Health framework". [6] The websites of PHAC and Environment and Climate Change Canada (ECCC) do not contain additional information regarding conducts environmental detection or surveillance activities for antimicrobial residues or AMR organisms. [7,8] Canada's Joint External Evaluation (JEE) report, published in 2019, notes that Canada's AMR surveillance mechanisms "support the integration of surveillance outcomes across human, animal, food, and environment domains", but does not describe specific environmental surveillance activities that Canada undertakes for AMR organisms. [9]

- [1] Government of Canada. 2017. "Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action". [<https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html>]. Accessed 17 August 2020.
- [2] Government of Canada. "Government of Canada's response to antimicrobial resistance". [<https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance/government-canada-response-antimicrobial-resistance.html#a2>]. Accessed 17 August 2020.
- [3] Public Health Agency of Canada. "Laboratory for Foodborne Zoonoses". [<https://www.canada.ca/en/public-health/services/infectious-diseases/laboratory-foodborne-zoonoses.html>]. Accessed 17 August 2020.
- [4] Public Health Agency of Canada. 2018. "Progress Report on the 2015 Federal Action Plan on Antimicrobial Resistance and Use". [<https://www.canada.ca/en/public-health/services/publications/drugs-health-products/progress-report-2015-federal-action-plan-antimicrobial-resistance-use.html>]. Accessed 17 August 2020.
- [5] Public Health Agency of Canada. 2018. "Canadian Antimicrobial Resistance Surveillance System Update 2018". [<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2018-report-executive-summary/pub1-eng.pdf>]. Accessed 17 August 2020.
- [6] Public Health Agency of Canada. 2020. "Canadian Antimicrobial Resistance Surveillance System Update 2020". [<https://www.canada.ca/en/public-health/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2020-report.html>]. Accessed 12 March 2021.
- [7] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 17 August 2020.
- [8] Environment and Climate Change Canada. 2019. "Environment and Climate Change Canada". [<https://www.canada.ca/en/environment-climate-change.html>]. Accessed 17 August 2020.
- [9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.1.2 Antimicrobial control

1.1.2a

Is there national legislation or regulation in place requiring prescriptions for antibiotic use for humans?

Yes = 2 , Yes, but there is evidence of gaps in enforcement = 1 , No = 0

Current Year Score: 2

Canada has national legislation and regulations in place requiring prescriptions for antibiotic use for humans. The Food and Drugs Act of 1985 grants the power to the Minister of Health to establish which medicines require a prescription (Section 29.1). [1] Canada's Food and Drug Regulations state that medicines designated as requiring a prescription will be included on the Prescription Drugs List. [2] The Prescription Drug List of Products for Human Use lists antibiotics as requiring a prescription. [3] Canada's 2017 Pan-Canadian Framework for Action on AMR states that Health Canada "regulates the approval of antimicrobial drugs for sale in Canada that are used in humans and animals" and notes that antibiotics require a prescription. [4] Health websites in Canada confirm that antibiotics require a prescription. [5] There is no evidence of gaps in enforcement of regulations on prescriptions of antibiotics for humans. Canada's Joint External Evaluation (JEE) report, published in 2019, does not discuss the legal framework for antibiotic prescriptions for humans, but notes that in Canada "antimicrobial stewardship programmes for human health focus on appropriate and prudent use of antimicrobials through a myriad of different activities such as outreach campaigns for patients, clinicians, and communities". [6]

[1] Government of Canada. 1985. "Food and Drugs Act". [<https://laws-lois.justice.gc.ca/eng/acts/F-27/FullText.html>]. Accessed 18 August 2020.

- [2] Government of Canada. 2019. "Food and Drug Regulations". [https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._870/FullText.html]. Accessed 18 August 2020.
- [3] Health Canada. 2019. "Prescription Drug List". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/prescription-drug-list/list.html>]. Accessed 18 August 2020.
- [4] Government of Canada. 2017. "Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action". [<https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html>]. Accessed 18 August 2020.
- [5] VisitDoctor.ca. 2016. "Can I Find Antibiotics Without Prescription in Ontario?". [<https://www.visitdoctor.ca/article/antibiotics-without-prescription-ontario>]. Accessed 18 August 2020.
- [6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.1.2b

Is there national legislation or regulation in place requiring prescriptions for antibiotic use for animals?

Yes = 2 , Yes, but there is evidence of gaps in enforcement = 1 , No = 0

Current Year Score: 2

Canada has national legislation and regulations in place requiring prescriptions for "medically important antimicrobials" use for animals. Beginning December 1, 2018 all medically important antimicrobials (MIAs) require a veterinarian's prescription for use in animals. [1] The definition of MIAs includes "antibacterial drug products", as well as antifungal and antiviral drugs. [2] The Prescription Drug List of Products for Veterinary Use was updated in 2018 to require prescriptions for all MIA use in animals. [3] Previously, only MIAs approved after 2004 required prescriptions for veterinary use. [1] Canada's 2017 Pan-Canadian Framework for Action on Antimicrobial Resistance (AMR) had listed changing these regulations to require veterinary prescriptions for antibiotic use in animals a priority in the country's AMR strategy. [4] According to the World Organization for Animal Health's (OIE's) 2017 PVS Evaluation of Canada, a "valid veterinarian-client-patient-relationship" must exist before a veterinarian can "prescribe or dispense a prescription drug for animals". [5] There is no evidence of gaps in enforcement of regulations requiring prescription for antibiotic use for animals. Canada's Joint External Evaluation (JEE) report, published in 2019, confirms that "from December 2018, all medically-important antimicrobials for veterinary use require a prescription". [6]

- [1] Health Canada. 2018. "Responsible use of Medically Important Antimicrobials in Animals". [<https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance/animals/actions/responsible-use-antimicrobials.html>]. Accessed 18 August 2020.
- [2] Health Canada. 2009. "Categorization of Antimicrobial Drugs Based on Importance in Human Medicine". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/veterinary-drugs/antimicrobial-resistance/categorization-antimicrobial-drugs-based-importance-human-medicine.html>]. Accessed 18 August 2020.
- [3] Health Canada. 2019. "Prescription Drug List". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/prescription-drug-list/list.html>]. Accessed 18 August 2020.
- [4] Government of Canada. 2017. "Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action". [<https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/tackling-antimicrobial-resistance-use-pan-canadian-framework-action.html>]. Accessed 18 August 2020.
- [5] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada". [http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 18 August 2020.
- [6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.2 ZOOBOTIC DISEASE

1.2.1 National planning for zoonotic diseases/pathogens

1.2.1a

Is there national legislation, plans, or equivalent strategy documents on zoonotic disease?

Yes = 1 , No = 0

Current Year Score: 1

There is public evidence to indicate that there exists a regulation that provides guidance on zoonotic diseases. The regulation is called the Health of Animals Regulations, issued under the authority of the Health of Animals Act, which "are intended to protect animals and animal health. They provide for the control of diseases and toxic substances that may affect terrestrial and aquatic animals or that may be transmitted by animals to persons." Though this Act was passed in 1990, a document updated in 2015 suggests that this is still in place. [1] Additionally, Canada has several disease-specific strategy plans in place for zoonotic disease, including Lyme disease, influenza and rabies, both within Canada and across North America. [2,3,4,5,6] Canada's Joint External Evaluation (JEE) report, published in 2019, also mentions that Health Canada, the Public Health Agency of Canada, and the Canadian Food Inspection Agency "have a Memorandum of Understanding for Common Issues Related to Human Health (2008) and also a Letter of Agreement regarding zoonotic surveillance and risk assessment process (2008) which lay down the coordination and information sharing between the sectors in case of outbreaks"; these documents bolster the response capacity for zoonotic diseases. [7] These documents do not appear to be shared online.

[1] Canadian Food Inspection Agency "Frequently Asked Questions: Health Of Animals Regulations - Canadian Food Inspection Agency 2015". [<https://www.inspection.gc.ca/about-cfia/acts-and-regulations/list-of-acts-and-regulations/faq-health-of-animals-regulations/eng/1426694335122/1426694360491>] Accessed 18 August 2020.

[2] Government of Canada. May 2017. "Lyme Disease in Canada: A federal framework." [<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/lyme-disease-canada-federal-framework/lyme-disease-canada-federal-framework-eng.pdf>]. Accessed 18 August 2020.

[3] Public Safety Canada. April 2012. "North America Plan for Animal and Pandemic Influenza." [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/nml-pndmc-nflnz/index-en.aspx>]. Accessed 18 August 2020.

[4] Government of Canada. December 2015. "Surveillance annex: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector." [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/surveillance-annex.html#a43>]. Accessed 18 August 2020.

[5] Government of Canada. October 2006. "Human health issues related to avian influenza in Canada." [<https://www.canada.ca/en/public-health/services/reports-publications/human-health-issues-related-avian-influenza.html>]. Accessed 18 August 2020.

[6] United States Department of Agriculture, Animal and Plant Health Inspection Service. 2008. "North American Rabies Management Plan: A Partnership for Effective Management." [[https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20\(ENGLISH\).pdf](https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20(ENGLISH).pdf)]. Accessed 18 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.2.1b

Is there national legislation, plans or equivalent strategy document(s) which includes measures for risk identification and reduction for zoonotic disease spillover events from animals to humans?

Yes = 1, No = 0

Current Year Score: 0

There is insufficient evidence that Canada has national plans and strategy documents which include measures for risk identification and reduction for zoonotic disease spillover events from animals to humans. There are several plans on wildlife and animal surveillance related to zoonotic diseases that describe how Canada will address such risks, but there is no plan, guidance, or law mandating the risk assessments themselves. Plans that describe responses to zoonotic disease spillover risk include "Lyme Disease in Canada: A Federal Framework" (2017), "North America Plan for Animal and Pandemic Influenza" (2012), "Human health issues related to avian influenza in Canada" (2006), "Notifiable Avian Influenza Hazard Specific Plan" (2013), and "North American Rabies Management Plan: A Partnership for Effective Management" (2008). [1,2,3,4,5] In the case of the Lyme disease framework, as an example, the Public Health Agency of Canada conducts surveillance of Lyme disease incidence and risk; the Canadian Institutes of Health Research leads research on the microbiology of the bacterium that causes Lyme disease, while Health Canada supports the delivery of primary care in response to and in prevention of Lyme disease. [1] In another example, the "North America Plan for Animal and Pandemic Influenza", which covers Canada, Mexico, and the United States, lists the agencies responsible for actions in response to influenza outbreaks. This multi-country plan focuses more on defining lines of responsibility in response to influenza outbreaks (including animal influenza which poses a risk of spillover). [2] Canada's "Notifiable Avian Influenza Hazard Specific Plan" is more specific about actions that have been taken or will be taken in response to avian influenza. For example, if Highly Pathogenic Notifiable Avian Influenza (HPNAI) is detected in commercial poultry, the CFIA is required to set up an "infected zone" of effective quarantine, and destroy all the poultry and poultry products within the zone. Similar measures are prescribed for non-commercial poultry and wild birds. [4] Canada's Joint External Evaluation (JEE) report, published in 2019, also mentions that Health Canada, the Public Health Agency of Canada, and the Canadian Food Inspection Agency "have a Memorandum of Understanding for Common Issues Related to Human Health (2008) and also a Letter of Agreement regarding zoonotic surveillance and risk assessment process (2008) which lay down the coordination and information sharing between the sectors in case of outbreaks"; these documents bolster the response capacity for zoonotic diseases. [6] These documents do not appear to be shared online. However, the JEE does not mention the existence of mandated risk assessment for zoonotic disease spillover. A 2016 report from the Public Health Agency of Canada, "Audit of the Management of Non-Enteric Zoonotic Infectious Disease Activities at the Public Health Agency of Canada", also mentions that "Risk modelling and risk assessments are conducted at the [National Medical Laboratory] ... as part of the population health assessments and economic analyses of particular diseases, to better understand and reduce public health risks", including the risk of emerging diseases migrating to northern Canada "due to climate change or from animals to humans". [7]

[1] Government of Canada. May 2017. "Lyme Disease in Canada: A federal framework."

[<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/lyme-disease-canada-federal-framework/lyme-disease-canada-federal-framework-eng.pdf>]. Accessed 18 August 2020.

[2] Public Safety Canada. April 2012. "North America Plan for Animal and Pandemic Influenza."

[<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/nml-pndmc-nflnz/index-en.aspx>]. Accessed 18 August 2020.

[3] Government of Canada. October 2006. "Human health issues related to avian influenza in Canada."

[<https://www.canada.ca/en/public-health/services/reports-publications/human-health-issues-related-avian-influenza.html>]. Accessed 18 August 2020.

[4] Government of Canada. 2013. "Notifiable Avian Influenza Hazard Specific Plan". [<https://www.inspection.gc.ca/animal-health/terrestrial-animals/diseases/reportable/ai/hazard-specific-plan/eng/1374504359532/1374504482294>]. Accessed 10 September 2020.

- [5] United States Department of Agriculture, Animal and Plant Health Inspection Service. 2008. "North American Rabies Management Plan: A Partnership for Effective Management."
[[https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20\(ENGLISH\).pdf](https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20(ENGLISH).pdf)]. Accessed 18 August 2020.
- [6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".
[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.
- [7] Public Health Agency of Canada. 2016. "Audit of the Management of Non-Enteric Zoonotic Infectious Disease Activities at the Public Health Agency of Canada".

1.2.1c

Is there national legislation, plans, or guidelines that account for the surveillance and control of multiple zoonotic pathogens of public health concern?

Yes = 1, No = 0

Current Year Score: 1

There is evidence that Canada has national plans, guidelines, or laws that account for the surveillance of multiple zoonotic pathogens of public health concern. There is evidence of surveillance and control guidelines for at least three zoonoses: foot-and-mouth disease; bovine spongiform encephalopathy; and Newcastle disease. [1,2,3] For example, the foot-and-mouth guidelines describe the , and the way that control should be exercised on wildlife and other vectors, how to set up a control zone, and how to coordinate with "the nearest Canadian Animal Health Surveillance Network (CAHSN) laboratory" for testing samples. There is also evidence of surveillance for Lyme disease, West Nile virus, pandemic influenza (for both animals and humans) and other zoonotic diseases, but of these, only public evidence of control measures for influenza and rabies. The Public Health Agency of Canada's (PHAC) Office of Audit and Evaluation's 2016 "Audit of the Management of Non-Enteric Zoonotic Infectious Disease Activities at the Public Health Agency of Canada" noted that PHAC conducts active surveillance of two zoonotic diseases: Lyme disease and West Nile virus. [4] PHAC's website contains pages with information about surveillance of both diseases, but no information regarding control activities, other than general prevention guidelines for individuals. [5, 6] In terms of surveillance, PHAC carries out active human surveillance on Lyme disease and West Nile virus, including reporting from provincial and territorial health authorities as well as wildlife surveillance for both diseases. [7, 8] PHAC also carries out surveillance of other zoonoses via mandatory disease notifications from public health professionals. Notifiable zoonoses include: Anthrax, Brucellosis, Malaria, Plague, Rabies, Tularemia, and Yellow Fever. There is no public evidence of control activities for these zoonoses. [9] In the animal health sector, the Community for Emerging and Zoonotic Diseases (CEZD) at the Canadian Animal Health Surveillance System publishes a weekly "Intelligence Report" on emerging and zoonotic diseases affecting animal populations that could affect Canada's industry and population, including reports of domestic and international outbreaks. [10] Canada has several disease-specific strategy plans in place for zoonotic disease, including Lyme disease, influenza and rabies, both within Canada and across North America. [11,12,13,14,15] However, only the rabies plan and influenza plan include measures on control; the rabies plan, for example discusses vaccination of domesticated and wildlife animals, and the pandemic influenza plan mentions the sharing of personnel and medical countermeasures to support response. [11,12,15]. The OIE's 2017 PVS Evaluation of Canada mentioned that the Canadian Rabies Management Plan was being updated by the PHAC, the Canadian Food Inspection Agency (CFIA) and the province of Ontario, but the plan does not appear to be publicly available. [16,17,18,19] The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and the Canadian Food Inspection Agency (CFIA) do not contain additional information regarding national plans, guidelines, or laws that account for the surveillance and control of multiple zoonotic pathogens of public health concern. [16,17,18] Canada's Joint External Evaluation (JEE) report, published in 2019, also mentions that Health Canada, the Public Health Agency of Canada, and the Canadian Food Inspection Agency "have a Memorandum of Understanding for Common Issues Related to Human Health (2008) and also a Letter of Agreement

regarding zoonotic surveillance and risk assessment process (2008) which lay down the coordination and information sharing between the sectors in case of outbreaks"; these documents bolster the response capacity for zoonotic diseases. [20] These documents do not appear to be shared online.

- [1] Government of Canada. 2013. "Foot-and-Mouth Disease Hazard Specific Plan". [<https://www.inspection.gc.ca/animal-health/terrestrial-animals/diseases/reportable/foot-and-mouth-disease/plan/eng/1332174353793/1332174430101>]. Accessed 12 March 2021.
- [2] Government of Canada. 2016. "Bovine Spongiform Encephalopathy (BSE)". [<https://www.inspection.gc.ca/animal-health/terrestrial-animals/diseases/reportable/bse/eng/1323991831668/1323991912972>]. Accessed 12 March 2021.
- [3] Government of Canada. 2014. "Authorities and Principles of Control". [<https://www.inspection.gc.ca/animal-health/terrestrial-animals/diseases/reportable/nd/hazard-specific-plan/authorities-and-principles-of-control/eng/1392662413409/1392662451620#a34>]. Accessed 12 March 2021.
- [4] Public Health Agency of Canada. 2016. "Audit of the Management of Non-Enteric Zoonotic Infectious Disease Activities at the Public Health Agency of Canada". [<https://www.canada.ca/en/public-health/corporate/mandate/about-agency/audit-services-division/reports/2016/audit-management-non-enteric-zoonotic-infectious-disease-activities-public-health-agency-canada.html>]. Accessed 18 August 2020.
- [5] Public Health Agency of Canada. 2019. "West Nile virus". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus.html>]. Accessed 18 August 2020.
- [6] Public Health Agency of Canada. 2019. "Lyme Disease". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html>]. Accessed 18 August 2020.
- [7] Public Health Agency of Canada. 2019. "Human surveillance". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus.html>]. Accessed 18 August 2020.
- [8] Public Health Agency of Canada. 2019. "Canada's surveillance of Lyme disease". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease/surveillance-lyme-disease.html>]. Accessed 18 August 2020.
- [9] Public Health Agency of Canada. 2019. "ARCHIVED - Case Definitions for Communicable Diseases under National Surveillance - 2009". [<https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2009-35/definitions-communicable-diseases-national-surveillance.html>]. Accessed 18 August 2020.
- [10] Canadian Animal Health Surveillance System. 2019. "Community for Emerging and Zoonotic Diseases". [<https://www.cahss.ca/groups/CEZD/>]. Accessed 18 August 2020.
- [11] Government of Canada. May 2017. "Lyme Disease in Canada: A federal framework." [<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/lyme-disease-canada-federal-framework/lyme-disease-canada-federal-framework-eng.pdf>]. Accessed 18 August 2020.
- [12] Public Safety Canada. April 2012. "North America Plan for Animal and Pandemic Influenza." [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/nml-pndmc-nflnz/index-en.aspx>]. Accessed 18 August 2020.
- [13] Government of Canada. December 2015. "Surveillance annex: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector." [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/surveillance-annex.html#a43>]. Accessed 18 August 2020.
- [14] Government of Canada. October 2006. "Human health issues related to avian influenza in Canada." [<https://www.canada.ca/en/public-health/services/reports-publications/human-health-issues-related-avian-influenza.html>]. Accessed 18 August 2020.
- [15] United States Department of Agriculture, Animal and Plant Health Inspection Service. 2008. "North American Rabies Management Plan: A Partnership for Effective Management." [[https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20\(ENGLISH\).pdf](https://www.aphis.usda.gov/wildlife_damage/oral_rabies/downloads/Final%20NARMP%209-30-2008%20(ENGLISH).pdf)]. Accessed 18 August 2020.
- [16] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 18 August 2020.

- [17] Agriculture and Agri-Food Canada. 2019. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 18 August 2020.
- [18] Canadian Food Inspection Agency. 2019. "Canadian Food Inspection Agency". [<http://inspection.canada.ca/eng/1297964599443/1297965645317>]. Accessed 18 August 2020.
- [19] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada". [http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 18 August 2020.
- [20] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.2.1d

Is there a department, agency, or similar unit dedicated to zoonotic disease that functions across ministries?

Yes = 1, No = 0

Current Year Score: 0

There is no publicly available evidence that Canada has a department, agency or similar unit dedicated to zoonotic disease that functions across ministries. The Public Health Agency of Canada (PHAC) houses the Infectious Disease Prevention and Control Branch (IDPCB), which supervises the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases which deals with the human health aspect of zoonotic diseases. The Centre's activities include "collecting, analysing and sharing information on known or newly emerging" zoonotic diseases and promoting the One Health approach. [1] The IDPCB also supervises the National Microbiology Laboratory (NML), which is Canada's reference laboratory. [2] Inside the NML, the division of Zoonotic Diseases and Special Pathogens provides tracking, diagnosis, control and treatment of zoonotic diseases, including Zika virus, rabies and Lyme disease. [3] In the animal health sector, the Canadian Food Inspection Agency (CFIA) collaborates with "industry, consumers, and federal, provincial and municipal organizations, continues to work towards protecting Canadians from preventable health risks related to food and zoonotic diseases". [4] The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and the Canadian Food Inspection Agency (CFIA) do not contain additional information regarding a department, agency or similar unit dedicated to zoonotic disease that functions across ministries. [5, 6, 7] Canada's Joint External Evaluation (JEE) report, published in 2019, does not mention the existence of a single agency dedicated to zoonotic disease, though it assigns Canada a score of 5 (the highest) for the indicator "Mechanisms for responding to infectious and potential zoonotic diseases established and functional". It also notes that the "Canadian Animal Health Surveillance System (CAHSS) is an independent "network of networks" to which different stakeholders contribute voluntarily, including the livestock industry". However, this CAHSS is not a single unit that functions across ministries. [8]

[1] Public Health Agency of Canada. 2019. "Centre for Food-borne, Environmental and Zoonotic Infectious Diseases". [<https://www.canada.ca/en/public-health/services/infectious-diseases/centre-food-borne-environmental-zoonotic-infectious-diseases.html>]. Accessed 18 August 2020.

[2] Public Health Agency of Canada. 2016. "Audit of the Management of Non-Enteric Zoonotic Infectious Disease Activities at the Public Health Agency of Canada". [<https://www.canada.ca/en/public-health/corporate/mandate/about-agency/audit-services-division/reports/2016/audit-management-non-enteric-zoonotic-infectious-disease-activities-public-health-agency-canada.html>]. Accessed 18 August 2020.

[3] Public Health Agency of Canada. 2019. "National Microbiology Laboratory". [<https://www.canada.ca/en/public-health/programs/national-microbiology-laboratory.html#networks>]. Accessed 18 August 2020.

[4] Canadian Food Inspection Agency. 2019. "Mandate". [<https://www.inspection.gc.ca/about-cfia/organizational-structure/mandate/eng/1299780188624/1319164463699>]. Accessed 18 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 18 August 2020.

[6] Agriculture and Agri-Food Canada. 2019. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 18 August 2020.

[7] Canadian Food Inspection Agency. 2019. "Canadian Food Inspection Agency". [<http://inspection.canada.ca/eng/1297964599443/1297965645317>]. Accessed 18 August 2020.

[8] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.2.2 Surveillance systems for zoonotic diseases/pathogens

1.2.2a

Does the country have a national mechanism (either voluntary or mandatory) for owners of livestock to conduct and report on disease surveillance to a central government agency?

Yes = 1 , No = 0

Current Year Score: 1

Canada has a mandatory national mechanism for owners of livestock to conduct and report on disease surveillance to a central government agency. According to the Canadian Food Inspection Agency (CFIA), all "animal owners, veterinarians and laboratories are required to immediately report the presence of an animal that is contaminated or suspected of being contaminated" with a reportable disease to a CFIA district veterinarian. [1] The reportable disease list includes anthrax, brucellosis, rabies and other zoonoses. [2] CFIA's website does not list an online reporting mechanism or a national hotline, but does list area offices and contact information in a link from the area where it states that individuals must notify CFIA or reportable diseases. [3] The CFIA's 2017 Plant and Animal Health Strategy for Canada includes action 3.5.2, which states that the agency will "develop a protocol to guide the reporting process, which includes minimum standards for reporting timelines as well as considerations for ensuring that data/information is reported in a manner that respects confidentiality". [4] The 2018-2019 Annual Report of the Canadian Animal Health Surveillance System (CAHSS) indicates that reporting of diseases may be possible through the CAHSS website. However, it is not clear that there is a designated disease reporting portal on the website that is different from the general contact form. [5,6] Canada's Joint External Evaluation (JEE) report, published in 2019, describes the CAHSS as "an independent 'network of networks' to which different stakeholders contribute voluntarily, including the livestock industry", but does not describe how it may function for disease reporting from livestock owners. [7]

[1] Canadian Food Inspection Agency. 2019. "Terrestrial Animal Diseases". [<http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/eng/1300388388234/1300388449143>]. Accessed 18 August 2020.

[2] Canadian Food Inspection Agency. 2019. "Reportable Diseases". [<http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/eng/1303768471142/1303768544412>]. Accessed 18 August 2020.

[3] Canadian Food Inspection Agency. 2019. "Animal Health Offices". [<http://inspection.canada.ca/animals/terrestrial-animals/offices/eng/1300462382369/1300462438912>]. Accessed 18 August 2020.

[4] Canadian Food Inspection Agency. 2017. "A Plant and Animal Health Strategy for Canada". [<http://www.inspection.gc.ca/about-the-cfia/accountability/partnerships-pahs/draft-for-consultation-purposes/eng/1490390513931/1490390586446?chap=0>]. Accessed 18 August 2020.

[5] Canadian Animal Health Surveillance System. April 2019. "Annual Report 2018-2019". [https://www.cahss.ca/media/uploads/documents-public-page-links/documents/19-05-21_15-19/NFAHWC_CAHSS_12.05.2019-e_A_9r16fCs.pdf]. Accessed 18 August 2020.

[6] Canadian Animal Health Surveillance System. [<https://www.cahss.ca/>]. Accessed 18 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.2.2b

Is there legislation and/or regulations that safeguard the confidentiality of information generated through surveillance activities for animals (for owners)?

Yes = 1 , No = 0

Current Year Score: 1

Canada has guidelines that safeguard the confidentiality of information generated through surveillance activities for animals (for owners). The Canadian Food Inspection Agency's (CFIA) 2017 Plant and Animal Health Strategy for Canada lists considerations for the reporting system, including the mandate that "confidentiality must be respected" and that "appropriate levels of access to the information are provided" within the reporting system. [1] In addition, the Strategy includes action 3.5.2, which states the agency will "develop a protocol to guide the reporting process, which includes minimum standards for reporting timelines as well as considerations for ensuring that data/information is reported in a manner that respects confidentiality". The Strategy was endorsed by "federal, provincial, and territorial ministers of agriculture at their annual conference in July 2017". [1] Activity 3.1.9 also tasks the CFIA with conducting a privacy impact assessment once data has been collected via the reporting system. The Strategy does not describe what the assessment entails. [1] The World Organisation for Animal Health (OIE) 2017 PVS Evaluation of Canada does not contain additional information regarding confidentiality of information generated through surveillance activities for animals (for owners). [2]

[1] Canadian Food Inspection Agency. 2017. "A Plant and Animal Health Strategy for Canada".

[<http://www.inspection.gc.ca/about-the-cfia/accountability/partnerships-pahs/draft-for-consultation-purposes/eng/1490390513931/1490390586446?chap=0>]. Accessed 18 August 2020.

[2] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada".

[http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 18 August 2020.

1.2.2c

Does the country conduct surveillance of zoonotic disease in wildlife (e.g., wild animals, insects, other disease vectors)?

Yes = 1 , No = 0

Current Year Score: 1

Canada conducts surveillance of zoonotic disease in wildlife. The Public Health Agency of Canada (PHAC) coordinates surveillance of mosquitos, birds, and horses for West Nile virus. The Canadian Wildlife Health Cooperative tests dead birds for the virus and veterinary laboratories must report cases or suspicion of West Nile virus to the Canadian Food Inspection Agency (CFIA). [1] PHAC also conducts wildlife surveillance for Lyme disease via passive tick surveillance (via voluntary submission from individuals, doctors and veterinarians) and active tick surveillance (collected from the field). [2] Canada's Joint External Evaluation (JEE) report, published in 2019, says that zoonotic disease surveillance is supported by the Canadian Animal Health Surveillance System (CAHSS), adding that "within CAHSS, unique and specific expertise on wildlife health is brought together on the virtual Canadian Wildlife Health Cooperative (CWHC) platform". [3,4]

- [1] Public Health Agency of Canada. 2019. "West Nile virus surveillance". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus.html>]. Accessed 18 August 2020.
- [2] Public Health Agency of Canada. 2019. "Canada's surveillance of Lyme disease". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease/surveillance-lyme-disease.html>]. Accessed 18 August 2020.
- [3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.
- [4] Canadian Wildlife Health Cooperative. [<http://www.cwhc-rcsf.ca/>]. Accessed 30 August 2020.

1.2.3 International reporting of animal disease outbreaks

1.2.3a

Has the country submitted a report to OIE on the incidence of human cases of zoonotic disease for the last calendar year?

Yes = 1 , No = 0

Current Year Score: 0

2019

OIE WAHIS database

1.2.4 Animal health workforce

1.2.4a

Number of veterinarians per 100,000 people

Input number

Current Year Score: 38.95

2018

OIE WAHIS database

1.2.4b

Number of veterinary para-professionals per 100,000 people

Input number

Current Year Score: 37.24

2018

OIE WAHIS database

1.2.5 Private sector and zoonotic

1.2.5a

Does the national plan on zoonotic disease or other legislation, regulations, or plans include mechanisms for working with the private sector in controlling or responding to zoonoses?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence that Canada has national plans, guidelines, or laws that account for the surveillance and control of zoonotic disease and which include mechanisms for working with the private sector. There is some public evidence of mechanisms for working with the private sector in controlling or responding to zoonoses, but these are not published in publicly available plans, legislation or regulations. The Canadian Food Inspection Agency's (CFIA) 2017 Plant and Animal Health Strategy for Canada discusses working with the private sector for animal health, but does not specifically focus on zoonoses. [1] The World Organisation for Animal Health (OIE) 2017 PVS Evaluation of Canada states that the private sector Canadian Veterinary Medicine Association (CVMA) has established the Canadian Veterinarian reserve to help the government respond to outbreaks of foreign animal diseases in Canada, but this program does not specifically focus on zoonoses. [2] In addition, the evaluation notes that in the province of Ontario the poultry industry has collaborated with the federal and provincial governments to control outbreaks of low-pathogenic avian influenza. [2] The Public Health Agency of Canada's (PHAC) website contains pages with information on West Nile virus and Lyme Disease, but these do not include specific mechanisms for engaging with the private sector for controlling and responding to zoonotic disease. [3, 4]. The websites of the Public Health Agency of Canada, Canadian Institutes of Health Research (CIHR), Agriculture and Agri-Food Canada, and the Canadian Food Inspection Agency (CFIA) do not contain additional information regarding mechanisms for working with the private sector in controlling or responding to zoonoses. [5, 6, 7, 8] The Canadian Public Health Laboratory Network (CPHLN) does not have a website. [5] Canada's Joint External Evaluation (JEE) report, published in 2019, does not describe any mechanisms for coordinating with the private sector specifically in response to zoonoses. [9]

[1] Canadian Food Inspection Agency. 2017. "A Plant and Animal Health Strategy for Canada".

[<http://www.inspection.gc.ca/about-the-cfia/accountability/partnerships-pahs/draft-for-consultation-purposes/eng/1490390513931/1490390586446?chap=0>]. Accessed 19 August 2020.

[2] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada".

[http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 19 August 2020.

[3] Public Health Agency of Canada. 2019. "West Nile virus". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus.html>]. Accessed 19 August 2020.

[4] Public Health Agency of Canada. 2019. "Lyme Disease". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html>]. Accessed 19 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 19 August 2020.

[6] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 19 August 2020.

[7] Agriculture and Agri-Food Canada. 2019. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 19 August 2020.

[8] Canadian Food Inspection Agency. 2019. "Canadian Food Inspection Agency".

[<http://inspection.canada.ca/eng/1297964599443/1297965645317>]. Accessed 19 August 2020.

[9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62->

eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 21 August 2020.

1.3 BIOSECURITY

1.3.1 Whole-of- government biosecurity systems

1.3.1a

Does the country have in place a record, updated within the past five years, of the facilities in which especially dangerous pathogens and toxins are stored or processed, including details on inventories and inventory management systems of those facilities?

Yes = 1 , No = 0

Current Year Score: 1

Canada has a record, updated within the past 5 years, of the facilities in which especially dangerous pathogens and toxins are stored or processed, including details on inventories and inventory management systems of those facilities. Under the Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR), all laboratories carrying out activities with especially dangerous pathogens and toxins are required to be licensed by the Public Health Agency of Canada (PHAC). [1, 2] Through this licensing procedure, Canada has a record of facilities that handle pathogens and toxins. Canada reports that there are approximately 8,500 laboratories in the country subject to HPTA controls. Researchers must track their inventories of pathogens and toxins using transfer reporting forms. [3] Licenses are valid for a maximum of five years, depending on the type of pathogens and/or toxins handled. Licenses are issued on the condition of PHAC's approval of a risk management plan that outlines how the licensee will manage and control biosafety and biosecurity risks, including inventory control. [2] In addition, in 2020 Canada reported on two government facilities that handle dangerous pathogens and toxins as part of its Confidence Building Measures under the Biological Weapons Convention. The public report includes information about the facilities as well as the pathogens and toxins they handle. [4] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide specific information about such a record of facilities, but assigns a score of 5 (the highest) to the indicator "whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities". Further, the JEE notes that "the government maintains an inventory of dangerous pathogens and toxins held in licensed facilities" implying that a record of the facilities also exists. [5]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Government of Canada. 2016. "BWC IMPLEMENTATION REVIEW INITIATIVE: REPORT BY CANADA ON THE VISIT TO OTTAWA". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 19 August 2020.

[4] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.3.1b

Does the country have in place legislation and/or regulations related to biosecurity which address requirements such as physical containment, operation practices, failure reporting systems, and/or cybersecurity of facilities in which especially dangerous pathogens and toxins are stored or processed?

Yes = 1 , No = 0

Current Year Score: 1

Canada has legislation and regulations related to biosecurity which address requirements such as physical containment, operation practices, failure reporting systems and cybersecurity of facilities in which especially dangerous pathogens and toxins are stored or processed. Canada's Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR) require all laboratories carrying out activities with especially dangerous pathogens and toxins to be licensed by the Public Health Agency of Canada (PHAC). Licenses are issued on the condition of PHAC's approval of a risk management plan that outlines how the licensee will manage and control biosafety and biosecurity risks. [1, 2] This requirement is operationalized through a Comprehensive Biosecurity Plan that each institution must develop. [3] The Plan must address physical security, including physical barriers, graded protection, access control and detection of unauthorized access; personnel suitability and reliability, including screening, assessment and security clearances; inventory control, including accountability and security during transportation; incident and emergency response, including reporting, response planning and investigation; information management and security, including information assets, classifying information and information security practices; and implementation, evaluation and improvement of the Biosecurity Plan. [3] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide additional relevant information about legislation and regulations (though it does list the HPTA as being relevant), but assigns a score of 5 (the highest) to the indicator "whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities". [4] Canada's 2020 Confidence Building Measures (CBM) report under the Biological Weapons Convention describes the government's Canadian Safety and Security Program (CSSP), which develops critical infrastructure protection, cybersecurity, and other security measures with various laboratories and agencies in Canada (such as the PHAC and the Canadian Food Inspection Agency). The CBM report lists the projects with which the CSSP collaborates in its "biological portfolio", but does not list specific security measures at individual facilities. The CBM report also describes the containment capacities of Canada's two Biosafety Level 4 laboratories, National Microbiology Laboratory and the National Foreign Disease Centre. [5]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Public Health Agency of Canada. 2019. "Developing a Comprehensive Biosecurity Plan". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/guidance/developing-comprehensive-biosecurity-plan-overview.html>]. Accessed 19 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.3.1c

Is there an established agency (or agencies) responsible for the enforcement of biosecurity legislation and regulations?

Yes = 1 , No = 0

Current Year Score: 1

The Public Health Agency of Canada (PHAC) or the Canadian Food Inspection Agency (CFIA) regulates and enforces biosecurity for pathogens and toxins depending on whether the pathogens and toxins are considered human (PHAC's responsibility) or animal (CFIA's responsibility) according to the Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR) as well as the Health of Animals Act (HAA) and Regulations (HAR). [1, 2, 3] PHAC is responsible for licensing laboratories that deal with pathogens and toxins. [3] PHAC's Centre for Biosecurity "administers and enforces the HPTA, HPTR and compliance to certain provisions of the HAA and HAR". [4] The HPTA provides the legal basis for the Minister of Health to delegate supervision of the application of biosecurity and biosafety regulations and laws to the PHAC. Inspectors have full power to examine the facilities and items subject to licensing, and licensees are obligated to provide the inspector with any information needed to carry out the inspection. [1] The CFIA develops and enforces national biosecurity standards for the food and agriculture industry. CFIA's website contains biosecurity standards for avian farms, the bee industry, beef cattle farms, cervid industry, dairy farms, equine industry, goat industry, mink industry, sheep industry, and for transporting livestock, poultry and deadstock. [5] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the role of the PHAC, specifically noting that the PHAC's Health Security Infrastructure Branch is "the national authority on biosafety and biosecurity for human pathogens and toxins and is responsible for their regulation. This agency has been designated as a WHO Collaborating Centre for Biosafety and Biosecurity (WHO CC CAN-92)". The Centre for Biosecurity is, in turn, housed within the Health Security Infrastructure Branch of the PHAC. [6] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not specifically discuss enforcement of biosecurity legislation and regulations. [7] The Health Security Infrastructure Branch does not have its own website.

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Public Health Agency of Canada. 2019. "Developing a Comprehensive Biosecurity Plan". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/guidance/developing-comprehensive-biosecurity-plan-overview.html>]. Accessed 19 August 2020.

[4] Public Health Agency of Canada. 2018. "Policy on Compliance Monitoring, Verification and Regulatory Risk-Based Activities". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/compliance-enforcement/centre-biosecurity-compliance-enforcement-policy/policy-compliance-monitoring-verification-regulatory-activities-based-risk.html>]. Accessed 19 August 2020.

[5] Canadian Food Inspection Agency. 2018. "National Biosecurity Standards and Biosecurity Principles". [<http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/eng/1344707905203/1344707981478>]. Accessed 19 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[7] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.3.1d

Is there public evidence that shows that the country has taken action to consolidate its inventories of especially dangerous pathogens and toxins into a minimum number of facilities?

Yes = 1 , No = 0

Current Year Score: 1

There is some public evidence that shows that Canada has taken action to consolidate its inventories of especially dangerous pathogens and toxins into a minimum number of facilities. There is evidence that Canada limits the number of facilities which can house especially dangerous pathogens. Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention notes that there are two facilities, the National Microbiology Laboratory (NML) and the National Centre for Foreign Animal Disease, that house especially dangerous pathogens and toxins. In addition, the government reported on two defence facilities engaged in biological defence programs that work with especially dangerous pathogens and toxins, the Suffield Research Centre and the Valcartier Research Centre. [1] In addition, private laboratories can be licensed to work with pathogens and toxins. These facilities must develop a Comprehensive Biosecurity Plan to be reviewed by the Public Health Agency of Canada (PHAC) as part of the licensing process. [2, 3, 4] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide specific information about such a record of facilities, but assigns a score of 5 (the highest) to the indicator "whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities". Further, the JEE notes that "the government maintains an inventory of dangerous pathogens and toxins held in licensed facilities". However, the JEE does not mention that inventories have been consolidated.[5] There is no evidence of relevant media reports or academic studies. The VERTIC (Verification Research Training and Information Centre) Biological Weapons Convention Legislation Database does not list any legislation that deals with the consolidation of such inventories; it lists the Human Pathogens and Toxins Act of 2009, which regulates facilities that deal with dangerous pathogens, but this legislation does not mention the consolidation of inventories. [6,7]

[1] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Public Health Agency of Canada. 2019. "Developing a Comprehensive Biosecurity Plan". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/guidance/developing-comprehensive-biosecurity-plan-overview.html>]. Accessed 19 August 2020.

[4] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[6] VERTIC(Verification Research Training and Information Centre) Biological Weapons Convention Legislation Database. 2020. "C". [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/c/>]. Accessed 10 September 2020.

[7] Government of Canada. 2009. "Human Pathogens and Toxins Act, S.C. 2009, c. 24". [https://www.vertic.org/media/National%20Legislation/Canada/CA_Human_Pathogens_Act.pdf]. Accessed 10 September 2020.

1.3.1e

Is there public evidence of in-country capacity to conduct Polymerase Chain Reaction (PCR)–based diagnostic testing for anthrax and/or Ebola, which would preclude culturing a live pathogen?

Yes = 1 , No = 0

Current Year Score: 1

Canada's National Microbiology Laboratory (NML) has the capacity to conduct Polymerase Chain Reaction (PCR)-based diagnostic testing for anthrax and Ebola, which would preclude culturing a live pathogen. The NML's Bacterial Pathogens Division can perform PCR-based diagnostics to identify anthrax. The turnaround time for a test is four calendar days for a preliminary result, 14 days for a final result and 28 days for any non-standard specimen type or special testing requests. [1] NML's Zoonotics and Special Pathogens Division can perform PCR-based diagnostics to identify Ebola. The turnaround time for the test is two calendar days. [2] Canada's Joint External Evaluation (JEE) report, published in 2019, does not discuss PCR or Ebola testing capacities. [3]

[1] Government of Canada. 2020. "Molecular Detection of Bacillus anthracis". [<https://cnphi.canada.ca/gts/reference-diagnostic-test/4195?labId=1024>]. Accessed 19 August 2020.

[2] Government of Canada. 2020. "Molecular Detection of Ebola virus". [<https://cnphi.canada.ca/gts/reference-diagnostic-test/4515?labId=1021>]. Accessed 19 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

1.3.2 Biosecurity training and practices

1.3.2a

Does the country require biosecurity training, using a standardized, required approach, such as through a common curriculum or a train-the-trainer program, for personnel working in facilities housing or working with especially dangerous pathogens, toxins, or biological materials with pandemic potential?

Yes = 1, No = 0

Current Year Score: 1

Canada requires biosecurity training, using a standardized, required approach, through suggested elements to include in a curriculum for personnel working in facilities housing or working with especially dangerous pathogens, toxins, or biological materials with pandemic potential. Canada's Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR) require all laboratories carrying out activities with especially dangerous pathogens and toxins to be licensed by the Public Health Agency of Canada (PHAC). [1, 2] Licenses are issued on the condition of PHAC's approval of a risk management plan that outlines how the licensee will manage and control biosafety and biosecurity risks. [2] This requirement is operationalized through a Comprehensive Biosecurity Plan that each institution must develop. [3] According to the guidance document for creating the Plan, it must address training for individuals authorized to work in containment zones. Training should include "modules on specific security processes and procedures that control access and prevent the loss, theft, or compromise of pathogens, toxins, and other assets". In addition, refresher training should be offered based on a needs assessment. Training should also include "Biosecurity Awareness", which comprises "a clear understanding of roles and responsibilities and establishes clear expectations regarding ways to protect the assets within the facility", "Social engineering" training so personnel can be aware of complex frauds, and "Information Security Awareness" training to provide personnel with in-depth information regarding protecting information assets. [3] Canada's Joint External Evaluation (JEE) report, published in 2019, also notes that the National Microbiological Laboratory "provides mandatory biosafety and biosecurity training or refresher training based on a common curriculum at all its sites", and says that there are "strong training programmes in biosafety and biosecurity programmes at all regulated facilities". [4] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention notes that biological agent training is included in the Defence Research & Development Canada (DRDC) program,

but does not mention requirements for such training. [5]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Public Health Agency of Canada. 2019. "Developing a Comprehensive Biosecurity Plan". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/guidance/developing-comprehensive-biosecurity-plan-overview.html>]. Accessed 19 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.3.3 Personnel vetting: regulating access to sensitive locations

1.3.3a

Do regulations or licensing conditions specify that security and other personnel with access to especially dangerous pathogens, toxins, or biological materials with pandemic potential are subject to the following checks: drug testing, background checks, and psychological or mental fitness checks?

Personnel are subject to all three of these checks = 3, Personnel are subject to two of these checks = 2, Personnel are subject to one of these checks = 1, Personnel are not subject to any of these checks = 0

Current Year Score: 1

Canada's regulations and licensing conditions require that personnel with access to pathogens and toxins possess a security clearance. Canada's Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR) require personnel with access to pathogens and toxins to apply for and receive an HPTA Security Clearance. [1, 2] The HPTA Security Clearance includes the following checks: a criminal background check, a records check with police and intelligence agencies, a security assessment from the Canadian Security Intelligence Services, an Equifax credit check, and a check of the applicant's immigration and citizenship status. [1, 2, 3] In addition, the guidance document for creating a Comprehensive Biosecurity Plan states that facilities may require a check of the applicant's educational background, a reference check, self and peer reporting procedures, and stress assessments, but these checks are suggestions and not required. [4] Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain relevant information. [5] There is no additional relevant legislation listed on the VERTIC (Verification Research Training and Information Centre) Biological Weapons Legislation Database. [6] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not have any additional relevant information. [7]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 19 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 19 August 2020.

[3] Government of Canada. 2016. "BWC Implementation Review Initiative: Report by Canada on the Visit to Ottawa". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 19 August 2020.

- [4] Public Health Agency of Canada. 2019. "Developing a Comprehensive Biosecurity Plan". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/guidance/developing-comprehensive-biosecurity-plan-overview.html>]. Accessed 19 August 2020.
- [5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.
- [6] VERTIC (Verification Research Training and Information Centre) Biological Weapons Convention Legislation Database. 2020. "C". [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/c/>]. Accessed 10 September 2020.
- [7] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.3.4 Transportation security

1.3.4a

Does the country have publicly available information on national regulations on the safe and secure transport of infectious substances (specifically including Categories A and B)?

Yes = 1 , No = 0

Current Year Score: 1

Canada's Transportation of Dangerous Goods Regulations (TDGR), derived from the Transportation of Dangerous Goods Act (TGDA, 1992) require the safe and secure transport of Category A and B infectious substances. Section 2.6 of the TGDR defines infectious substances to include substances in the national designation of Class 6.2 as well as UN Categories A and B. Schedule 1 of the TDGR lists these substances. Category A substances include several highly infectious viruses. Section 5.16 describes the requirements for "Means of Containment" for Category A and B infectious substances. Section 6.1 establishes that personnel involved in the transport of these substances must have received a training certificate. Section 7.1 establishes the requirement for an Emergency Response Assistance Plan (ERAP) that is specific to the substance being transported and ensures the immediate response to "emergency situations involving the dangerous goods". [1] Canada provided more detailed requirements for the shipping of COVID-19 substances in February 2020, in response to the global pandemic. [2] The requirements for shipping infectious substances are also summarized in a separate online bulletin on a government website, "Shipping Infectious Substances". [3] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the importance of the Transportation of Dangerous Goods Act in governing transport, but otherwise does not provide additional relevant information. [4,5] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information. [6]

[1] Government of Canada. 2020. "Transportation of Dangerous Goods Regulations". [<https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/transportation-dangerous-goods-regulations>]. Accessed 20 August 20.

[2] Government of Canada. February 2020. "COVID-19: Requirements for safe transportation of infectious substances (Class 6.2)". [<https://tc.canada.ca/en/dangerous-goods/covid-19-requirements-safe-transportation-infectious-substances-class-62>]. Accessed 20 August 2020.

[3] Government of Canada. 2020. "Shipping Infectious Substances". [<https://tc.canada.ca/en/dangerous-goods/transportation-dangerous-goods/shipping-infectious-substances#packaging>]. Accessed 20 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 1992. "Transportation of Dangerous Goods Act, S.C. 1992, c. 34". [<https://lois-laws.justice.gc.ca/PDF/T-19.01.pdf>]. Accessed 21 August 2020.

[6] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.3.5 Cross-border transfer and end-user screening

1.3.5a

Is there legislation and/or regulations in place to oversee the cross-border transfer and end-user screening of especially dangerous pathogens, toxins, and pathogens with pandemic potential?

Yes = 1, No = 0

Current Year Score: 1

Canada's national regulations oversee the cross-border transfer and end-user screening of especially dangerous pathogens, toxins and pathogens with pandemic potential. According to Canada's reports under the Biological Weapons Convention (BWC), the country maintains "export controls on biological agents, toxins, and dual-use equipment and technology". Canada's export control list matches the Australia Group export control regime and is updated automatically in accordance with updates to the Australia Group's list. Canada's export permit regulations require certification of the end user in order to export materials contained on the list. If the end user cannot be satisfactorily certified, then the permit to export will not be issued. [1] In terms of importation, the Human Pathogens and Toxins Act (HPTA) requires importers to hold and HPTA license, which is the same license required of all facilities that handle pathogens and toxins. End user screening occurs as part of the licensing process. [1, 2, 3] The receiving licensee's designated Biological Safety Officer is responsible for ensuring that the receiving facility has "appropriate physical containment and operational practices in place to conduct activities safely with the incoming human pathogen or toxin". [1] Canada's Joint External Evaluation (JEE) report, published in 2019, also lists the HPTA as core federal public health-related legislation, but does not provide additional relevant information. [4] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information, and simply refers to the BWC Implementation Review Initiative report of 2016, which is cited above. [5]

[1] Government of Canada. 2016. "BWC Implementation Review Initiative: Report by Canada on the Visit to Ottawa". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 20 August 2020.

[2] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 20 August 2020.

[3] Government of Canada. 2019. "Human Pathogens and Toxins Regulations". [<https://laws.justice.gc.ca/eng/regulations/SOR-2015-44/FullText.html>]. Accessed 20 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.4 BIOSAFETY

1.4.1 Whole-of-government biosafety systems

1.4.1a

Does the country have in place national biosafety legislation and/or regulations?

Yes = 1 , No = 0

Current Year Score: 1

Canada's national biosafety regulations are contained in the Canadian Biosafety Standard (CBS) manual, 2nd Edition, last updated in 2015. The CBS establishes "physical containment, operational practice, and performance and verification testing requirements for the safe handling and storing of human and terrestrial animal pathogens and toxins". [1, 2] The Public Health Agency of Canada (PHAC) and the Canadian Food Inspection Agency (CFIA) use the CBS to inspect and verify compliance of facilities with national biosafety standards. [1] The CBS is supported in legislation by the Human Pathogens and Toxins Act (HPTA), the Human Pathogens and Toxins Regulations (HPTR), the Health of Animals Act (HAA), and the Health of Animals Regulations (HAR). [2] Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain additional relevant information. [3] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information, and simply makes reference to the 2016 BWC Implementation Review Initiative report cited above. [4,1]

[1] Government of Canada. 2016. "BWC Implementation Review Initiative: Report by Canada on the Visit to Ottawa". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 20 August 2020.

[2] Government of Canada. 2015. "Canadian Biosafety Standard (CBS) Second Edition". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/second-edition.html>]. Accessed 20 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[4] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.4.1b

Is there an established agency responsible for the enforcement of biosafety legislation and regulations?

Yes = 1 , No = 0

Current Year Score: 1

Canada's national biosafety regulations, the Canadian Biosafety Standard (CBS), 2nd Edition, state that the Public Health Agency of Canada (PHAC) and the Canadian Food Inspection Agency (CFIA) are the regulatory authorities for biosafety and biosecurity (Section 1.2). The PHAC is the national authority for human pathogens and toxins under the authority of the Human Pathogens and Toxins Act (HPTA) and Regulations (HPTR), as well as for "the importation or transfer of pure cultures of terrestrial animal pathogens and toxins, with the exception of non-indigenous animal pathogens and pathogens causing emerging animal disease" as regulated by the Health of Animals Act (HAA) and Regulations (HAR). CFIA is the national authority for "foreign animal diseases and emerging animal diseases". [1] PHAC's Centre for Biosecurity "administers and enforces the HPTA, HPTR, and compliance to certain provisions of the HAA and HAR". The Centre's enforcement policy

specifically includes biosafety. [2] The HPTA provides the legal basis for the Minister of Health to delegate supervision of the application of biosecurity and biosafety regulations and laws to the PHAC. Inspectors have full power to examine the facilities and items subject to licensing and licensees are obligated to provide the inspector with any information needed to carry out the inspection. [3] According to its website, the CFIA coordinates with experts to "establish the biocontainment levels, procedures and protocols that are needed to work safely with animal and zoonotic pathogens, chemical hazards, and plant pests of quarantine significance, and to protect laboratory staff, the Canadian public, and the environment". [4] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the role of the PHAC, specifically noting that the PHAC's Health Security Infrastructure Branch is "the national authority on biosafety and biosecurity for human pathogens and toxins and is responsible for their regulation. This agency has been designated as a WHO Collaborating Centre for Biosafety and Biosecurity (WHO CC CAN-92)". The Centre for Biosecurity is, in turn, housed within the Health Security Infrastructure Branch of the PHAC. [5] The Health Security Infrastructure Branch does not have its own website. Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information, and simply refers to the 2016 BWC Implementation Review Initiative report cited above. [6]

[1] Government of Canada. 2015. "Canadian Biosafety Standard (CBS) Second Edition". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/second-edition.html>]. Accessed 20 August 2020.

[2] Public Health Agency of Canada. 2018. "Policy on Compliance Monitoring, Verification and Regulatory Risk-Based Activities". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/compliance-enforcement/centre-biosecurity-compliance-enforcement-policy/policy-compliance-monitoring-verification-regulatory-activities-based-risk.html>]. Accessed 20 August 2020.

[3] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 20 August 2020.

[4] Canadian Food Inspection Agency. 2016. "Biohazard Containment and Safety". [<http://www.inspection.gc.ca/animals/biohazard-containment-and-safety/eng/1300121579431/1315776600051>]. Accessed 20 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[6] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.4.2 Biosafety training and practices

1.4.2a

Does the country require biosafety training, using a standardized, required approach, such as through a common curriculum or a train-the-trainer program, for personnel working in facilities housing or working with especially dangerous pathogens, toxins, or biological materials with pandemic potential?

Yes = 1, No = 0

Current Year Score: 1

Canada's national biosafety regulations, the Canadian Biosafety Standard (CBS), 2nd Edition, require biosafety training, using a standardised, required approach, through standard elements of curriculum for personnel working in facilities housing or working with especially dangerous pathogens, toxins, or biological materials with pandemic potential. Chapter 4 of the CBS establishes "Operational Practice Requirements" and Section 4.3 outlines the requirements for the biosafety Training Program. The program should include theoretical education and practical training. Required elements include training on the

biosafety manual, standard operating procedures, potential hazards, signs and symptoms of infection from the material personnel work with, understanding of the physical design of the containment zone and containment systems, correct use and operation of laboratory equipment, including primary containment devices, and animal handling and restraint techniques. In addition, personnel must demonstrate their knowledge of standard operating procedures, trainees must be supervised by authorised personnel, and a training needs assessment must be conducted at least once per year. Refresher training on emergency response procedures must also be provided annually. [1] In addition, the Public Health Agency of Canada (PHAC) offers an online course titled "Principles of Laboratory Biosafety e-Learning Course" that is designed to reinforce biosafety and biosecurity principles. [2] Canada's Joint External Evaluation (JEE) report, published in 2019, also notes that the National Microbiological Laboratory "provides mandatory biosafety and biosecurity training or refresher training based on a common curriculum at all its sites", and says that there are "strong training programmes in biosafety and biosecurity programmes at all regulated facilities". [3] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information. [4]

[1] Government of Canada. 2015. "Canadian Biosafety Standard (CBS) Second Edition". [<https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/second-edition.html>]. Accessed 20 August 2020.

[2] Public Health Agency of Canada. 2020. "Principles of Laboratory Biosafety e-Learning Course". [<https://training-formation.phac-aspc.gc.ca/course/index.php?categoryid=2&lang=en>]. Accessed 20 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[4] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.5 DUAL-USE RESEARCH AND CULTURE OF RESPONSIBLE SCIENCE

1.5.1 Oversight of research with especially dangerous pathogens, toxins, pathogens with pandemic potential and/or other dual-use research

1.5.1a

Is there publicly available evidence that the country has conducted an assessment to determine whether ongoing research is occurring on especially dangerous pathogens, toxins, pathogens with pandemic potential and/or other dual-use research?

Yes = 1, No = 0

Current Year Score: 1

There is evidence that Canada has conducted an assessment to determine whether ongoing research is occurring on especially dangerous pathogens, toxins, pathogens with pandemic potential, and other dual use research. As part of the licensing process for facilities working with pathogens and toxins, Section 3 of the Human Pathogens and Toxins Act (HPTA) states that the Minister of Health must "determine that the person has developed a plan that sets out administrative measures for managing and controlling biosafety and biosecurity risks during the period in which the licence is in effect". [1, 2] This requirement has been operationalized at research facilities via the presentation of a "Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting". The Plan is designed to "facilitate the development and support of internal accountability structures" and must "demonstrate how institutions or organizations identify, assess and manage research activities with dual-use potential, including gain-of-function research". Because the Minister of Health and the delegated authority, the Public Health Agency of Canada (PHAC), must review the Plan in order to decide to grant a license, they are assessing the potential for dual use research as part of the license application process. [3] The Plan must include the

following elements: an overview of how research is reviewed based on its potential for dual use during the research lifecycle, an overview of how to assess risk once dual use potential is identified, and a risk assessment for dual use research. [2] At a 2016 implementation review mission under the auspices of the Convention on Biological Weapons, participants noted that an assessment of dual use research potential occurs as part of the HPTA licensing process. [3] The guidelines for the creation of the Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting include a decision tree to assist researchers in identifying dual use potential. [2] Despite the existence of these regulations that effectively control dual use research, there is no publicly available evidence that Canada has conducted an assessment of such research. Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide specific information about such a record of facilities, but assigns a score of 5 (the highest) to the indicator "whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities". Further, the JEE notes that "the government maintains an inventory of dangerous pathogens and toxins held in licensed facilities". However, the JEE does not mention that any relevant assessments of research have taken place. [4] Canada's 2020 Confidence Building Measures (CBM) report under the Biological Weapons Convention reports that there are two laboratories, the National Microbiology Laboratory and the National Centre for Foreign Animal Disease, which are Biosafety Level 4 laboratories; presumably these would be the sole laboratories conducting research on especially dangerous pathogens. However, there is no specific mention in the CBM report of an assessment of such research. The CBM report itself might be considered an assessment of such research, since it lists the pathogens under study at those two laboratories. However, it is not completely clear that this reporting of dangerous pathogen and toxin research is comprehensive. [5] There is no relevant evidence in recent media reports or academic studies. The VERTIC (Verification Research Training and Information Centre) Biological Weapons Convention Legislation Database does not list any relevant legislation. [6]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 20 August 2020.

[2] Government of Canada. 2015. "Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting - Required Elements and Guidance". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/licensing-program/plan-administrative-oversight-pathogens-toxins-a-research-setting-required-elements-guidance.html>]. Accessed 20 August 2020.

[3] Government of Canada. 2016. "BWC Implementation Review Initiative: Report by Canada on the Visit to Ottawa". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 20 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

[6] VERTIC (Verification Research Training and Information Centre) Biological Weapons Convention Legislation Database. 2020. "C". [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/c/>]. Accessed 10 September 2020.

1.5.1b

Is there legislation and/or regulation requiring oversight of research with especially dangerous pathogens, toxins, pathogens with pandemic potential and/or other dual-use research?

Yes = 1 , No = 0

Current Year Score: 1

Canada has a national policy requiring oversight of dual use research, such as research with especially dangerous pathogens, toxins, and pathogens with pandemic potential. As part of the licensing process for facilities working with pathogens and toxins, Section 3 of the Human Pathogens and Toxins Act (HPTA) states that the Minister of Health must "determine that the person has developed a plan that sets out administrative measures for managing and controlling biosafety and biosecurity risks during the period in which the licence is in effect". [1, 2] This requirement has been operationalised at research facilities via the presentation of a "Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting". The Plan is designed to "facilitate the development and support of internal accountability structures" and must "demonstrate how institutions or organizations identify, assess and manage research activities with dual-use potential, including gain-of-function research". [3] The guidelines for the creation of the Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting outline the policy for oversight of dual use research, which is principally focused on creating internal accountability structures that can be reviewed by the Public Health Agency of Canada (PHAC). The policy can be summed up in three elements: identification of dual use risks, risk assessment, and management and control of dual use risks. [2] In addition, in 2018 the government posted new guidelines for public consultation for dual use research in the life sciences. The goal of the guidelines is to "increase awareness on dual-use and promote the responsible conduct of research amongst the scientific and biosafety community". [4] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide additional relevant information. [5] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information. [6]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 20 August 2020.

[2] Government of Canada. 2015. "Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting - Required Elements and Guidance". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/licensing-program/plan-administrative-oversight-pathogens-toxins-a-research-setting-required-elements-guidance.html>]. Accessed 20 August 2020.

[3] Government of Canada. 2016. "BWC IMPLEMENTATION REVIEW INITIATIVE: REPORT BY CANADA ON THE VISIT TO OTTAWA". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 20 August 2020.

[4] Public Health Agency of Canada. 2018. "Consultation on Dual-Use in Life Science Research - Closed consultation". [<https://www.canada.ca/en/public-health/programs/consultation-biosafety-guideline-dual-use-life-science-research.html>]. Accessed 20 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[6] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.5.1c

Is there an agency responsible for oversight of research with especially dangerous pathogens, toxins, pathogens with pandemic potential and/or other dual-use research?

Yes = 1, No = 0

Current Year Score: 1

The Public Health Agency of Canada (PHAC) is the primary agency responsible for oversight of research with especially dangerous pathogens, pathogens with pandemic potential, and other dual use research, and it coordinates with the Canadian

Food Inspection Agency (CFIA) regarding research on animal pathogens and toxins. Section 3 of the Human Pathogens and Toxins Act (HPTA) states that the Minister of Health must "determine that the person has developed a plan that sets out administrative measures for managing and controlling biosafety and biosecurity risks during the period in which the licence is in effect". [1, 2] According to the HPTA, the PHAC is responsible for supervising licensees and reviews facilities' biosecurity and biosafety plans as well as the Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting, which deals with dual use potential. [3] The PHAC and CFIA collaborated on the creation of the new guidelines for dual use research in the life sciences, titled "Canadian Biosafety Guideline - Dual-Use in Life Science Research". The guidelines were posted in 2018 for public consultation; the consultation period has ended and the guidelines thus appear to be final. The guidelines provide "comprehensive guidance on how to identify research with dual-use potential and how to mitigate the risks". [4] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide additional relevant information. [5] Canada's 2020 Confidence Building Measures report under the Biological Weapons Convention does not contain additional relevant information. [6]

[1] Government of Canada. 2019. "Human Pathogens and Toxins Act". [<https://laws.justice.gc.ca/eng/acts/H-5.67/FullText.html>]. Accessed 20 August 2020.

[2] Government of Canada. 2015. "Plan for Administrative Oversight for Pathogens and Toxins in a Research Setting - Required Elements and Guidance". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/licensing-program/plan-administrative-oversight-pathogens-toxins-a-research-setting-required-elements-guidance.html>]. Accessed 20 August 2020.

[3] Government of Canada. 2016. "BWC Implementation Review Initiative: Report by Canada on the Visit to Ottawa". [[https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/7A28ADF74B8C1F4BC12580610078DF72/\\$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A28ADF74B8C1F4BC12580610078DF72/$file/BWC+Implementati+on+Review+Visit+Report+-+CANADA+-+final.pdf)]. Accessed 19 August 2020.

[4] Public Health Agency of Canada. 2018. "Canadian Biosafety Guideline - Dual-Use in Life Science Research". [<https://www.canada.ca/en/public-health/programs/consultation-biosafety-guideline-dual-use-life-science-research/document.html>]. Accessed 20 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[6] Government of Canada. 2020. "Canada 2020 Annual Report of Confidence Building Measures Biological and Toxin Weapons Convention". [https://bwc-ecbm.unog.ch/system/files/form-pdf/bwc_cbm_2020_canada_en.pdf?]. Accessed 10 September 2020.

1.5.2 Screening guidance for providers of genetic material

1.5.2a

Is there legislation and/or regulation requiring the screening of synthesized DNA (deoxyribonucleic acid) against lists of known pathogens and toxins before it is sold?

Yes = 1, No = 0

Current Year Score: 0

There is no public evidence that Canada has a national legislation, regulation, policy, or other guidance, requiring the screening of synthesized DNA before it is sold. In 2009, Canada enacted the Human Pathogens and Toxins Act which regulates the safety and security of human pathogens and toxins, including "any synthetic form of the human pathogen or toxin." While the law does require licenses to possess any of the regulated pathogens and requires permission from the Minister of Health prior to their transfer to another party, no specific mention is made about screening of DNA. [1] Additionally, the Canadian Environmental Protection Act (CEPA) also has regulations regarding the creation of new

substances and organisms using synthetic (recombinant) DNA. CEPA is implemented via the "New Substances Notification Regulations (Organisms)" (NSNR Organisms). The Regulations require creators of new microorganisms to notify the government of their creation and provide extensive information on production methods, characteristics of the organism, genetic modifications, life cycle and other information. However, there is no public evidence that the regulations or CEPA directly regulate the sale of such organisms or require the screening of synthetic DNA. [2] The websites of the Public Health Agency of Canada, Canadian Institutes of Health Research (CIHR), Agriculture and Agri-Food Canada, the Canadian Food Inspection Agency (CFIA), Transport Canada, the Department of National Defence, and Innovation, Science and Economic Development Canada do not contain additional information regarding national legislation, regulation, policy, or other guidance, requiring the screening of synthesized DNA before it is sold. [3, 4, 5, 6, 7, 8,9] The Canadian Public Health Laboratory Network (CPHLN) does not share relevant information on its webpage, which is hosted on the webpage of the National Collaborating Centre for Infectious Diseases. [10] Canada's 2020 Confidence Building Measures submission under the Biological Weapons Convention does not contain additional information regarding screening of synthesized DNA before it is sold. [11] Canada's Joint External Evaluation (JEE) report, published in 2019, does not provide additional relevant information. [12] There is no additional relevant legislation listed for Canada in the VERTIC (Verification Research Training & Information Centre) Biological Weapons Convention Legislation Database. [13]

[1] Government of Canada. 2009. "Human Pathogens and Toxins Act." [<https://laws.justice.gc.ca/eng/acts/H-5.67/page-1.html>]. Accessed 20 August 2020.

[2] Government of Canada. August 2019. "New substances: guidelines for organisms". [<https://www.canada.ca/en/environment-climate-change/services/managing-pollution/evaluating-new-substances/biotechnology-living-organisms/guidelines.html>]. Accessed 20 August 2020.

[3] Transport Canada. 2019. "Transport Canada". [<https://www.tc.gc.ca/en/transport-canada.html>]. Accessed 20 August 2020.

[4] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence". [<https://www.canada.ca/en/department-national-defence.html>]. Accessed 20 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 20 August 2020.

[6] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 20 August 2020.

[7] Agriculture and Agri-Food Canada. 2019. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 20 August 2020.

[8] Canadian Food Inspection Agency. 2019. "Canadian Food Inspection Agency". [<http://inspection.canada.ca/eng/1297964599443/1297965645317>]. Accessed 20 August 2020.

[9] Innovation, Science and Economic Development Canada. 2019. "ISED". [<https://www.ic.gc.ca/eic/site/icgc.nsf/eng/home>]. Accessed 20 August 2020.

[10] National Collaborating Centre for Infectious Diseases. 2020. "Canadian Public Health Laboratory Network". [<https://nccid.ca/cphln/>]. Accessed 20 August 2020.

[11] United Nations Office at Geneva. 2020. "BWC Electronic Confidence Building Measures Portal". [<https://bwc-ecbm.unog.ch/canada/bwccbm2020canadaen>]. Accessed 20 August 2020.

[12] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[13] VERTIC (Verification Research Training & Information Centre) Biological Weapons Convention Legislation Database. 2020. "C". [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/c/>]. Accessed 10 September 2020.

1.6 IMMUNIZATION

1.6.1 Vaccination rates

1.6.1a

Immunization rate (measles/MCV2)

Immunization rate (measles/MCV2), 95% or greater = 2, 80-94.9% = 1, Less than 80%, or no data = 0

Current Year Score: 1

2019

World Health Organization

1.6.1b

Are official foot-and-mouth disease (FMD) vaccination figures for livestock publicly available through the OIE database?

Yes = 1, No = 0

Current Year Score: 1

2020

OIE WAHIS database

Category 2: Early detection and reporting for epidemics of potential international concern

2.1 LABORATORY SYSTEMS STRENGTH AND QUALITY

2.1.1 Laboratory testing for detection of priority diseases

2.1.1a

Does the national laboratory system have the capacity to conduct diagnostic tests for at least 5 of the 10 WHO-defined core tests?

Evidence they can conduct 5 of the 10 core tests and these tests are named = 2, Evidence they can conduct 5 of the 10 core tests and the tests are not named = 1, No evidence they can conduct 5 of the 10 core tests = 0

Current Year Score: 2

Canada's national laboratory system has the capacity to conduct diagnostic tests via polymerase chain reaction (PCR) testing for Influenza virus (flu); virus culture for poliovirus (polio); serology for HIV; microscopy for mycobacterium tuberculosis (tuberculosis/TB); rapid diagnostic testing for plasmodium spp. (malaria); and bacterial culture for Salmonella enteritidis serotype Typhi (typhoid). Canada's National Microbiological Laboratory (NML) of the Public Health Agency of Canada

confirms that it can conduct PCR testing for influenza, virus culture for polio, serology for HIV and bacterial culture for salmonella. [1,2,3,4] While the NML conducts alternate tests for microscopy and does not conduct testing for malaria, there is evidence that Canada has the capacity to conduct these tests through regional laboratories. [5,6] For example, the province of Ontario's Public Health Laboratory can test for malaria via rapid diagnostic testing. [7] The Ontario Public Health Laboratory also indicates Canada's capacity to conduct the core tests at the regional level. In addition to rapid diagnostic testing for malaria, the Ontario Laboratory Public Health Laboratory can conduct PCR testing for influenza, polio virus via virus culture, HIV via serology and Salmonella Typhi via bacterial culture. [8,9,10,11] According to the Canadian Tuberculosis Standard, public health laboratories in Canada can also test for tuberculosis via microscopy. [12] The websites of the Public Health Agency of Canada and Canadian Institutes of Health Research (CIHR) do not contain additional information regarding Canada's country specific core diagnostic tests. [13,14] Canada's Joint External Evaluation (JEE) report, published in 2019, does not list all of Canada's diagnostic test capacities, but assigns the country a score of 5 (the highest) for the indicator "Laboratory testing for detection of priority diseases", noting that "the national laboratory system provides sufficient capacity to test for a broad range of samples in safe and secure environments, including BSL-3 and BSL-4 facilities". [15]

- [1] Public Health Agency of Canada. "Pathogens - I". [<https://cnphi.canada.ca/gts/pathogens-start-with/I>]. Accessed 20 August 2020.
- [2] Public Health Agency of Canada. "Pathogens - P". [<https://cnphi.canada.ca/gts/pathogens-start-with/P>]. Accessed 20 August 2020.
- [3] Public Health Agency of Canada. "Pathogens - H". [<https://cnphi.canada.ca/gts/pathogens-start-with/H>]. Accessed 20 August 2020.
- [4] Public Health Agency of Canada. "Pathogens - S". [<https://cnphi.canada.ca/gts/pathogens-start-with/S>]. Accessed 20 August 2020.
- [5] Public Health Agency of Canada. "Pathogens - M". [<https://cnphi.canada.ca/gts/pathogens-start-with/M>]. Accessed 20 August 2020.
- [6] Canadian Malaria Network. February 2018. "CMN Contact Information". [http://thinkottawamedicine.ca/wp-content/uploads/2014/01/20180202-CMN_ThinkMedWebsite_Content_EN-Final1.pdf]. Accessed 20 August 2020.
- [7] Public Health Ontario. 2020. "Malaria". [<https://www.publichealthontario.ca/en/laboratory-services/test-information-index/malaria-blood>]. Accessed 20 August 2020.
- [8] Public Health Ontario. 2020. "Respiratory Viruses (including Influenza)". [<https://www.publichealthontario.ca/en/laboratory-services/test-information-index/virus-respiratory>]. Accessed 20 August 2020.
- [9] Public Health Ontario. 2020. "Polio virus". [<https://www.publichealthontario.ca/en/laboratory-services/test-information-index/poliovirus>]. Accessed 20 August 2020.
- [10] Public Health Ontario. 2020. "HIV Diagnostic Serology". [<https://www.publichealthontario.ca/en/laboratory-services/test-information-index/hiv-diagnostic-serology>]. Accessed 20 August 2020.
- [11] Public Health Ontario. 2020. "Enteric - bacterial culture". [<https://www.publichealthontario.ca/en/laboratory-services/test-information-index/enteric-culture>]. Accessed 20 August 2020.
- [12] Public Health Agency of Canada. 2014. "Canadian Tuberculosis Standard 7th edition". [<http://www.phac-aspc.gc.ca/tbpc-latb/pubs/tb-canada-7/assets/pdf/tb-standards-tb-normes-appd-eng.pdf>]. Accessed 20 August 2020.
- [13] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 20 August 2020.
- [14] Canadian Institutes of Health Research. 2020. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 20 August 2020.
- [15] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

2.1.1b

Is there a national plan, strategy or similar document for conducting testing during a public health emergency, which includes considerations for testing for novel pathogens, scaling capacity, and defining goals for testing?

Yes, there is evidence of a plan, and it includes considerations for testing for novel pathogens, scaling capacity, and defining goals for testing = 2, Yes, there is evidence of a plan, but there is insufficient evidence that it includes considerations for testing for novel pathogens, scaling capacity, and defining goals for testing = 1, No evidence of a plan = 0

Current Year Score: 0

There is insufficient evidence to show that Canada has a national plan, strategy or similar document for conducting testing during a public health emergency, which includes considerations for testing for novel pathogens, scaling capacity, and defining goals for testing. The Canadian Public Health Laboratory Network (CPHLN) Strategic Plan 2016-2020 calls for the development of an all-hazards plan that will incorporate protocols that are "fundamental to a nationwide laboratory response, and guidance for topics such as shipping, Emergency Response Action Plan activation, and decentralization of diagnostic testing in Canada." [1] However, this all-hazards plan, if it has been developed, is not shared via a public website. The Joint External Evaluation (JEE) for Canada, published in 2019, lauds Canada's testing capacity in general, noting that the "entire population has access to laboratory services for testing priority diseases". However, it does not mention the existence of a plan or protocols for testing during a public health emergency that includes testing for novel pathogens. [2] Government websites describing Canada's response to the COVID-19 pandemic describe the importance of testing and outline some standards, but do not provide an overall strategy or plan for national-level testing. [3,4,5] Prime Minister Justin Trudeau has stated publicly that a national testing strategy for COVID-19 is undesirable for Canada, because of the variation in needs across provinces. [6] However, the government has issued a "National laboratory testing indication guidance for COVID-19", which describes "the elements of a national approach to laboratory testing", such as who should be eligible for testing. The Guidance does not amount to a national strategy. [7] Neither the Federal/Provincial/Territorial Public Health Response Plan for Biological Events nor Canada's "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" contains or makes reference to a national testing strategy. [8,9] Neither the Public Health Agency of Canada, the Canadian Institutes of Health Research, nor Agriculture and Agri-Food Canada share relevant information via a publicly available website. [10,11,12] The Canadian Public Health Laboratory Network (CPHLN) does not have a website. Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain additional relevant information. [13]

[1] Canadian Public Health Laboratory Network. 2016. "Strategic Plan 2016-2020".

[<https://www.canada.ca/content/dam/themes/health/publications/science-research-data/2016-2020-canadian-public-health-laboratory-network-strategic-plan/CPHLN-Strat-Plan-2016-2020.pdf>]. Accessed 21 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[3] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>]. Accessed 29 August 2020.

[4] Government of Canada. August 2020. "Testing for COVID-19". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/symptoms/testing.html>]. Accessed 29 August 2020.

[5] Government of Canada. April 2020. "Government of Canada's research response to COVID-19".

[<https://www.canada.ca/en/public-health/services/publications/diseases-conditions/covid-19-government-canada-research-response.html>]. Accessed 29 August 2020.

[6] Connolly, Amanda. 7 May 2020. "National coronavirus testing strategy wouldn't work for Canada, Trudeau says". Global News. [<https://globalnews.ca/news/6916991/national-coronavirus-testing-strategy-canada/>]. Accessed 29 August 2020.

[7] Government of Canada. "National laboratory testing indication guidance for COVID-19".

[<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance->

documents/national-laboratory-testing-indication.html]. Accessed 29 August 2020.

[8] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html]. Accessed 24 August 2020.

[9] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html]. Accessed 24 August 2020.

[10] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [https://www.canada.ca/en/public-health.html]. Accessed 29 August 2020.

[11] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [http://www.cihr-irsc.gc.ca/e/193.html]. Accessed 19 August 2020.

[12] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada". [http://www.agr.gc.ca/eng/home/?id=1395690825741]. Accessed 25 August 2020.

[13] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 21 August 2020.

2.1.2 Laboratory quality systems

2.1.2a

Is there a national laboratory that serves as a reference facility which is accredited (e.g., International Organization for Standardization [ISO] 15189:2003, U.S. Clinical Laboratory Improvement Amendments [CLIA])?

Yes = 1 , No = 0

Current Year Score: 1

Canada's national reference laboratory, the National Microbiology Laboratory (NML), is accredited to the ISO/IEC 17025:2005 standard. The Standards Council of Canada has accredited the NML to ISO/IEC 17025:2005 "General requirements for the competence of testing and calibration laboratories" through 2021. [1] In addition, the NML's National HIV & Retrovirology Laboratory is accredited to ISO 15189 "Medical laboratories -- Requirements for quality and competence". [2] Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain additional relevant information. [3]

[1] Standards Council of Canada. 2018. "Scope of Accreditation: National Microbiology Laboratory". [https://www.scc.ca/en/system/files/client-scopes/ASB_SOA_15734-Scope_v5_2019-07-10.pdf]. Accessed 21 August 2020.

[2] Government of Canada. 2020. "National Laboratory for HIV Reference Services". [https://cnphi.canada.ca/gts/laboratory/10080]. Accessed 21 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 21 August 2020.

2.1.2b

Is there a national laboratory that serves as a reference facility which is subject to external quality assurance review?

Yes = 1 , No = 0

Current Year Score: 1

There is evidence that Canada's national reference laboratory, the National Microbiology Laboratory (NML), is subject to external quality assurance review. NML's National HIV & Retrovirology Laboratory is accredited to ISO 15189 "Medical laboratories -- Requirements for quality and competence". [1] ISO 15189 certification requires external quality assurance reviews. [2] Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain additional relevant information. [3]

[1] Government of Canada. 2020. "National Laboratory for HIV Reference Services".

[<https://cnphi.canada.ca/gts/laboratory/10080>]. Accessed 21 August 2020.

[2] World Health Organization. "Content Sheet 10-1: Overview of External Quality Assessment (EQA)".

[http://www.who.int/ihr/training/laboratory_quality/10_b_eqa_contents.pdf]. Accessed 21 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

2.2 LABORATORY SUPPLY CHAINS

2.2.1 Specimen referral and transport system

2.2.1a

Is there a nationwide specimen transport system?

Yes = 1, No = 0

Current Year Score: 1

The Public Health Agency of Canada (PHAC) has outlined the requirements of a nationwide specimen transport system in regulations and guidance documents. Information on diagnostic testing provided by the National Microbiology Laboratory (NML), Canada's national reference laboratory that is supervised by PHAC, states that samples shipped to the NML for testing must be shipped by a licensee under the Transportation of Dangerous Goods Regulations (TDGR) and follow the rules for proper packaging established in the TDGR. [1] Guidance for submitting ticks for testing for Lyme disease at the NML states that they can be shipped by mail or courier. [2] Guidelines for shipping Ebola require that the Emergency Response Assistance Plan (ERAP) described in the TDGR be activated. [3] Guidance documents for influenza and Zika virus also specify similar transport requirements. [4, 5] The TDGR apply nationwide throughout Canada. [6] Canada's Joint External Evaluation (JEE), published in 2019, gives Canada a score of 5 (the highest) for its specimen transport and referral system, indicating that there is "transport of specimens to/from other laboratories in the region and funded from the host country budget", and further notes that Canada has "demonstrated capacity for specimen referral and transport system to and from other laboratories in the region". [7,8]

[1] Public Health Agency of Canada. 2019. "Pathogen Diagnostic Tests". [<https://cnphi.canada.ca/gts/reference-diagnostic-test/10039?alphaReturn=pathogenByLetter&alphaChar=P>]. Accessed 21 August 2020.

[2] Public Health Agency of Canada. 2019. "Submitting Ticks for Testing". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease/removing-submitting-ticks-testing.html#a4>]. Accessed 21 August 2020.

[3] Public Health Agency of Canada. 2019. "Biosafety guidelines for laboratories handling Ebola".

[<https://www.canada.ca/en/public-health/services/infectious-diseases/viral-haemorrhagic-fevers/interim-biosafety-guidelines-laboratories-handling-specimens-patients-under-investigation-ebola-virus-disease.html>]. Accessed 21 August 2020.

[4] Public Health Agency of Canada. 2019. "Influenza Planning - Laboratory". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/laboratory->

annex.html]. Accessed 21 August 2020.

[5] Public Health Agency of Canada. 2019. "Zika Virus". [<https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/biosafety-directives-advisories-notifications/zika-virus-april-14-2016.html>]. Accessed 21 August 2020.

[6] Government of Canada. 2019. "TDG Regulations". [<http://www.tc.gc.ca/eng/tdg/clear-part1-475.html>]. Accessed 21 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[8] World Health Organization (WHO). 2018. "Joint External Evaluation Tool". [<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 21 August 2020.

2.2.2 Laboratory cooperation and coordination

2.2.2a

Is there a plan in place to rapidly authorize or license laboratories to supplement the capacity of the national public health laboratory system to scale-up testing during an outbreak?

Yes = 2 , Yes, but there is evidence of gaps in implementation = 1 , No = 0

Current Year Score: 0

There is insufficient evidence to confirm that Canada has a plan in place to rapidly authorize or license laboratories to supplement the capacity of the national public health laboratory system to scale-up testing during an outbreak. The Federal/Provincial/Territorial Public Health Response Plan for Biological Events lists as an expected response function to emerging diseases "rapid and coordinated nationwide laboratory response to emerging and re-emerging communicable diseases", but does not describe an expedited laboratory authorization process. [1] Canada's "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" and its "Laboratory Annex" include extensive contingency planning for public health laboratory testing capacity in the case of a pandemic, but do not specifically mention an expedited process for licensing or authorizing laboratories to supplement the national public health system. [2,3] In 2020, in response to the COVID-19 pandemic Canada issued an Interim Order that allows the expedited importation and sale of medical devices for combating COVID-19, including to laboratories. However, there is no mention in this Interim Order nor interim guidelines for the surveillance of COVID-19 that mentions an expediting licensing process. [4,5,6] Canada's "COVID-19 pandemic guidance for the health care sector" do not contain any relevant provisions. [7] Canada's "Coronavirus disease (COVID-19): Canada's response" website states that the National Microbiology Laboratory "is working collaboratively with Canadian provincial public health laboratories through the Canadian Public Health Laboratory Network to ensure there is additional testing capacity in multiple jurisdictions", but does not mention any measures for expedited laboratory licensing. [8] Canada's Joint External Evaluation, published in 2019, states that "microbiology laboratories must be licensed by [the Public Health Agency of Canada]. Licensing and inspection of most laboratories is a function of provincial governments or provincial government agencies. Provincial laboratories are required by their respective governments to be accredited by an appropriate accreditation body." However, the JEE does not mention any measures for expedited laboratory licensing. [9] Media reports indicate that Canada has effectively ramped up testing in response to the COVID-19 pandemic, but do not mention an expedited lab approval process. [10,11] Neither the Public Health Agency of Canada, the Canadian Institutes of Health Research, nor Agriculture and Agri-Food Canada share relevant information via a publicly available website. [12,13,14] The Canadian Public Health Laboratory Network (CPHLN) does not have a website.

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological->

events.html]. Accessed 24 August 2020.

[2] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 24 August 2020.

[3] Government of Canada. 2015. "Laboratory guidelines: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/laboratory-annex.html#a35>]. Accessed 29 August 2020.

[4] Health Canada. 18 March 2020. "Interim order respecting the importation and sale of medical devices for use in relation to COVID-19". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/announcements/interim-order-importation-sale-medical-devices-covid-19.html>]. Accessed 28 August 2020.

[5] Government of Canada. 10 February 2020. "Interim national surveillance guidelines for human infection with Coronavirus disease (COVID-19)". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/interim-guidance-surveillance-human-infection.html>]. Accessed 29 August 2020.

[6] Government of Canada. 18 March 2020. "Health Canada expedites access to COVID-19 diagnostic laboratory test kits and other medical devices". [<https://www.canada.ca/en/health-canada/news/2020/03/health-canada-expedites-access-to-covid-19-diagnostic-laboratory-test-kits-and-other-medical-devices.html>]. Accessed 29 August 2020.

[7] Government of Canada. April 2020. "COVID-19 pandemic guidance for the health care sector". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/covid-19-pandemic-guidance-health-care-sector.html>]. Accessed 29 August 2020.

[8] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>]. Accessed 29 August 2020.

[9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 29 August 2020.

[10] Canadian Press. 5 March 2020. "Coronavirus: Canadian health authorities prepare to increase COVID-19 lab testing". [<https://globalnews.ca/news/6633801/coronavirus-canadian-testing-labs/>]. Accessed 29 August 2020.

[11] Ling, J. 13 March 2020. "Canada Shows How Easy Virus Testing Can Be". Foreign Policy. [<https://foreignpolicy.com/2020/03/13/canada-shows-how-easy-virus-testing-can-be/>]. Accessed 29 August 2020. [12 Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[13] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 29 August 2020.

[14] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

2.3 REAL-TIME SURVEILLANCE AND REPORTING

2.3.1 Indicator and event-based surveillance and reporting systems

2.3.1a

Is there evidence that the country is conducting ongoing event-based surveillance and analysis for infectious disease?

Yes, there is evidence of ongoing event-based surveillance and evidence that the data is being analyzed on a daily basis = 2,

Yes, there is evidence of ongoing event-based surveillance, but no evidence that the data are being analyzed on a daily basis

= 1, No = 0

Current Year Score: 2

Canada conducts ongoing event-based surveillance and analysis for infectious disease via the Global Public Health Intelligence Network (GPHIN). Canada's Joint External Evaluation (JEE), published in 2019, assigns a score of 5 (the highest) to Canada's indicator- and event-based surveillance systems, and says that "the cornerstone of the national public health early warning function is event-based surveillance and relies on the GPHIN platform, which also constitutes the foundation of the public early warning function at the global level." [1] The score of 5 indicates that the "performance of the surveillance system is regularly evaluated and updated at all levels in the country and [either] has the capacity to support other countries in developing surveillance systems or contributes to regional or international surveillance networks". [2] The government of Canada created GPHIN in the late 1990s in collaboration with the World Health Organization (WHO). GPHIN is headquartered at the Public Health Agency of Canada (PHAC) and provides information to members both nationally and globally. GPHIN tracks "disease outbreaks, infectious diseases, contaminated food and water, bioterrorism and exposure to chemicals, natural disasters, and issues related to the safety of products, drugs and medical devices and radioactive agents". GPHIN is used by public health authorities in Canada that conduct public health surveillance. PHAC's Centre for Emergency Preparedness and Response (CEPR) manages GPHIN. [3] According to an academic paper from 2015 titled "Big Data and the Global Public Health Intelligence Network (GPHIN)", GPHIN analyzes more than 20,000 online news reports from more than 30,000 sources in nine languages from across the world every day. GPHIN uses an algorithm to detect signals of "emerging public health events" which are reviewed by a "multilingual, multidisciplinary team". GPHIN is credited with identifying the early SARS outbreak in China and issuing the first alert on MERS-CoV. [4]

[1] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[2] World Health Organization (WHO). 2018. "Joint External Evaluation Tool".

[<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 21 August 2020.

[3] Public Health Agency of Canada. 2017. "About GPHIN". [https://gphin.canada.ca/cepr/aboutgphin-rmispenbref.jsp?language=en_CA]. Accessed 21 August 2020.

[4] Dion, M., P. Abdelmalik, and A. Mawudeku. 2015. "Big Data and the Global Public Health Intelligence Network (GPHIN)". Canada communicable disease report = Relevé des maladies transmissibles au Canada 41

[9] :209-14.

[https://www.researchgate.net/publication/309697628_Big_Data_and_the_Global_Public_Health_Intelligence_Network_GPHIN]. Accessed 21 August 2020.

2.3.1b

Is there publicly available evidence that the country reported a potential public health emergency of international concern (PHEIC) to the WHO within the last two years?

Yes = 1, No = 0

Current Year Score: 1

There is evidence that Canada reported a potential public health emergency of international concern (PHEIC) to the World Health Organization (WHO) within the last two years. The first COVID-19 case in Canada was reported on January 25, 2020, five days before COVID-19 was declared a PHEIC. [1,2] The WHO and the Ministry of Health share similar statistics about the global COVID-19 pandemic spread to Canada, with almost 900,000 cases as of March 2021. [3,4] Other than COVID-19, according to the WHO's Disease Outbreak News, Canada's most recent report of a potential PHEIC was an outbreak of Seoul virus, reported to the WHO in February 2017 in conjunction with the United States. [5,6] The virus is a zoonosis and was detected among home-based rat breeders in the northern United States. Subsequent epidemiological investigation found the illness among rats and rat breeders in Canada as well. Three positive human cases were identified in Canada. Canada

committed to: further laboratory testing to confirm the virus in humans, assessment of pet rat breeding facilities, and further epidemiological investigation and testing among rats. [5] Canada's previous reported outbreak was for measles in February 2015. [7] Other than COVID-19, however, there are no media reports within the last two years of verified disease outbreaks in the last year. The Public Health Agency of Canada does not report any other potential PHEICs in the last two years on its website. [8]

- [1] Canadian Health Network. 20 April 2020. "COVID-19: A Canadian timeline". [https://www.canadianhealthcarenetwork.ca/covid-19-a-canadian-timeline]. Accessed 12 March 2021.
- [2] World Health Organization. 27 January 2020. "Novel Coronavirus(2019-nCoV) Situation Report - 7". [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200127-sitrep-7-2019--ncov.pdf?sfvrsn=98ef79f5_2]. Accessed 9 March 2021.
- [3] World Health Organization. "WHO Coronavirus Disease (COVID-19) Dashboard". [https://covid19.who.int/?gclid=CjwKCAjwnef6BRAgEiwAgv8mQfRf_Q66Hc1td5fDKvmqtIDEnhWFpg5ZhtstlFXNpYojZX5qBoqQTRoC3zkQAvD_BwE]. Accessed 9 March 2021.
- [4] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html]. Accessed 9 March 2021.
- [5] World Health Organization. 2017. "Seoul virus - United States of America and Canada". [https://www.who.int/csr/don/20-february-2017-seoulvirus-usa-and-canada/en/]. Accessed 21 August 2020.
- [6] World Health Organization. 2020. "Emergency preparedness, response: Canada". [https://www.who.int/csr/don/archive/country/can/en/]. Accessed 21 August 2020.
- [7] World Health Organization. 2015. "Measles - The Americas". [https://www.who.int/csr/don/13-february-2015-measles/en/]. Accessed 21 August 2020.
- [8] Public Health Agency of Canada. 2020. "Public Health Notices". [https://www.canada.ca/en/public-health/services/public-health-notice.html]. Accessed 21 August 2020.

2.3.2 Interoperable, interconnected, electronic real-time reporting systems

2.3.2a

Does the government operate an electronic reporting surveillance system at both the national and the sub-national level?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence that Canada operates an electronic reporting surveillance system at both the national and sub-national level. Canada's Joint External Evaluation (JEE), published in 2019, assigns a score of 3 to Canada for the category of "interoperable, interconnected, electronic real-time reporting system", indicating that "information technology tools [are] available at the national level that permit management of a surveillance database and an event management system". [1,2] However, the JEE also notes that there is a "lack of a registry or registries for event management purposes at the federal level". [1] Indeed, although Canada does operate the Canadian Notifiable Disease Surveillance System (CNDSS), this is a voluntary, annual reporting exercise on notifiable diseases and not a regularly updated system for reporting incidents of diseases. [3] The Pan-Canadian Public Health Network's 2016 "Blueprint for a Federated System for Public Health Surveillance in Canada" noted that surveillance data is not shared in a timely and meaningful manner among provinces and between subnational and national governments. The paper stated there were "few standards and agreements for information sharing" and "incomplete implementation of repeated recommendations for public health surveillance in Canada". [4] Similarly, a 2018 summary of the state of Zika virus surveillance in Canada noted that "the sharing of information across jurisdictions" was "a central challenge to having a robust and effective surveillance system in Canada". The summary highlighted the role of the Canadian Institute for Health Information (CIHI) in attempting to standardize data sharing, as well

as a 2014 agreement for sharing information during "emerging public health events". Despite these advances, however, electronic reporting and surveillance are insufficiently integrated across jurisdictions in Canada. [5] In 2008, the government-owned firm Infoway collaborated with the British Columbia provincial Ministry of Health and IBM to create a health information management system called Panorama. However, recent observers have stated that the system's technological framework is outdated by current standards. [6] Infoway reports that Panorama has been implemented in areas covering 75% of the Canadian population. [7] Panorama has a component for "Communicable Disease Case Management" and public health surveillance. However, it is unclear if that component has been widely implemented. Manitoba's report on its use of Panorama does not mention public health surveillance. [8] British Columbia's description of its use of Panorama does not make it clear that it is currently being used for public health surveillance. [9] A 2015 audit of Panorama's implementation in British Columbia, which was the first province selected for implementation, noted that the implementation was 420% over budget, the system had thousands of defects, and it was not fully functional. [10] The websites of the Public Health Agency of Canada and Canadian Institutes of Health Research (CIHR) do not contain additional information regarding an electronic reporting surveillance system at both the national and sub-national level. [11, 12] The Canadian Public Health Laboratory Network (CPHLN) does not share relevant information on its webpage, which is hosted on the webpage of the National Collaborating Centre for Infectious Diseases. [13] In 2020, Canada set up a surveillance systems for COVID-19 that includes electronic reporting and subnational data, provided to the Public Health Agency of Canada (PHAC) by provinces and territories on a voluntary basis. The system is exclusively for COVID-19. [14,15]

[1] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[2] World Health Organization. 2020. "Emergency preparedness, response: Canada".

[<https://www.who.int/csr/don/archive/country/can/en/>]. Accessed 21 August 2020.

[3] Government of Canada. 2020. "Notifiable diseases online." [<https://diseases.canada.ca/notifiable>]. Accessed 21 August 2020.

[4] Pan-Canadian Public Health Network. 2016. "Blueprint for a Federated System for Public Health Surveillance in Canada".

[http://www.phn-rsp.ca/pubs/bfsph-psfsp-2016/index-eng.php#a3_7]. Accessed 21 August 2020.

[5] National Collaborating Centre for Infectious Diseases. 2018. "Policies and Provisions for Public Health Surveillance of Zika and Other Emerging Infectious Diseases in Canada: Summary and Analysis of the 2016 Environmental Scan".

[<https://nccid.ca/publications/summary-analysis-zika-scan/>]. Accessed 21 August 2020.

[6] Webster, Paul. 2013. "National electronic disease surveillance: a dream delayed". Canadian Medical Association Journal.

[<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3680568/>]. Accessed 21 August 2020.

[7] Infoway. 2020. "Public Health Surveillance". [<https://www.infoway-inforoute.ca/en/solutions/digital-health-foundation/electronic-health-records/public-health-surveillance>]. Accessed 21 August 2020.

[8] Province of Manitoba. 2020. "Public Health Information Management System".

[<https://www.gov.mb.ca/health/publichealth/surveillance/phims.html>]. Accessed 21 August 2020.

[9] Province of British Columbia. 2020. "Public Health Information Project". [<http://www.bccdc.ca/our-services/service-areas/public-health-information-systems>]. Accessed 21 August 2020.

[10] Office of the Auditor General of British Columbia. 2015. "An Audit of the Panorama Public Health System".

[https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC_PanoramaReport_FINAL.pdf]. Accessed 21 August 2020.

[11] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 21 August 2020.

[12] Canadian Institutes of Health Research. 2020. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 21 August 2020.

[13] National Collaborating Centre for Infectious Diseases. 2020. "Canadian Public Health Laboratory Network".

[<https://nccid.ca/cphln/>]. Accessed 20 August 2020.

[14] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 21 August 2020.

[15] Canadian Institutes of Health Research. 2020. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 21 August 2020.

[16] National Collaborating Centre for Infectious Diseases. 2020. "Canadian Public Health Laboratory Network".

[<https://nccid.ca/cphln/>]. Accessed 20 August 2020.

[17] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 21 August 2020.

[14] Government of Canada. "National surveillance for Coronavirus disease (COVID-19)". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/interim-guidance-surveillance-human-infection.html>]. Accessed 12 March 2021.

[15] Government of Canada. "Coronavirus disease 2019 (COVID-19): Epidemiology update ". [<https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>]. Accessed 12 March 2021.

2.3.2b

Does the electronic reporting surveillance system collect ongoing or real-time laboratory data?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence that Canada operates an electronic reporting surveillance system at both the national and sub-national level. Canada's Joint External Evaluation (JEE), published in 2019, assigns a score of 3 to Canada for the category of "interoperable, interconnected, electronic real-time reporting system", indicating that "information technology tools [are] available at the national level that permit management of a surveillance database and an event management system". [1,2] However, the JEE also notes that there is a "lack of a registry or registries for event management purposes at the federal level". [1] Indeed, although Canada does operate the Canadian Notifiable Disease Surveillance System (CNDSS), this is a voluntary, annual reporting exercise on notifiable diseases and not a regularly updated system for reporting incidents of diseases. [3] The Pan-Canadian Public Health Network's 2016 "Blueprint for a Federated System for Public Health Surveillance in Canada" noted that surveillance data is not shared in a timely and meaningful manner among provinces and between subnational and national governments. The paper stated there were "few standards and agreements for information sharing" and "incomplete implementation of repeated recommendations for public health surveillance in Canada". [4] Similarly, a 2018 summary of the state of Zika virus surveillance in Canada noted that "the sharing of information across jurisdictions" was "a central challenge to having a robust and effective surveillance system in Canada". The summary highlighted the role of the Canadian Institute for Health Information (CIHI) in attempting to standardize data sharing, as well as a 2014 agreement for sharing information during "emerging public health events". Despite these advances, however, electronic reporting and surveillance are insufficiently integrated across jurisdictions in Canada. [5] In 2008, the government-owned firm Infoway collaborated with the British Columbia provincial Ministry of Health and IBM to create a health information management system called Panorama. However, recent observers have stated that the system's technological framework is outdated by current standards. [6] Infoway reports that Panorama has been implemented in areas covering 75% of the Canadian population. [7] Panorama has a component for "Communicable Disease Case Management" and public health surveillance. However, it is unclear if that component has been widely implemented. Manitoba's report on its use of Panorama does not mention public health surveillance. [8] British Columbia's description of its use of Panorama does not make it clear that it is currently being used for public health surveillance. [9] A 2015 audit of Panorama's implementation in British Columbia, which was the first province selected for implementation, noted that the implementation was 420% over budget, the system had thousands of defects, and it was not fully functional. [10] The websites of the Public Health Agency of Canada and Canadian Institutes of Health Research (CIHR) do not contain additional information regarding an electronic reporting surveillance system at both the national and sub-national level. [11, 12] The Canadian Public Health Laboratory Network (CPHLN) does not share relevant information on its webpage, which is hosted on the webpage of the National Collaborating Centre for Infectious Diseases. [13] In 2020, Canada set up a surveillance systems for COVID-19 that includes electronic reporting and subnational data, provided to the Public Health Agency of Canada (PHAC) by provinces and territories on a voluntary basis. The system is exclusively for COVID-19. [14,15]

[1] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

- [2] World Health Organization. 2020. "Emergency preparedness, response: Canada". [<https://www.who.int/csr/don/archive/country/can/en/>]. Accessed 21 August 2020.
- [3] Government of Canada. 2020. "Notifiable diseases online." [<https://diseases.canada.ca/notifiable>]. Accessed 21 August 2020.
- [4] Pan-Canadian Public Health Network. 2016. "Blueprint for a Federated System for Public Health Surveillance in Canada". [http://www.phn-rsp.ca/pubs/bfshp-psfsp-2016/index-eng.php#a3_7]. Accessed 21 August 2020.
- [5] National Collaborating Centre for Infectious Diseases. 2018. "Policies and Provisions for Public Health Surveillance of Zika and Other Emerging Infectious Diseases in Canada: Summary and Analysis of the 2016 Environmental Scan". [<https://nccid.ca/publications/summary-analysis-zika-scan/>]. Accessed 21 August 2020.
- [6] Webster, Paul. 2013. "National electronic disease surveillance: a dream delayed". Canadian Medical Association Journal. [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3680568/>]. Accessed 21 August 2020.
- [7] Infoway. 2020. "Public Health Surveillance". [<https://www.infoway-inforoute.ca/en/solutions/digital-health-foundation/electronic-health-records/public-health-surveillance>]. Accessed 21 August 2020.
- [8] Province of Manitoba. 2020. "Public Health Information Management System". [<https://www.gov.mb.ca/health/publichealth/surveillance/phims.html>]. Accessed 21 August 2020.
- [9] Province of British Columbia. 2020. "Public Health Information Project". [<http://www.bccdc.ca/our-services/service-areas/public-health-information-systems>]. Accessed 21 August 2020.
- [10] Office of the Auditor General of British Columbia. 2015. "An Audit of the Panorama Public Health System". [https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC_PanoramaReport_FINAL.pdf]. Accessed 21 August 2020.
- [11] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 21 August 2020.
- [12] Canadian Institutes of Health Research. 2020. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 21 August 2020.
- [13] National Collaborating Centre for Infectious Diseases. 2020. "Canadian Public Health Laboratory Network". [<https://nccid.ca/cphln/>]. Accessed 20 August 2020.
- [14] Government of Canada. "National surveillance for Coronavirus disease (COVID-19)". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/interim-guidance-surveillance-human-infection.html>]. Accessed 12 March 2021.
- [15] Government of Canada. "Coronavirus disease 2019 (COVID-19): Epidemiology update ". [<https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>]. Accessed 12 March 2021.

2.4 SURVEILLANCE DATA ACCESSIBILITY AND TRANSPARENCY

2.4.1 Coverage and use of electronic health records

2.4.1a

Are electronic health records commonly in use?

Electronic health records are commonly in use = 2, Electronic health records are not commonly in use, but there is evidence they are used = 1, No evidence electronic health records are in use = 0

Current Year Score: 2

Electronic health records (EHR), also referred to as electronic medical records (EMR), are commonly in use in Canada. In 2017, Canada Health Infoway, a government-owned enterprise working on information technology in the health sector, reported that 85% of Canadian primary care physicians were using EMRs, compared to 77% in 2014. Alberta had the highest percentage of physicians using EMR, at 91%. [1] In 2006, 23% of primary care physicians were using EMRs in Canada, and by

2012 that number was 56%. [2]

[1] Canada Health Infoway. 2017. "EMR Use in Canada Continues to Grow". [<https://www.newswire.ca/news-releases/emr-use-in-canada-continues-to-grow-642393113.html>]. Accessed 21 August 2020.

[2] Canada Health Infoway. 2012. "Public health surveillance: developing a pan-Canadian solution to protect Canadians". [<https://www.infoway-inforoute.ca/en/174-what-we-do/digital-health-and-you/stories/clinician-stories/380-public-health-surveillance-developing-a-pan-canadian-solution-to-protect-canadians>]. Accessed 21 August 2020.

2.4.1b

Does the national public health system have access to electronic health records of individuals in their country?

Yes = 1 , No = 0

Current Year Score: 1

Canada's public health system has access to electronic health records of individuals. Canada Health Infoway, a government-owned enterprise working on information technology in the health sector, reports that "virtually all Canadians and practicing physicians have been uniquely identified" in registries that operate in each province and territories. The registries "accurately identify patients and authorized clinicians" and allow authorised parties to access patients' electronic health records. Authorised parties include public health system providers. [1] However, it should be noted that news reports claim difficulties in accessing patient data across provinces. [2,3]

[1] Canada Health Infoway. "Registries". [<https://www.infoway-inforoute.ca/en/solutions/digital-health-foundation/electronic-health-records/registries>]. Accessed 21 August 2020.

[2] Goldman, B. 14 January 2019. "A national electronic health record for all Canadians". CBC/Radio-Canada. [<https://www.cbc.ca/radio/whitecoat/a-national-electronic-health-record-for-all-canadians-1.4976932>]. Accessed 21 August 2020.

[3] Persaud, N. 14 January 2019. "A national electronic health record for primary care". Canadian Medical Association Journal. [<https://www.cmaj.ca/content/191/2/E28>]. Accessed 21 August 2020.

2.4.1c

Are there data standards to ensure data is comparable (e.g., ISO standards)?

Yes = 1 , No = 0

Current Year Score: 1

Canada's electronic health records (EHR), also referred to as electronic medical records (EMR), system has data standards to ensure data is comparable. Canada Health Infoway, a government-owned enterprise working on information technology in the health sector, reports that it supports provincial governments working on interoperability of EMRs so that records are portable among providers across the "continuum of care". [1] The Canadian Institute for Health Information (CIHI) has also played a leading role in establishing data standards for EMRs. CIHI issued a "pan-Canadian content standard for primary health care electronic medical records, working with jurisdictions and Canada Health Infoway". CIHI has also worked to standardize data collection at hospitals and healthcare facilities so that it is easier to standardize data in EMRs. The CIHI Reference Data Model (CRDM) "is a high-level, corporate-wide data architecture standard" with the goal "to facilitate data integration across CIHI by having common terminology and meaning". [2] CIHI's CRDM Toolkit document notes that standards such as HL7 and SNOMED CT were consulted during the development of CRDM. CRDM is the pan-Canadian standard for health information systems. [3]

[1] Canada Health Infoway. 2020. "Interoperable EHRs". [<https://www.infoway-inforoute.ca/en/solutions/digital-health-foundation/electronic-health-records/interoperable-ehr>]. Accessed 21 August 2020.

[2] Canadian Institute for Health Information. 2020. "Developing and implementing accurate national standards for Canadian health care information". [<https://www.cihi.ca/en/submit-data-view-standards/data-standards/previous-years>]. Accessed 21 August 2020.

[3] Canadian Institute for Health Information. 2016. "CIHI Reference Data Model Toolkit".

[<https://www.cihi.ca/sites/default/files/document/crdm-toolkit-2019-en-web.pdf>]. Accessed 21 August 2020.

2.4.2 Data integration between human, animal, and environmental health sectors

2.4.2a

Is there evidence of established mechanisms at the relevant ministries responsible for animal, human, and wildlife surveillance to share data (e.g., through mosquito surveillance, brucellosis surveillance)?

Yes = 1 , No = 0

Current Year Score: 1

Canada has established mechanisms at the relevant ministries responsible for animal, human and wildlife surveillance to share data. The Public Health Agency of Canada (PHAC) issues surveillance reports that consolidate data on human, mosquito, bird and horse cases of West Nile virus to provide an overall picture of the disease in the country. [1] PHAC coordinates surveillance of mosquitos, birds, and horses for West Nile virus. The Canadian Wildlife Health Cooperative coordinates tests of dead birds for the virus and shares data with public health authorities via provincial laboratories and the National Microbiology Laboratory (national reference laboratory overseen by the PHAC). Veterinary laboratories must report cases or suspicion of West Nile virus to the Canadian Food Inspection Agency (CFIA), which shares data with the PHAC for the consolidated West Nile surveillance report mentioned above. [2] In addition to PHAC's activities, the World Organisation for Animal Health (OIE)'s 2017 PVS Evaluation of Canada notes that the CFIA leads the Community for Emerging and Zoonotic Disease (CEZD), which hosts an online platform for a "community of practice" that shares and analyses surveillance data for zoonotic diseases. The CZED includes veterinarians, public health specialists, researchers, academics and others from the public and private sectors. [3,4] Canada's Joint External Evaluation (JEE), published in 2019, notes the existence fo additional mechanisms for sharing. Health Canada, PHAC, and the CFIA have "a Memorandum of Understanding for Common Issues Related to Human Health (2008) and also a Letter of Agreement regarding zoonotic surveillance and risk assessment process (2008)"; these two documents establish coordination and information sharing between concerned sectors if an outbreak occurs. [5] There is no evidence that these documents are shared via a publicly available website.

[1] Public Health Agency of Canada. 2018. "West Nile Virus national surveillance report: November 11 - December 15, 2018". [<https://www.canada.ca/en/public-health/services/publications/diseases-conditions/west-nile-virus-surveillance/2018/november-11-december-15-week-46-50.html>]. Accessed 21 August 2020.

[2] Public Health Agency of Canada. 2020. "West Nile virus surveillance". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus.html>]. Accessed 21 August 2020.

[3] Community for Emerging and Zoonotic Diseases (CEZD). 2016. "Disease Intelligence Process of CEZD has five stages". [https://www.cahss.ca/media/uploads/CEZD/documents/17-03-16_17-49/CEZD_poster_16.03.2017_English_.pdf]. Accessed 21 August 2020.

[4] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada".

[http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 21 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation (JEE) of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

2.4.3 Transparency of surveillance data

2.4.3a

Does the country make de-identified health surveillance data on infectious diseases publicly available via reports (or other format) on government websites (such as the Ministry of Health, Ministry of Agriculture, or similar)?

Yes = 1 , No = 0

Current Year Score: 1

Canada makes de-identified health surveillance data on disease outbreaks publicly available via reports on government websites. The Public Health Agency of Canada (PHAC) publishes "Weekly influenza reports" on its website providing statistics and description of the extent of influenza outbreaks in the country. There is no evidence of any recent lag in publication. [1] In addition, PHAC provides surveillance data less frequently on other illnesses, such as Lyme disease. Data includes the number of cases annually and their distribution. [2] PHAC's National Enteric Surveillance Program (NESP) monitors foodborne pathogens. The programme's webpage states that it issues a weekly surveillance report, but it is only available to "recognized provincial and federal public health professionals". [3] Canada's Joint External Evaluation (JEE) report, published in 2019, states that Canada has an "advanced analytical capacity" that allows "multiple surveillance outputs, including disease-specific weekly surveillance reports (on, for example, influenza, measles, and rubella), monthly peer-reviewed publications (for example Canadian Communicable Disease Report) and travel advice and advisories to be generated." [4] In response to the COVID-19 pandemic, Canada publishes a detailed situation report daily, which included de-identified health surveillance data. [5]

[1] Public Health Agency of Canada. 2019. "Weekly influenza reports". [<https://www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/weekly-influenza-reports.html>]. Accessed 23 August 2020.

[2] Public Health Agency of Canada. 2019. "Surveillance of Lyme disease". [<https://www.canada.ca/en/public-health/services/diseases/lyme-disease/surveillance-lyme-disease.html>]. Accessed 23 August 2020.

[3] Public Health Agency of Canada. 2019. "National Enteric Surveillance Program (NESP)". [<https://www.canada.ca/en/public-health/programs/national-enteric-surveillance-program.html>]. Accessed 23 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 24 August 2020.

[5] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>]. Accessed 23 August 2020.

2.4.3b

Does the country make de-identified COVID-19 surveillance data (including details such as daily case count, mortality rate, etc) available via daily reports (or other formats) on government websites (such as the Ministry of Health, or similar)?

Yes = 1 , No = 0

Current Year Score: 1

Canada makes de-identified COVID-19 surveillance data (including details such as daily case count, mortality rate, etc) available via daily reports on a government website. In response to the COVID-19 pandemic, the Canadian government publishes a detailed situation report daily, "Coronavirus Diseases (COVID-19): Outbreak Update", which includes de-identified

health surveillance data. [1]

[1] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>]. Accessed 23 August 2020.

2.4.4 Ethical considerations during surveillance

2.4.4a

Is there legislation and/or regulations that safeguard the confidentiality of identifiable health information for individuals, such as that generated through health surveillance activities?

Yes = 1 , No = 0

Current Year Score: 1

Canada's provinces and territories have laws that safeguard the confidentiality of identifiable health information for individuals, such as that generated through health surveillance activities. A 2018 summary of the state of Zika virus surveillance in Canada noted that "each province and territory has some version of a personal health information access and protection of privacy' act" that limits personal data collected for health care to that data that is necessary and limits data sharing as well. Data sharing agreements between the federal and subnational governments ensure that "only aggregate data is shared across jurisdictions, unless there is a specific and agreed purpose for sharing individual record information in order to respond to a public health emergency". [1] The summary was compiled by the National Collaborating Centre for Infectious Diseases (NCCID), which "is one of six National Collaborating Centres for Public Health funded by the Public Health Agency of Canada, each focusing on a different area of public health". The NCCID is housed at the University of Manitoba. [2]

[1] National Collaborating Centre for Infectious Diseases. 2018. "Policies and Provisions for Public Health Surveillance of Zika and Other Emerging Infectious Diseases in Canada: Summary and Analysis of the 2016 Environmental Scan". [<https://nccid.ca/publications/summary-analysis-zika-scan/>]. Accessed 24 August 2020.

[2] National Collaborating Centre for Infectious Diseases. 2019. "About Us". [<https://nccid.ca/about-nccid/>]. Accessed 24 August 2020.

2.4.4b

Is there legislation and/or regulations safeguarding the confidentiality of identifiable health information for individuals, such as that generated through health surveillance activities, include mention of protections from cyber attacks (e.g., ransomware)?

Yes = 1 , No = 0

Current Year Score: 1

Canada's federal, provincial and territorial governments have entered into a surveillance information sharing agreement that safeguards the confidentiality of identifiable health information for individuals and includes mention of protections from cyber attacks. The Multi-Lateral Information Sharing Agreement (MLISA) was signed in 2014 by Canada's federal, provincial and territorial governments. [1] It facilitates "consistent and transparent sharing of relevant, comparable information" and is coordinated by the Public Health Agency of Canada (PHAC) and the Pan-Canadian Public Health Network's National Surveillance Information Task Group. [2] The MLISA includes a Data Management Annex that specifies mandatory obligations for all parties to the agreement regarding "protection of public health information". Parties must "take all reasonable steps to Exchange Public Health Information in a manner that protects and safeguards against an Information Breach, including but not limited to, implementing data encryption, network firewalls, passwords, access restricted to authorized personnel, or

other limits on access". [1] In addition, parties to MLISA must provide immediate notification of any information security breach to the originating party for the data subject to the breach. [1] Moreover, at the subnational level, provinces and territories have laws that safeguard the confidentiality of identifiable health information for individuals and consider information security aspects. A 2018 summary of the state of Zika virus surveillance in Canada noted that "each province and territory has some version of a 'personal health information access and protection of privacy' act" that protects personal health data. [3] For example, Ontario's 2004 Personal Health Information Protection Act, section 12 states that "a health information custodian shall take steps that are reasonable in the circumstances to ensure that personal health information in the custodian's custody or control is protected against theft, loss and unauthorized use or disclosure and to ensure that the records containing the information are protected against unauthorized copying, modification or disposal". Further, section 55.3 states that organizations that maintain electronic health records must "protect the personal health information that is accessible by means of the electronic health record against unauthorized copying, modification or disposal" and "protect the integrity, security and confidentiality of the personal health information that is accessible by means of the electronic health record". In addition, such organizations must carry out an assessment to identify and address "threats, vulnerabilities and risks to the security and integrity of the personal health information" as well as "how each of those systems may affect the privacy of the individuals to whom the information relates". [4]

[1] Pan-Canadian Public Health Network. 2014. "Multi-Lateral Information Sharing Agreement (MLISA)". [<http://www.phn-rsp.ca/pubs/mlisa-emer-eng.php>]. Accessed 24 August 2020.

[2] Public Health Agency of Canada. 2017. "ARCHIVED - Multi-lateral information sharing agreement (MLISA)". [<https://www.canada.ca/en/public-health/services/public-health-practice/multi-lateral-information-sharing-agreement-mlisa.html>]. Accessed 24 August 2020.

[3] National Collaborating Centre for Infectious Diseases. 2018. "Policies and Provisions for Public Health Surveillance of Zika and Other Emerging Infectious Diseases in Canada: Summary and Analysis of the 2016 Environmental Scan". [<https://nccid.ca/publications/summary-analysis-zika-scan/>]. Accessed 24 August 2020.

[4] Province of Ontario. 2004. "Personal Health Information Protection Act". [<https://www.ontario.ca/laws/statute/04p03#BK17>]. Accessed 24 August 2020.

2.4.5 International data sharing

2.4.5a

Has the government made a commitment via public statements, legislation and/or a cooperative agreement to share surveillance data during a public health emergency with other countries in the region?

Yes, commitments have been made to share data for more than one disease, Yes, commitments have been made to share data only for one disease = 1, No = 0

Current Year Score: 2

The Government of Canada has made commitments to share surveillance data for multiple diseases during a public health emergency with other countries in the region. In 2012, Canada, Mexico, and the United States issued the North American Plan for Animal and Pandemic Influenza. Chapter 4 of the plan includes commitments by the three countries to "strengthen our existing sharing of epidemiological and surveillance data", especially in the context of a public health emergency such as pandemic influenza. Specifically, the plan commits Canada to "Sharing regular situation reports with essential epidemiological data, in the event of a pandemic" and "Collaborating to develop guidelines, principles and procedures for information and data sharing for novel and pandemic influenza viruses". [1] In addition, PulseNet Canada is a food safety surveillance laboratory network that is modelled after PulseNet in the United States. PulseNet Canada and PulseNet USA signed a memorandum of understanding in 2005, which was fully implemented in 2007 and allows both networks to share laboratory data and have read-only access to the other's laboratory data information system. [2, 3] In 2016, the Canadian

Institutes of Health Research (CIHR) signed a public declaration titled "Statement on Data Sharing in Public Health Emergencies" in conjunction with the CDC, academic journals and other organisations stating that it would share research data as quickly and openly as possible during a public health emergency. [4, 5]

[1] Department of Health and Human Services. 2012. "North American Plan For Animal and Pandemic Influenza".

[<https://www.phe.gov/Preparedness/international/Documents/napapi.pdf>]. Accessed 24 August 2020.

[2] Public Health Agency of Canada. 2019. "PulseNet Canada". [<https://www.canada.ca/en/public-health/programs/pulsenet-canada.html>]. Accessed 24 August 2020.

[3] PulseNet International. 2019. "PulseNet Canada". [<https://pulsenetinternational.org/networks/canada.asp>]. Accessed 24 August 2020.

[4] Canadian Institutes of Health Research. 2016. "CIHR Health Research and Health-Related Data Framework and Action Plan". [<http://www.cihr-irsc.gc.ca/e/50182.html>]. Accessed 24 August 2020.

[5] BioMed Central. 2016. "Statement on Data Sharing in Public Health Emergencies".

[<https://www.biomedcentral.com/about/press-centre/business-press-releases/11-02-16>]. Accessed 24 August 2020.

2.5 CASE-BASED INVESTIGATION

2.5.1 Case investigation and contact tracing

2.5.1a

Is there a national system in place to provide support at the sub-national level (e.g. training, metrics standardization and/or financial resources) to conduct contact tracing in the event of a public health emergency?

Yes, there is evidence that the national government supports sub-national systems to prepare for future public health emergencies = 2, Yes, there is evidence that the national government supports sub-national systems, but only in response to active public health emergencies = 1, No = 0

Current Year Score: 1

There is no evidence that Canada has a standalone national system in place to provide support at the sub-national level to conduct contact tracing, but only in response to an active public health emergency. The Safe Restart Agreement was launched by the federal government in 2020 in response to the COVID-19 pandemic. As part of the agreement, "the Government of Canada will provide \$4.28 billion to support provinces and territories with the costs of increasing their capacity to conduct testing, perform contact tracing, and share public health data that will help fight the pandemic." [1]

There is no other evidence of such a system to prepare for future public health emergencies. The

Federal/Provincial/Territorial Public Health Response Plan for Biological Events does not mention contact tracing. [2]

Canada's "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" lists "contact investigation" as a "surveillance activity," and says that it will be conducted by local public health authorities. However, it does not otherwise describe a national system to support contact tracing. [3,4] In 2020, in response to the COVID-19 pandemic, subnational authorities have launched various contact-tracing initiatives and plans, including, for example, in Ontario and British Columbia. [5,6] In July 2020, Canada launched a voluntary contact-tracing app, "COVID Alert", which was intended to assist contact tracing around the country. [7,8] However, the app's launch did not appear to be accompanied by a broader plan. No other relevant information is shared via Canada's COVID-19 online information hubs, or the websites of the Public Health Agency of Canada and the Canadian Institutes of Health Research. [9,10] The Canadian Public Health Laboratory Network (CPHLN) does not have a website.

[1] Government of Canada. "Safe Restart Agreement". [<https://www.canada.ca/en/intergovernmental-affairs/services/safe-restart-agreement.html>]. Accessed 12 March 2021. [1] Government of Canada. 2017. "Federal/Provincial/Territorial Public

Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

[2] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 24 August 2020.

[3] Government of Canada. December 2015. "Surveillance annex: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector." [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/surveillance-annex.html#a43>]. Accessed 18 August 2020.

[4] Public Health Ontario. 2020. "COVID-19 Contact Tracing Initiative". [<https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/respiratory-diseases/novel-coronavirus/contact-tracing-initiative>]. Accessed 29 August 2020.

[5] BC Centre for Disease Control. 2020. "Contact tracing". [<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/self-isolation/contact-tracing>]. Accessed 29 August 2020.

[6] Government of Canada. 2020. "Download COVID Alert today". [<https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/covid-alert.html>]. Accessed 29 August 2020.

[7] National Post. 31 July 2020. "'Completely voluntary' COVID-19 contact tracing app ready for Canadians to download". [<https://nationalpost.com/health/canadians-can-now-download-new-covid-19-exposure-alert-smartphone-app>]. Accessed 29 August 2020.

[8] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html#a2>]. Accessed 29 August 2020.

[9] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>]. Accessed 29 August 2020.

[10] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[11] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 19 August 2020.

2.5.1b

Does the country provide wraparound services to enable infected people and their contacts to self-isolate or quarantine as recommended, particularly economic support (paycheck, job security) and medical attention?

Yes, both economic support and medical attention are provided = 2, Yes, but only economic support or medical attention is provided = 1, No = 0

Current Year Score: 1

There is evidence that Canada provides wraparound services (medical attention) to enable infected people and their contacts to self-isolate or quarantine as recommended. Economic support varies by jurisdiction and employment sector, and the evidence seems to be Covid-19 specific. Different measures at the national level provide support to self-isolating workers. For example, Canada allocated CAN\$50 million in April 2020 to provide income support to workers in food supply industries who were forced to self isolate. [1] In 2020, the government proposed an initiative called the Canada Recovery Sickness Benefit (CRSB) that provides CAN\$500 "per week for up to two weeks, for workers who are sick or must self-isolate for reasons related to COVID-19". As of March the program was still active. [2,3] There is evidence of subnational programs to support individuals who are self-isolating. For example, Alberta and Saskatchewan provinces, and the Yukon Territory offer financial assistance for self-isolating workers. [4,5] The Canada Health Act of 1985 guarantees Canadians medical attention, whether self-isolating or not. [6,7] Aside from the CRSB and existing guarantees of access to health, there is no mention in Canada's COVID-19 online information hubs (including in its instructions on how to self-isolate) of national-level economic or medical support specifically directed toward those required to self-isolate. [8,9,10] Neither the Federal/Provincial/Territorial Public Health Response Plan for Biological Events nor Canada's 2018 "Canadian Pandemic Influenza Preparedness: Planning

Guidance for the Health Sector" contain relevant provisions. [11,12] No other relevant information is shared via the websites of the Public Health Agency of Canada and the Canadian Institutes of Health Research. [13,14] The Canadian Public Health Laboratory Network (CPHLN) does not have a website.

- [1] Agriculture and Agri-Food Canada. 13 April 2020. "Keeping Canadians and workers in the food supply chain safe". [https://www.canada.ca/en/agriculture-agri-food/news/2020/04/keeping-canadians-and-workers-in-the-food-supply-chain-safe.html]. Accessed 29 August 2020.
- [2] Government of Canada. August 2020. "Canada's COVID-19 Economic Response Plan". [https://www.canada.ca/en/department-finance/economic-response-plan.html]. Accessed 29 August 2020.
- [3] Government of Canada. "Canada Recovery Sickness Benefit (CRSB)" [https://www.canada.ca/en/revenue-agency/services/benefits/recovery-sickness-benefit.html]. Accessed 12 March 2021.
- [4] Flanagan, Ryan. 26 March 2020. "Emergency benefits: What each province is offering during the COVID-19 pandemic". CTV News. [https://www.ctvnews.ca/health/coronavirus/emergency-benefits-what-each-province-is-offering-during-the-covid-19-pandemic-1.4869158]. Accessed 29 August 2020.
- [5] Lexology. 20 March 2020. "COVID-19: Consolidated briefing of federal and provincial measures". [https://www.lexology.com/library/detail.aspx?g=355f66a5-c067-4b03-85d3-aec1fd877d69]. Accessed 29 August 2020.
- [6] Government of Canada. 2020. "Canada Health Act". [https://www.canada.ca/en/health-canada/services/health-care-system/canada-health-care-system-medicare/canada-health-act.html]. Accessed 29 August 2020.
- [7] Government of Canada. 1985. "Canada Health Act (R.S.C., 1985, c. C-6)". [https://laws-lois.justice.gc.ca/eng/acts/c-6/page-1.html]. Accessed 29 August 2020.
- [8] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html#a2]. Accessed 29 August 2020.
- [9] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html]. Accessed 29 August 2020.
- [10] Government of Canada. 2020. "How to quarantine (self-isolate) at home when you may have been exposed to COVID-19 and have no symptoms". [https://www.canada.ca/en/public-health/services/publications/diseases-conditions/coronavirus-disease-covid-19-how-to-self-isolate-home-exposed-no-symptoms.html]. Accessed 29 August 2020.
- [11] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html]. Accessed 24 August 2020.
- [12] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html]. Accessed 24 August 2020.
- [13] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [https://www.canada.ca/en/public-health.html]. Accessed 29 August 2020.
- [14] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [http://www.cihr-irsc.gc.ca/e/193.html]. Accessed 19 August 2020.

2.5.1c

Does the country make de-identified data on contact tracing efforts for COVID-19 (including the percentage of new cases from identified contacts) available via daily reports (or other format) on government websites (such as the Ministry of Health, or similar)?

Yes = 1, No = 0

Current Year Score: 0

There is insufficient evidence to confirm that Canada makes de-identified data on contact tracing efforts for COVID-19 (including the percentage of new cases from identified contacts) available via daily reports (or other format) on government websites. Canada releases a detailed daily epidemiological report on COVID-19 in the country, which includes the likely exposure setting for each positive COVID-19 test. However, neither this epidemiological report nor other government COVID-19 online information hubs report complete data on contact tracing efforts and the percentage of new cases from identified contacts. [1,2,3,4] Neither the Public Health Agency of Canada nor the Canadian Institutes of Health Research shares additional relevant information via a publicly available website. [5,6] The Canadian Public Health Laboratory Network (CPHLN) does not have a website.

[1] Health Canada. 29 August 2020. "Coronavirus disease 2019 (COVID-19): Epidemiology update". [<https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>]. Accessed 29 August 2020.

[2] Public Health Agency of Canada. 29 August 2020. "Detailed preliminary information on confirmed cases of COVID-19 (Revised), Public Health Agency of Canada". [<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310078101>]. Accessed 29 August 2020.

[3] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>]. Accessed 29 August 2020.

[4] Health Canada. 2020. "Interactive data visualizations of COVID-19". [<https://health-infobase.canada.ca/covid-19/visual-data-gallery/>]. Accessed 29 August 2020.

[5] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[6] Canadian Institutes of Health Research. 2019. "Canadian Institutes of Health Research". [<http://www.cihr-irsc.gc.ca/e/193.html>]. Accessed 29 August 2020.

2.5.2 Point of entry management

2.5.2a

Is there a joint plan or cooperative agreement between the public health system and border control authorities to identify suspected and potential cases in international travelers and trace and quarantine their contacts in the event of a public health emergency?

Yes, plan(s)/agreement(s) are in place to prepare for future public health emergencies = 2, Yes, but plan(s)/agreement(s) are in place only in response to active public health emergencies = 1, No = 0

Current Year Score: 1

There is evidence that Canada has a joint plan or cooperative agreement between the public health system and border control authorities to identify suspected and potential cases in international travelers and trace and quarantine their contacts in the event of an active public health emergency, but only in response to an ongoing emergency.

There is legislation empowering border authorities to quarantine individuals suspected of being exposed to disease, but these laws do not amount to a joint plan or cooperative agreement that extends to tracing and quarantining contacts. Canada's Joint External Evaluation (JEE) report, published in 2019, describes the country as having "conducive legal and regulatory framework reflecting a holistic national travel and border health strategy". The Canada Border Services Agency and Health Canada" (2011), which "constitutes the basis for collaboration in the administration and enforcement of public health-related acts and regulations covering travellers, conveyances and cargo". However, the memorandum does not address quarantine powers. [1,2] The JEE assigns Canada a score of 5 (the highest) for both Points of Entry indicators, indicating that all routine IHR core capacities prescribed "are functioning as an all-hazard, multisectoral approach, with evidence of periodic evaluation and continuous improvement". [1,3] The authorities are empowered to quarantine potential

cases by the Quarantine Act (updated 2005) and its 2006 Regulations. [1,4,5] The Act includes provisions that give a quarantine officer the power to refer a traveller for treatment or detain them if there is reason to believe they have been in close proximity with a potential case. [4,5]

There is evidence that public health system and border control authorities are coordinating their policies in response to the COVID-19 pandemic. Canada Border Services Agency has launched the ArriveCAN mobile app to make it easier for travellers to provide their contact information upon entering the country. Data obtained from the mobile application will be used by the Public Health Agency of Canada to administer and enforce legislation and keep Canadians safe and healthy.[6]

[1] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[2] Government of Canada. 2011. " Umbrella memorandum of understanding between the Canada Border Services Agency and Health Canada". [https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/cps-spc/alt_formats/pdf/legislation/acts-lois/pest/mou-cbsa-hc-entente.pdf]. Accessed 29 August 2020.

[3] World Health Organization (WHO). 2018. "Joint External Evaluation Tool".

[<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 21 August 2020.

[4] Government of Canada. 2005. "Quarantine Act (S.C. 2005, c. 20)". [<https://laws-lois.justice.gc.ca/eng/acts/q-1.1/page-1.html>]. Accessed 29 August 2020.

[5] Government of Canada. 11 August 2020. "Quarantine Regulations". [https://laws-lois.justice.gc.ca/PDF/C.R.C.,_c._1368.pdf]. Accessed 29 August 2020.

[6] Toronto Pearson. "Government of Canada launches ArriveCAN mobile app for passengers to complete mandatory info digitally" April 29, 2020. [<https://www.torontopearson.com/en/whats-happening/stories/arrivecan>]

2.6 EPIDEMIOLOGY WORKFORCE

2.6.1 Applied epidemiology training program, such as the field epidemiology training program, for public health professionals and veterinarians (e.g., Field Epidemiology Training Program [FETP] and Field Epidemiology Training Program for Veterinarians [FETPV])

2.6.1a

Does the country meet one of the following criteria?

- Applied epidemiology training program (such as FETP) is available in country
- Resources are provided by the government to send citizens to another country to participate in applied epidemiology training programs (such as FETP)

Needs to meet at least one of the criteria to be scored a 1 on this measure. , Yes for both = 1 , Yes for one = 1 , No for both = 0

Current Year Score: 1

Canada has an applied epidemiology training program available in country. There is no public evidence that Canada provides resources to send citizens to another country to participate in applied epidemiology training programs. The Canadian Field Epidemiology Program (CFEP) trains public health professionals in applied epidemiology during a two-year full-time programme as employees of the Public Health Agency of Canada (PHAC). These field epidemiologists in training "work and learn at placement sites within a provincial, territorial, regional or local government department or public health agency" and must complete nine professional experience guidelines: Field investigation, Epidemiologic analysis, Public health surveillance

system, Peer-reviewed journal, Public health update, Oral presentation, Conference abstract, General communication, and Public health service. CFEP partners with Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) and the World Health Organisation (WHO)'s Global Outbreak Alert and Response Network (GOARN), potentially providing participants with "the opportunity to present their work at international conferences and support investigations outside Canada". [1] The websites of the PHAC and TEPHINET do not contain additional information regarding Canada providing resources to send citizens to another country to participate in applied epidemiology training programs. [2, 3] Canada's Joint External Evaluation report, published in 2019, assigns a Canada a score of 5 (the highest) for the indicator "FETP or other applied epidemiology-training programme in place", indicating that the country has "three levels of FETP (basic, intermediate and advanced) or comparable applied epidemiology training programme(s) are in place ... with sustainable national funding". [4,5]

[1] Public Health Agency of Canada. 2019. "Canadian Field Epidemiology Program". [<https://www.canada.ca/en/public-health/services/public-health-practice/canadian-field-epidemiology-program.html>]. Accessed 24 August 2020.

[2] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 24 August 2020.

[3] Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET). 2019. "TEPHINET". [<https://www.tephinet.org/>]. Accessed 24 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] World Health Organization (WHO). 2018. "Joint External Evaluation Tool". [<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 21 August 2020.

2.6.1b

Are the available field epidemiology training programs explicitly inclusive of animal health professionals or is there a specific animal health field epidemiology training program offered (such as FETPV)?

Yes = 1 , No = 0

Current Year Score: 1

The Canadian Field Epidemiology Program (CFEP) is explicitly inclusive of animal health professionals. There is no public evidence that a specific animal health field epidemiology training program offered. CFEP's application and hiring process occurs via Public Service Commission of Canada. The Commission's archived listings document that CFEP accepts applicants from three career tracks: Epidemiologist (EC-05), Medical Doctor (MD-MOF-01), and Veterinary Epidemiologist (VM-02). Veterinary epidemiologists (VM-02) are defined as individuals with a graduate degree in epidemiology or public health and an undergraduate degree in veterinary medicine. [1] The websites of the Public Health Agency of Canada (PHAC) and Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) do not contain additional information regarding a specific animal health field epidemiology training program offered in Canada. [2, 3] Canada's Joint External Evaluation (JEE) report, published in 2019, assigns a Canada a score of 5 (the highest) for the indicator "FETP or other applied epidemiology-training programme in place", indicating that the country has "three levels of FETP (basic, intermediate and advanced) or comparable applied epidemiology training programme(s) are in place ... with sustainable national funding". However, the JEE does not offer additional information about whether training programs are inclusive of animal health professionals. [4,5]

[1] Public Health Agency of Canada. 2018. "Field Epidemiologist Reference number: AHS18J-019280-000059".

[<https://emploisfp-psjobs.cfp-psc.gc.ca/psrs-srpf/applicant/page1800?poster=1208357>]. Accessed 24 August 2020.

[2] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 24 August 2020.

[3] Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET). 2019. "TEPHINET". [<https://www.tephinet.org/>]. Accessed 24 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] World Health Organization (WHO). 2018. "Joint External Evaluation Tool". [<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 21 August 2020.

2.6.2 Epidemiology workforce capacity

2.6.2a

Is there public evidence that the country has at least 1 trained field epidemiologist per 200,000 people?

Yes = 1, No = 0

Current Year Score: 1

2020

Completed JEE assessments; Economist Impact analyst qualitative assessment based on official national sources, which vary by country

Category 3: Rapid response to and mitigation of the spread of an epidemic

3.1 EMERGENCY PREPAREDNESS AND RESPONSE PLANNING

3.1.1 National public health emergency preparedness and response plan

3.1.1a

Does the country have an overarching national public health emergency response plan in place which addresses planning for multiple communicable diseases with epidemic or pandemic potential?

Evidence that there is a plan in place, and the plan is publicly available = 2, Evidence that the plan is in place, but the plan is not publicly available OR, Disease-specific plans are in place, but there is no evidence of an overarching plan = 1, No evidence that such a plan or plans are in place = 0

Current Year Score: 2

Canada has an overarching national public health emergency response plan in place which addresses planning for multiple communicable diseases with pandemic potential. It is in place and publicly available. The Federal/Provincial/Territorial Public Health Response Plan for Biological Events from 2017 is designed to "contribute to a coordinated, system-wide approach to emergency management that can be applied if necessary in a whole of government response". [1] The plan's focus "is on public health events that are biological in nature and require a public health response at both the P/T [subnational] and

federal levels". Under the scope of the plan, biological events "can be naturally occurring disease outbreaks at national and international levels, accidental exposure to pathogens (disease causing agent) in the context of biomedical diagnostics and research, significant shortages of drugs and biologics or intentional use of pathogens or biotoxin (poisonous substance produced by a living organism) against humans, plants, or animals for harmful purposes". And biological agents are defined to "include bacteria, viruses, fungi, other microorganisms and their associated toxins". [1] The plan includes four levels of response: Routine, which is activated during an outbreak within a single jurisdiction and relies on existing governance structures for response; Heightened, which is activated during and outbreak in multiple jurisdictions and has the objective of controlling the outbreak; Escalated, which can be activated for unusual illnesses, public health emergencies of international concern (PHEIC) outside of Canada, or events that will have implications for Canada or require support from the country; and Emergency, which covers PHEICs inside Canada and other events that require immediate response. [1] The Plan includes a governance structure that coordinates subnational response and the Federal Health Portfolio Operations Centre (HPOC), which is an emergency operations centre for public health events at the federal level. [1] Canada's Joint External Evaluation (JEE) report, published in 2019, describes the Public Health Response Plan for Biological events as being "in place", and notes that it facilitates "formal coordination of responses to public health events that are biological in nature and of a severity, scope or significance to require the involvement of senior level decision-makers at a national level". [2] Additionally, Canada's National Microbiology Laboratory (NML) has an emergency management plan to guide its response to biological events. The plan includes "Site response, Continuity and Site support" in order to provide laboratory services needed to respond to biological events. [3]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[3] Marcino, D. and Gordon, K. 2018. "An overview of the National Microbiology Laboratory emergency management program". [<https://www.canada.ca/content/dam/phac-aspc/documents/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2018-44/issue-5-may-3-2018/ccdrv44i05a02-eng.pdf>]. Accessed 24 August 2020.

3.1.1b

If an overarching plan is in place, has it been updated in the last 3 years?

Yes = 1 , No /no plan in place= 0

Current Year Score: 1

Canada has an overarching national public health emergency response plan in place which addresses planning for multiple communicable diseases with pandemic potential, and which has been updated in the past three years. Canada's Federal/Provincial/Territorial Public Health Response Plan for Biological Events was issued in October 2017. The Plan states that it will be updated at least every three years by the Public Health Infrastructure Steering Committee (PHI-SC) "and any changes will be tracked and noted as amendments in the plan". In addition, after action reviews for events and simulations will be used to determine changes and updates to the Plan. [1] Canada's National Microbiology Laboratory (NML) emergency management plan was created after the 2003 SARS (Severe Acute Respiratory Syndrome) outbreak. Documentation does not contain definitive information regarding its last update. [2]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [[https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-](https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html)

events.html]. Accessed 24 August 2020.

[2] Marcino, D. and Gordon, K. 2018. "An overview of the National Microbiology Laboratory emergency management program". [<https://www.canada.ca/content/dam/phac-aspc/documents/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2018-44/issue-5-may-3-2018/ccdrv44i05a02-eng.pdf>]. Accessed 24 August 2020.

3.1.1c

If an overarching plan is in place, does it include considerations for pediatric and/or other vulnerable populations?

Yes = 1 , No /no plan in place= 0

Current Year Score: 0

There is insufficient evidence that Canada has an overarching national public health emergency response plan in place that includes considerations for paediatric or other vulnerable populations. Canada's "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" provides guidance on vulnerable populations with respect to prevention, control and surveillance of pandemic influenza. For example, the guidances describe visiting procedures during an influenza outbreak for vulnerable patients (such as the neonatal intensive care unit) and discusses specialized treatment protocols for children, pregnant women, the elderly and immunocompromised patients. [1,2,3] However, there is no public evidence that Canada's Federal/Provincial/Territorial Public Health Response Plan for Biological Events—its overarching plan—includes considerations for paediatric and other vulnerable populations. The Plan does not mention paediatric or elderly populations specifically and only mentions the "vulnerability of the affected populations" in a biological event generally. The Plan only specifically mentions "federal populations", which are populations that receive health care from the federal government (government employees and First Nations, for example), in terms of specifically considering specific populations. [4]

[1] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 24 August 2020.

[2] Government of Canada. August 2018. "Prevention and control for health care settings: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/prevention-and-control-of-influenza-during-a-pandemic-for-all-healthcare-settings.html>]. Accessed 24 August 2020.

[3] Government of Canada. August 2018. "Clinical care guidelines and tools: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/health-services-clinical-care-guidelines-and-tools.html>]. Accessed 24 August 2020.

[4] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

3.1.1d

Does the country have a publicly available plan in place specifically for pandemic influenza preparedness that has been updated since 2009?

Yes = 1 , No = 0

Current Year Score: 1

2020

WHO Strategic Partnership for IHR and Health Security (SPH)

3.1.2 Private sector involvement in response planning

3.1.2a

Does the country have a specific mechanism(s) for engaging with the private sector to assist with outbreak emergency preparedness and response?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that Canada has specific mechanisms for engaging with the private sector to assist with outbreak emergency preparedness and response. The plans and mechanisms that exist are implemented at the subnational level. The 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events only mentions the private sector in terms of providing technical recommendations and guidance to private laboratories during a public health emergency. The Plan notes that "linkages and channels of communication between ministries, programs and agencies of government, non-governmental organizations and the private sector" are established at the provincial and territorial levels. Further, all provinces and territories "have their own governance and response structures for coordinating the response to emergencies impacting the health sector". [1] Additionally, the 2011 Federal Emergency Response Management System (FERMS), which guides emergencies in general in Canada mentions the importance of the private sector, but makes no mention of specific mechanisms. [2] For example, the province of British Columbia has an All-Hazard Plan that was issued by the Emergency Management office in 2012. The plan states that private firms that own or operate critical infrastructure are required by law to maintain contingency plans. The plan further states that representatives of these firms are usually present at provincial emergency operations centres to interface and work with government agencies during an emergency. The All-Hazard Plan includes "disease and epidemics", citing pandemic influenza as an example, in its list of hazards faced by the province. [3] However, also at the subnational level, neither the province of British Columbia's 2020 Pandemic Influenza Provincial Coordination Plan nor its 2012 Public Health and Medical Services Annex to the All-Hazard Plan mention coordination with the private sector. [4, 5] The websites of Public Health Agency of Canada and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding specific mechanisms for engaging with the private sector to assist with outbreak emergency preparedness and response. [6, 7] Canada's Joint External Evaluation (JEE) report, published in 2019, in its section on Risk Communication, mentions that "during emergencies, communication activities can also be coordinated with NGOs and the private sector", but otherwise does not describe mechanisms for engaging with the private sector to assist with outbreak response. [8]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

[2] Public Safety Canada. January 2011. "Federal Emergency Response Plan". [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/mrgnc-rspns-pln/index-en.aspx>]. Accessed 24 August 2020.

[3] Province of British Columbia. 2012. "The All-Hazard Plan". [<https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/embc-all-hazard-plan.pdf>]. Accessed 24 August 2020.

[4] Province of British Columbia. February 2020. "British Columbia Pandemic Influenza Provincial Coordination Plan". [<https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/pandemic-provincial-coordination-plan.pdf>]. Accessed 24 August 2020.

- [5] Province of British Columbia. 2012. "Public Health and Medical Services Annex". [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/public-health-and-medical-services-annex.pdf]. Accessed 24 August 2020.
- [6] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [https://www.canada.ca/en/public-health.html]. Accessed 24 August 2020.
- [7] Public Safety Canada. 2019. "Public Safety Canada". [https://www.publicsafety.gc.ca/index-en.aspx]. Accessed 24 August 2020.
- [8] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 24 August 2020.

3.1.3 Non-pharmaceutical interventions planning

3.1.3a

Does the country have a policy, plan and/or guidelines in place to implement non-pharmaceutical interventions (NPIs) during an epidemic or pandemic?

Yes, a policy, plan and/or guidelines are in place for more than one disease = 2, Yes, but the policy, plan and/or guidelines exist only for one disease = 1, No = 0

Current Year Score: 2

Canada has a plan in place to implement non-pharmaceutical interventions (NPIs) during an epidemic or pandemic. The Federal/Provincial/Territorial Public Health Response Plan for Biological Events (2017) lists, among its objectives and strategies for outbreak control (Table 2.2), several NPIs that may be implemented to minimize spread, including "case isolation, rapid contact identification and management, decontamination at source, vector control, mitigate risk from animal sources/exposures". The Plan uses the term "public health measures" to refer to NPIs, and specifies that they can be deployed in response to an ongoing outbreak. [1] Canada's "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" similarly lists a variety of "public health measures" and is more specific about when they can be implemented, for example noting that the detection of a novel virus in a local jurisdiction can result in school closures. [2] The document notes that Canadian authorities derive the power to implement many such public health measures from the Quarantine Act, updated in 2005. [2,3] Canada's Joint External Evaluation (JEE) report, published in 2019, describes the Quarantine Act as "fully empowering federal public health authorities, is regarded as sufficient for Canada to comply with IHR provisions related to the implementation of public health measures at PoE, including those concerning arriving and departing travellers, baggage, cargo, conveyances or goods". The JEE does not otherwise describe non-pharmaceutical interventions. [4] Canada activated its Federal/Provincial/Territorial Public Health Response Plan for Biological Events in response to the COVID-19 pandemic, including NPIs such as the closure of non-essential businesses, schools, and issuing requirements for social distancing. [5] In April 2020, Canada published a plan to lift some of the NPIs it had implemented in response to the pandemic, according to local needs. [6]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html]. Accessed 29 August 2020.

[2] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html]. Accessed 29 August 2020.

[3] Government of Canada. 2005. "Quarantine Act (S.C. 2005, c. 20)". [https://laws-lois.justice.gc.ca/eng/acts/q-1.1/page-1.html]. Accessed 29 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 21 August 2020.

[5] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>]. Accessed 29 August 2020.

[6] Government of Canada. 30 April 2020. "Lifting of restrictive public health measures - Recommendations from the F/P/T Special Advisory Committee on COVID-19". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/recommendations-lifting-restrictive-public-health-measures.html>]

3.2 EXERCISING RESPONSE PLANS

3.2.1 Activating response plans

3.2.1a

Does the country meet one of the following criteria?

- Is there evidence that the country has activated their national emergency response plan for an infectious disease outbreak in the past year?

- Is there evidence that the country has completed a national-level biological threat-focused exercise (either with WHO or separately) in the past year?

Needs to meet at least one of the criteria to be scored a 1 on this measure. , Yes for both = 1 , Yes for one = 1 , No for both = 0

Current Year Score: 1

Canada activated its national emergency response plan for an infectious disease outbreak in the past year. On January 15, 2020, Canada activated its 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events in response to the COVID-19 outbreak, which became a global pandemic. [1,2] There is no public evidence that Canada has in the past year completed a national-level biological threat-focused exercise (either with the World Health Organization [WHO] or separately) in the past year. The websites of the WHO IHR Portal, WHO Canada page, Pan American Health Organization, Public Health Agency of Canada (PHAC), Agriculture and Agri-Food Canada, and Public Safety Canada do not contain additional information regarding such an exercise. [3, 4, 5, 6,7,8] The PHAC's Health Portfolio Operations Centre (HPOC) does not have a website. [6]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

[2] Government of Canada. 11 June 2020. "Government of Canada takes action on COVID-19". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/government-canada-takes-action-covid-19.html>]. Accessed 25 August 2020.

[3] World Health Organization. 2020. "Strategic Partnership for International Health Regulations (2005) and Health Security (SPH)". [<https://extranet.who.int/sph/simulation-exercise>]. Accessed 25 August 2020.

[4] World Health Organization. 2020. "Countries - Canada". [<https://www.who.int/countries/can/en/>]. Accessed 25 August 2020.

[5] Pan American Health Organization. 2020. "PAHO Canada". [<https://www.paho.org/can/index.php?lang=en>]. Accessed 25 August 2020.

[6] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 25 August 2020.

[7] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 25 August 2020.

[8] Public Safety Canada. 2020. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 25 August 2020.

3.2.1b

Is there evidence that the country in the past year has identified a list of gaps and best practices in response (either through an infectious disease response or a biological-threat focused exercise) and developed a plan to improve response capabilities?

Yes, the country has developed and published a plan to improve response capacity = 2 , Yes, the country has developed a plan to improve response capacity, but has not published the plan = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence that Canada has in the past year has undergone an exercise to identify a list of gaps and best practices through either an after action review (post emergency response) or a biological threat-focused IHR(International Health Regulation) exercise with the World Health Organization (WHO). The websites of the WHO IHR Portal, WHO Canada page, Pan American Health Organization, Public Health Agency of Canada (PHAC), Agriculture and Agri-Food Canada, and Public Safety Canada do not contain additional information regarding an exercise to identify a list of gaps and best practices through either an after action review (post emergency response) or a biological threat-focused IHR exercise with the WHO. [1, 2, 3, 4, 5, 6] The PHAC's Health Portfolio Operations Centre (HPOC) does not have a website. [4] There is, however, evidence that After Action Reviews (AARs) may be conducted although public evidence may not exist. An evaluation report of emergency preparedness activities between 2012 and 2017 indicates that " Of the 10 major events that occurred over the evaluation period, three did not have AARs available for review (Syrian refugee response ended March 1, 2016, Zika response ended January 13, 2017, and Fentanyl response ended March 31, 2017). " This demonstrates that seven major events did have AARs completed. However, there is no evidence of AARs from within the past year. [7] Canada's Joint External Evaluation (JEE) report, published in 2019, notes that "after-action reviews and exercises, with multiple national, regional, provincial and locally run exercises take place each year and range from small workshops and tabletop exercises to large, complex, multijurisdictional exercises", but does not specifically provide an example of such an exercise that was conducted in the past year. [8]

[1] World Health Organization. 2020. "Strategic Partnership for International Health Regulations (2005) and Health Security (SPH)". [<https://extranet.who.int/sph/after-action-review>]. Accessed 25 August 2020.

[2] World Health Organization. 2020. "Countries - Canada". [<https://www.who.int/countries/can/en/>]. Accessed 25 August 2020.

[3] Pan American Health Organization. 2020. "PAHO Canada". [<https://www.paho.org/can/index.php?lang=en>]. Accessed 25 August 2020.

[4] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 25 August 2020.

[5] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 25 August 2020.

[6] Public Safety Canada. 2020. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 25 August 2020.

[7] Health Canada and the Public Health Agency of Canada. March 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17." [<https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html#s4-4-1>]. Accessed 25 August 2020.

[8] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 25 August 2020.

3.2.2 Private sector engagement in exercises

3.2.2a

Is there evidence that the country in the past year has undergone a national-level biological threat-focused exercise that has included private sector representatives?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence that Canada has in the past year undergone a national-level biological threat-focused exercise that has included private sector representatives. The websites of the World Health Organization (WHO) IHR (International Health Regulation) Portal, WHO Canada page, Pan American Health Organization, Public Health Agency of Canada (PHAC), Agriculture and Agri-Food Canada, and Public Safety Canada do not contain additional information regarding such an exercise. [1, 2, 3, 4, 5, 6] The PHAC's Health Portfolio Operations Centre (HPOC) does not have a website. [4] There is, however, evidence that exercises may be conducted that are not fully publicly documented. Canada's Joint External Evaluation (JEE) report, published in 2019, notes that "After-action reviews and exercises, with multiple national, regional, provincial and locally run exercises take place each year and range from small workshops and tabletop exercises to large, complex, multijurisdictional exercises", but does not specifically provide an example of such an exercise that was conducted in the past year. [7]

[1] World Health Organization. 2020. "Strategic Partnership for International Health Regulations (2005) and Health Security (SPH)". [https://extranet.who.int/sph/simulation-exercise]. Accessed 25 August 2020.

[2] World Health Organization. 2020. "Countries - Canada". [https://www.who.int/countries/can/en/]. Accessed 25 August 2020.

[3] Pan American Health Organization. 2020. "PAHO Canada". [https://www.paho.org/can/index.php?lang=en]. Accessed 25 August 2020.

[4] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [https://www.canada.ca/en/public-health.html]. Accessed 25 August 2020.

[5] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada". [http://www.agr.gc.ca/eng/home/?id=1395690825741]. Accessed 25 August 2020.

[6] Public Safety Canada. 2020. "Public Safety Canada". [https://www.publicsafety.gc.ca/index-en.aspx]. Accessed 25 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 25 August 2020.

3.3 EMERGENCY RESPONSE OPERATION

3.3.1 Emergency response operation

3.3.1a

Does the country have in place an Emergency Operations Center (EOC)?

Yes = 1 , No = 0

Current Year Score: 1

Canada has in place an Emergency Operations Centre for the Health Portfolio at the federal level. The Health Portfolio Operations Centre (HPOC) coordinates "response activities to significant public health events of national interest within the Health Portfolio's mandate, and acts as the point of contact for providing emergency management governance support and operational communications". The HPOC is integrated in the Federal/Provincial/Territorial Public Health Response Plan for Biological Events, where it is tasked with supporting technical and logistics operations and develops the incident action plan during a public health emergency. [1] The HPOC manages the Public Health Agency of Canada's (PHAC) response to public health emergencies and liaises with the Department of Public Safety and Emergency Preparedness. [2]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html]. Accessed 25 August 2020.

[2] Government of Canada. 2019. "Emergencies and Disasters". [https://www.canada.ca/en/health-canada/services/health-concerns/emergencies-disasters.html]. Accessed 25 August 2020.

3.3.1b

Is the Emergency Operations Center (EOC) required to conduct a drill for a public health emergency scenario at least once per year or is there evidence that they conduct a drill at least once per year?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that the Health Portfolio Operations Centre (HPOC) conducts a drill at least once per year, but no evidence that it is required to do so. Canada's Joint External Evaluation (JEE) report, published in 2019, notes that "after-action reviews and exercises, with multiple national, regional, provincial and locally run exercises take place each year and range from small workshops and tabletop exercises to large, complex, multijurisdictional exercises", but does not specifically describe requirements for such exercises. [1] This passage in the JEE does not specifically mention the HPOC, but goes on to note that "the degree of institutionalization of this component demonstrates Canada's deeply ingrained continuous quality improvement culture". [1] Canada's 2007 Emergency Management Act states that the Minister of Public Safety and Emergency Preparedness must conduct exercises and provide training related to emergency management (Section 4), though it does not set a requirement for how often such simulations should occur. [2] Section 6 of the Act describes responsibilities for all government ministers, which include establishing sectoral emergency plans and conducting exercises related to those plans. However, the Act does not set a requirement for how often such simulations should occur. [2] According to a 2018 audit of the Public Health Agency of Canada's (PHAC) Emergency Preparedness and Response Activities, PHAC "has conducted a wide variety of exercise activities to meet its obligations under the Emergency Management Act". PHAC prepares a "multi-year exercise plan reflecting emerging priority areas". It further notes that the HPOC was "activated for 10 events for a total of 1,067 days of emergency response" during the period 2012-17. [3] The World Organisation for Animal Health (OIE)'s 2017 PVS Evaluation Report notes that "simulation exercises are regularly undertaken nationally, with international partners, and by some of the provinces", but does not describe a requirement to carry out simulations at least once per year. [4] The websites of PHAC and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding a requirement to conduct a drill at least once per year. [5,6]

[1] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 25 August 2020.

[2] Government of Canada. 2019. "Emergency Management Act". [https://laws-lois.justice.gc.ca/eng/acts/e-

4.56/FullText.html]. Accessed 25 August 2020.

[3] Health Canada and the Public Health Agency of Canada. 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17". [<https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html>]. Accessed 25 August 2020.

[4] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada". [http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 25 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 25 August 2020.

[6] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 25 August 2020.

3.3.1c

Is there public evidence to show that the Emergency Operations Center (EOC) has conducted within the last year a coordinated emergency response or emergency response exercise activated within 120 minutes of the identification of the public health emergency/scenario?

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient public evidence to show that Canada's emergency operations center has conducted, within the last year, a coordinated emergency response or emergency response exercise activated within 120 minutes of the identification of the public health emergency/scenario. Canada activated its Health Portfolio Operations Centre (HPOC), a body of the Public Health Agency of Canada (PHAC), on January 15, 2020, in response to the COVID-19 outbreak, which became a global pandemic. However, it is unclear that this activation occurred within a 120-minute timeframe. [1,2] According to a 2018 audit of the Public Health Agency of Canada's (PHAC) Emergency Preparedness and Response Activities, PHAC "has conducted a wide variety of exercise activities to meet its obligations under the Emergency Management Act". PHAC prepares a "multi-year exercise plan reflecting emerging priority areas". However, documentation of these activities does not appear to be publicly available online. [3] The websites of PHAC and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding a coordinated emergency response or emergency response exercise activated within 120 minutes of the identification of the public health emergency/scenario. [4, 5] Canada's Joint External Evaluation (JEE) report, published in 2019, notes that "after-action reviews and exercises, with multiple national, regional, provincial and locally run exercises take place each year and range from small workshops and tabletop exercises to large, complex, multijurisdictional exercises", but does not specifically provide an example of such an exercise that was conducted in the past year. [6]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 24 August 2020.

[2] Government of Canada. 11 June 2020. "Government of Canada takes action on COVID-19". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/government-canada-takes-action-covid-19.html>]. Accessed 25 August 2020.

[3] Health Canada and the Public Health Agency of Canada. 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17". [<https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html>]. Accessed 25 August 2020.

[4] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 25 August 2020.

[5] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 25 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 25 August 2020.

3.4 LINKING PUBLIC HEALTH AND SECURITY AUTHORITIES

3.4.1 Public health and security authorities are linked for rapid response during a biological event

3.4.1a

Does the country meet one of the following criteria?

- Is there public evidence that public health and national security authorities have carried out an exercise to respond to a potential deliberate biological event (i.e., bioterrorism attack)?
- Are there publicly available standard operating procedures, guidelines, memorandums of understanding (MOUs), or other agreements between the public health and security authorities to respond to a potential deliberate biological event (i.e., bioterrorism attack)?

Needs to meet at least one of the criteria to be scored a 1 on this measure., Yes for both = 1, Yes for one = 1, No for both = 0

Current Year Score: 0

There is some publicly available guidelines for public health and security authorities in Canada to respond to a potential deliberate biological event but it is insufficient. Although Canada's public health and national security authorities have carried out exercises to respond to a potential deliberate biological event, both the exercises are more than 5 years old. Canadian public health and national security authorities have participated in two terrorism simulations organised by the United States. The TOPOFF 3 exercise was conducted in 2005 and involved a simulated biological and chemical attack in New Jersey. International participants included Canada and the United Kingdom. [1] The Public Health Agency of Canada (PHAC) stated that the "exercise was designed to familiarize senior officials with the issues associated with a terrorist attack involving weapons of mass destruction, and helped participants practise their roles and responsibilities in a bio-terrorism event". [2] Canada also participated in the TOPOFF 4 exercise in 2007, but that exercise focused on a simulated radiological dirty bomb instead of bioterrorism. [1] In addition, the Federal/Provincial/Territorial Public Health Response Plan for Biological Events establishes a public health emergency governance structure that could be used to respond to bioterrorism events. The Plan states that it does not cover specific linkages with public safety and security authorities, but that its procedures could apply to a bioterrorism event. [3] However, in terms of bioterrorism, PHAC states that it "works closely with Health Canada, the Department of National Defence and Public Safety (PS) as part of a system of Emergency Operation Centres (EOCs) that may be mobilized in response to calls for emergency assistance". [2] The Plan includes eight steps in its "Concept of Operations": notification, initial assessment, situational assessment, initial response planning and capability assessment, strategic review and approval, response implementation, de-escalation and after incident review. [3] The Plan also mentions several governance structures for response, including the Special Advisory Committee (SAC), the SAC Secretariat, Response Streams, Technical Advisory Committee, Public Health Network Communications Group, Logistics Advisory Committee and the Health Portfolio Operations Centre (HPOC). [3] In addition, Canada's "Federal terrorism response plan" outlines national coordination, including security and public health authorities, for responding to a terrorist attack, including biological and chemical attacks. [4] The terrorism response plan's "multi-faceted approach" includes three types of responses: crisis response, which includes police response and activation of local or provincial response plans; security and intelligence

response, which focuses on investigation, specialised response plans, international collaboration and collective federal action, among other aspects; and consequence management, which is primarily assigned to provincial authorities, assuming they have the capability, and also deals with ongoing information sharing. [4] Canada's Joint External Evaluation (JEE) report, published in 2019, lists a variety of mechanisms that exist for coordination in response to bioterrorism and other threats, including the Federal Terrorism Response Plan of 2018. [5,6] The JEE also notes that "most public health jurisdictions maintain either memoranda of understanding (MoU), agreements, protocols or plans for engaging with and sharing information with law enforcement for specific public health emergencies such as bioterrorism", and concludes that Canada has "formalized coordination mechanisms through legislation, strategic documents, joint planning activities, and bilateral and multilateral agreements among relevant agencies at multiple levels of government" to respond to security and public health threats. [5]

[1] U.S. Department of State. 2007. "Top Officials (TOPOFF)". [<https://2001-2009.state.gov/s/ct/about/c16661.htm>]. Accessed 25 August 2020.

[2] Public Health Agency of Canada. 2012. "Bioterrorism and Emergency Preparedness". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/bioterrorism-emergency-preparedness.html>]. Accessed 25 August 2020.

[3] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 25 August 2020.

[4] Public Safety Canada. 2018. "Federal terrorism response plan: Domestic concept of operations ". [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/fdrl-trrrsm-rspns-pln/index-en.aspx>]. Accessed 25 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 25 August 2020.

[6] Government of Canada. 2018. "Federal Terrorism Response Plan". [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/fdrl-trrrsm-rspns-pln/fdrl-trrrsm-rspns-pln-en.pdf>]. Accessed 25 August 2020.

3.5 RISK COMMUNICATIONS

3.5.1 Public communication

3.5.1b

Does the risk communication plan (or other legislation, regulation or strategy document used to guide national public health response) outline how messages will reach populations and sectors with different communications needs (eg different languages, location within the country, media reach)?

Yes = 1 , No = 0

Current Year Score: 1

There is some evidence of broad requirements for government communications, that Canada has plans for how messages will reach populations and sectors with different communications needs. The 2006 Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada does not specifically mention which methods and channels work for reaching different populations. The Framework states that written risk communication plans should "detail messages, materials, and the appropriate media to reach and address stakeholders". [1] However, the Framework does not describe different stakeholder groups in detail, instead stating that a stakeholder analysis should be carried out as part of the risk communications process. The Framework also notes that evaluation of the risk communications process is important to determine how communications messages and strategies may need to be modified. [1] Beyond the general health sector risk communications framework, the Communications and Stakeholder Liaison Annex of the Canadian Pandemic Influenza

Preparedness: Planning Guidance for the Health Sector (CPIP) document outlines how messages will reach populations and sectors with different communications needs. The Annex promotes a research-based approach to determining what methods and channels work for reaching different populations and then building in-house capacity to communicate with each population. Specific populations mentioned in the document include immigrants and other culturally and linguistically diverse populations. The Annex also states that public health authorities should work with community-based organisations "to help ensure that the pandemic public health messaging is delivered to vulnerable populations from a trusted source". [2] The websites of Public Health Agency of Canada and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding how risk communications messages will reach populations and sectors with different communications needs. [3,4] Canada has a Policy on Communications and Federal Identity which guides all government communications. The plan specifically mentions that communications are integrated into "emergency preparedness and crisis management planning." The requirements note that information must be provided in both official languages (English and French), "considers the needs of official language minority communities in Canada" and "uses a variety of media and platforms to maximize reach". [5] Canada's Joint External Evaluation (JEE) report, published in 2019, says that all government communication materials in Canada "are produced in the two official languages (English and French), as well as in a variety of other languages including indigenous languages where needed". [6] It also gives Canada score of 5 (the highest) for the risk communication indicator "public communication", indicating that "the government, partners and diverse media outlets are engaged in robust and increasingly responsive collaboration to provide health advice". [6,7] Further, the JEE notes the existence of additional plans that may be relevant, including Protocols for Health Emergency Risk Communication- Health Canada's Communications and Public Affairs Branch (2013). However, these plans cannot be located online. [6]

[1] Minister of Health. 2006. "Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada". [https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ahc-asc/alt_formats/pacrb-dgapcr/pdf/pubs/ris/ris-comm-eng.pdf]. Accessed 26 August 2020.

[2] Public Health Agency of Canada. 2018. "Communications and Stakeholder Liaison Annex".

[<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/communications-stakeholder-liaison-annex.html#toc20>]. Accessed 26 August 2020.

[3] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 26 August 2020.

[4] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 26 August 2020.

[5] Government of Canada. 2016. "Policy on Communications and Federal Identity." [<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=30683>]. Accessed 26 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 26 August 2020.

[7] World Health Organization (WHO). 2018. "Joint External Evaluation Tool".

[<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 26 August 2020.

3.5.1 Risk communication planning

3.5.1a

Does the country have in place, either in the national public health emergency response plan or in other legislation, regulation, or strategy documents, a section detailing a risk communication plan that is specifically intended for use during a public health emergency?

Yes = 1 , No = 0

Current Year Score: 1

Health Canada and the Public Health Agency of Canada (PHAC) have in place a risk communication plan that is specifically intended for use during all public health emergencies. In 2006, the agencies issued the Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada. Health Canada is the "federal department responsible for helping the people of Canada maintain and improve their health". [1] The Framework "emphasizes a strategic, systematic approach to formulating and implementing effective risk communications" and includes five guiding principles, implementation guidelines and a detailed process for risk communications. The five guiding principles are: strategic risk communications is integral to integrated risk management; stakeholders are the focal point; decisions are evidence-based, using social and natural sciences; risk management and risk communications processes are transparent; and continuous improvement via evaluation. [1] The Framework's purpose is to "support all Health Canada and PHAC professionals involved in risk management activities in integrating effective risk communications into their work". [1] In addition, the 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events mentions implementing a risk communication strategy to minimise social disruption and public anxiety during a public health emergency. [2] A detailed risk communications strategy is contained in the Communications and Stakeholder Liaison Annex of the Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector (CPIP) document. [3] The Annex discusses the strategic risk communications framework and applies it to a public health emergency involving a pandemic flu outbreak. The plan includes lessons learned from the 2009 H1N1 pandemic, as well as legal and ethical considerations. The goals and objectives are to "inform Canadians and the organizations that represent them about the risks posed by the pandemic so that they can take appropriate and informed actions" and "engage citizens and stakeholders in dialogue on pandemic response plans that impact their health". [3] The websites of Public Health Agency of Canada and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding a risk communication plan that is specifically intended for use during all public health emergencies. [4, 5] Canada's Joint External Evaluation (JEE) report, published in 2019, says that "Canada has a comprehensive system in place to communicate during emergencies at all levels of government and with a wide variety of stakeholders". [6] The report also assigns Canada a score of 4 for the risk communication indicator "risk communication systems", indicating that there is "a fully operational national system established". [6,7] Further, the JEE notes the existence of additional plans that may be relevant, including Protocols for Health Emergency Risk Communication-Health Canada's Communications and Public Affairs Branch (2013). However, these plans cannot be located online. [6]

[1] Minister of Health. 2006. "Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada". [https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ahc-asc/alt_formats/pacrb-dgapcr/pdf/pubs/ris-comm-eng.pdf]. Accessed 26 August 2020.

[2] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 26 August 2020.

[3] Public Health Agency of Canada. 2018. "Communications and Stakeholder Liaison Annex". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/communications-stakeholder-liaison-annex.html#toc20>]. Accessed 26 August 2020.

[4] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 26 August 2020.

[5] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 26 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 26 August 2020.

[7] World Health Organization (WHO). 2018. "Joint External Evaluation Tool".

[<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>]. Accessed 26 August 2020.

3.5.1c

Does the risk communication plan (or other legislation, regulation or strategy document used to guide national public health response) designate a specific position within the government to serve as the primary spokesperson to the public during a public health emergency?

Yes = 1 , No = 0

Current Year Score: 1

Canada's risk communication planning designates a specific position within the government to serve as the primary spokesperson to the public during a public health emergency. There are no relevant provisions in the Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada, a 2006 document. [1] the 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events mentions implementing a risk communication strategy to minimise social disruption and public anxiety during a public health emergency, and says that this strategy should include the identification of spokespersons. However, the Plan does not elaborate on this need or designate a specific position in the government. [2] A detailed risk communications strategy is contained in the Communications and Stakeholder Liaison Annex of the Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector (CPIP) document. The Annex notes that "Effective emergency and risk communications planning and response depends on trust-based relationships and the flow of accurate, understandable and timely information between public health authorities and citizens. The process of establishing trust and efficacy of spokespersons begins well in advance of a pandemic". It also mentions that in the H1N1 pandemic, "the Chief Public Health Officer, Federal Minister of Health, PT Ministers of Health and Chief Medical Officers of Health" served as effective spokespersons. However, there is no other discussion of designating a specific position within the government for other public health emergencies. [3,4] Canada's Joint External Evaluation (JEE) report, published in 2019, says that "There are designated spokespersons across all government levels and a multitude of public communication channels to reach various audiences in emergencies". It does not, however, mention that Canada has designated a specific position within the government to serve as spokesperson. Further, the JEE notes the existence of additional plans that may be relevant, including Protocols for Health Emergency Risk Communication- Health Canada's Communications and Public Affairs Branch (2013). However, these plans cannot be located online. [5] The websites of Public Health Agency of Canada and the Department of Public Safety and Emergency Preparedness do not contain additional relevant information. [6,7]

[1] Minister of Health. 2006. "Strategic Risk Communications Framework for Health Canada and the Public Health Agency of Canada". [https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ahc-asc/alt_formats/pacrb-dgapcr/pdf/pubs/ris/ris-comm-eng.pdf]. Accessed 26 August 2020.

[2] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 26 August 2020.

[3] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 26 August 2020.

[4] Public Health Agency of Canada. 2018. "Communications and Stakeholder Liaison Annex". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/communications-stakeholder-liaison-annex.html#toc20>]. Accessed 26 August 2020.

[5] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 26 August 2020.

[6] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 26 August 2020.

[7] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 26 August 2020.

3.5.2 Public communication

3.5.2a

In the past year, is there evidence that the public health system has actively shared messages via online media platforms (e.g. social media, website) to inform the public about ongoing public health concerns and/or dispel rumors, misinformation or disinformation?

Public health system regularly shares information on health concerns = 2, Public health system shares information only during active emergencies, but does not regularly utilize online media platforms = 1, Public health system does not regularly utilize online media platforms, either during emergencies or otherwise = 0

Current Year Score: 2

There is evidence that the Canadian public health system has, within the last year actively shared messages via online media platforms (such as social media and websites) to inform the public about ongoing public health concerns. Public Health Canada has a site that categorises all ongoing public health notices which have primarily been food-borne illness-related; this has been consistently updated over the last year. [1] The government has also provided updates via Facebook. [2] In the past year, Public Health Canada has also shared messages on ongoing cases of acute flaccid myelitis, West Nile and influenza. [3,4,5] Health Canada and the Public Health Agency of Canada have a combined, verified Twitter account that is used not only to share information about ongoing public health concerns such as COVID-19, but also to dispel rumors and misinformation. [6] For example, the account has led a vaccine campaign in the last year using hashtags to assure Canadians that vaccines are, safe, effective, and life-saving. [7] Also in the past year, the government has established several websites to share timely and accurate information about the COVID-19 pandemic, notably "Coronavirus disease (COVID-19): Outbreak update". [8,9] Regional governments have also shared information on ongoing public health events. For example, the government of New Brunswick shared updates on an ongoing measles outbreak via Twitter. [10]

[1] Government of Canada. "Public Health Notices". [<https://www.canada.ca/en/public-health/services/public-health-notices.html>]. Accessed 30 August 2020.

[2] Government of Canada. 2019. "Healthy Canadians". [<https://www.facebook.com/209857686718/posts/10157252948021719?s=90401206&sfns=mo>]. Accessed 30 August 2020.

[3] Public Health Agency of Canada. "Information for Canadians regarding reports of acute flaccid myelitis (AFM)". [<https://www.canada.ca/en/public-health/services/diseases/acute-flaccid-myelitis.html>]. Accessed 30 August 2020.

[4] Public Health Agency of Canada. "West Nile virus weekly surveillance and monitoring". [<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus/west-nile-virus-weekly-surveillance-monitoring.html>]. Accessed 30 August 2020.

[5] Public Health Agency of Canada. "Weekly influenza reports". [<https://www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/weekly-influenza-reports.html>]. Accessed 30 August 2020.

[6] Twitter. "Health Canada and PHAC." [<https://twitter.com/govcanhealth?lang=en>]. Accessed 30 August 2020.

[7] Twitter. 21 August 2020. "Health Canada and PHAC" status update. [<https://twitter.com/GovCanHealth/status/1296884708920430593?s=20>]. Accessed 30 August 2020.

[8] Government of Canada. 2020. "Coronavirus disease (COVID-19): Outbreak update". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>]. Accessed 30 August 2020.

[9] Government of Canada. 2020. "Coronavirus Disease: COVID-19". [<https://www.canada.ca/en/public->

health/services/diseases/coronavirus-disease-covid-19.html]. Accessed 30 August 2020.

[10] Government of New Brunswick. 2019. "Twitter page". [https://twitter.com/Gov_NB/status/1148263948791242752]. Accessed 30 August 2020.

3.5.2b

Is there evidence that senior leaders (president or ministers) have shared misinformation or disinformation on infectious diseases in the past two years?

No = 1, Yes = 0

Current Year Score: 1

There is no evidence that Canadian senior leaders (president or ministers) have shared misinformation or disinformation on infectious diseases in the past two years. There is no evidence of such sharing in media reports. International media has generally praised Canadian leadership's communications response to the COVID-19 pandemic. [1]

[1] Cecco, L. 9 July 2020. "'It's like night and day': Trudeau's and Trump's Covid-19 responses fuel wildly different outcomes". [theguardian.com/world/2020/jul/09/canada-coronavirus-us-justin-trudeau-donald-trump]. Accessed 30 August 2020.

3.6 ACCESS TO COMMUNICATIONS INFRASTRUCTURE

3.6.1 Internet users

3.6.1a

Percentage of households with Internet

Input number

Current Year Score: 91

2019

International Telecommunication Union (ITU)

3.6.2 Mobile subscribers

3.6.2a

Mobile-cellular telephone subscriptions per 100 inhabitants

Input number

Current Year Score: 92.53

2019

International Telecommunication Union (ITU)

3.6.3 Female access to a mobile phone

3.6.3a

Percentage point gap between males and females whose home has access to a mobile phone

Input number

Current Year Score: 6.0

2019

Gallup; Economist Impact calculation

3.6.4 Female access to the Internet

3.6.4a

Percentage point gap between males and females whose home has access to the Internet

Input number

Current Year Score: 2.0

2019

Gallup; Economist Impact calculation

3.7 TRADE AND TRAVEL RESTRICTIONS

3.7.1 Trade restrictions

3.7.1a

In the past year, has the country issued a restriction, without international/bilateral support, on the export/import of medical goods (e.g. medicines, oxygen, medical supplies, PPE) due to an infectious disease outbreak?

Yes = 0, No = 1

Current Year Score: 1

There is no public evidence that Canada has, in the past year, issued a restriction on the export/import of medical goods due to an infectious disease outbreak, including in response to the COVID-19 pandemic. The World Health Organization's disease outbreak news lists the last disease outbreak in Canada as Seoul virus in 2017. [1] The World Organisation for Animal Health (OIE) lists two animal disease notifications for Canada in 2018 (Rabbit haemorrhagic disease and Koi herpesvirus disease) and one for 2019 (Infectious hypodermal and haematopoietic necrosis virus, in shrimp). In none of these cases did the government restrict movement of goods or people. [2, 3, 4] The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and Global Affairs Canada do not contain additional information a relevant restriction, without international/bilateral support, on the export/import of medical goods stating that this was due to an infectious disease outbreak. [5,6,7] There is no evidence of relevant media reports.

[1] World Health Organization. 2019. "Disease Outbreak News - Canada".

[<https://www.who.int/csr/don/archive/country/can/en/>]. Accessed 29 August 2020.

[2] World Organisation for Animal Health. 2018. "Koi herpesvirus disease, Canada".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=27758].

Accessed 29 August 2020.

[3] World Organisation for Animal Health. 2018. "Rabbit haemorrhagic disease, Canada".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=26404].

Accessed 29 August 2020.

[4] World Organisation for Animal Health. 2019. "Infectious hypodermal and haematopoietic necrosis virus".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=31421].

Accessed 29 August 2020.

[5] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>].

Accessed 29 August 2020.

[6] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

[7] Global Affairs Canada. 2020. "Global Affairs Canada". [<https://www.international.gc.ca/gac-amc/index.aspx?lang=eng>].

Accessed 29 August 2020.

3.7.1b

In the past year, has the country issued a restriction, without international/bilateral support, on the export/import of non-medical goods (e.g. food, textiles, etc) due to an infectious disease outbreak?

Yes = 0 , No = 1

Current Year Score: 1

There is no public evidence that Canada has, in the past year, issued a restriction on the export/import of non-medical goods (e.g. food, textiles, etc) due to an infectious disease outbreak, including in response to the COVID-19 pandemic. The World Health Organization's disease outbreak news lists the last disease outbreak in Canada as Seoul virus in 2017. [1] The World Organisation for Animal Health (OIE) lists two animal disease notifications for Canada in 2018 (Rabbit haemorrhagic disease and Koi herpesvirus disease) and one for 2019 (Infectious hypodermal and haematopoietic necrosis virus, in shrimp). In none of these cases did the government restrict movement of goods or people. [2, 3, 4] The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and Global Affairs Canada do not contain additional information regarding a restriction, without international/bilateral support, on the export/import of non-medical goods due to an infectious disease outbreak during the last year. [5,6,7] There is no evidence of relevant media reports.

[1] World Health Organization. 2019. "Disease Outbreak News - Canada".

[<https://www.who.int/csr/don/archive/country/can/en/>]. Accessed 29 August 2020.

[2] World Organisation for Animal Health. 2018. "Koi herpesvirus disease, Canada".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=27758].

Accessed 29 August 2020.

[3] World Organisation for Animal Health. 2018. "Rabbit haemorrhagic disease, Canada".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=26404].

Accessed 29 August 2020.

[4] World Organisation for Animal Health. 2019. "Infectious hypodermal and haematopoietic necrosis virus".

[https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=31421].

Accessed 29 August 2020.

[5] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>].

Accessed 29 August 2020.

[6] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

[7] Global Affairs Canada. 2020. "Global Affairs Canada". [<https://www.international.gc.ca/gac-amc/index.aspx?lang=eng>].

Accessed 29 August 2020.

3.7.2 Travel restrictions

3.7.2a

In the past year, has the country implemented a ban, without international/bilateral support, on travelers arriving from a specific country or countries due to an infectious disease outbreak?

Yes = 0 , No = 1

Current Year Score: 0

There is evidence that Canada has, in the past year, implemented a ban, without international/bilateral support, on travelers arriving from a specific country or countries due to an infectious disease outbreak. In March 2020, Canada issued a blanket ban on all foreign nationals from non-essential travel to Canada. The ban remained in effect in August 2020. [1,2,3] Other than the response to the COVID-19 pandemic, there is no other evidence of a relevant ban implemented by Canada. The World Health Organization's disease outbreak news lists the last disease outbreak in Canada (aside from COVID-19) as Seoul virus in 2017. [4] The World Organisation for Animal Health (OIE) lists two animal disease notifications for Canada in 2018 (Rabbit haemorrhagic disease and Koi herpesvirus disease) and one for 2019 (Infectious hypodermal and haematopoietic necrosis virus, in shrimp). In none of these cases did the government restrict movement of goods or people. [5,6,7] The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and Global Affairs Canada do not contain additional information regarding a ban on travelers in the last year, stating that was due to an infectious disease outbreak. [8,9,10] There is no evidence of relevant media reports on bans on travelers, aside from that issued in response to the COVID-19 pandemic.

[1] Government of Canada. August 2020. "Pandemic COVID-19 all countries: avoid non-essential travel outside Canada". [<https://travel.gc.ca/travelling/health-safety/travel-health-notice/221>]. Accessed 29 August 2020.

[2] Government of Canada. August 2020. "Coronavirus disease (COVID-19): Travel restrictions, exemptions and advice". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/latest-travel-health-advice.html>]. Accessed 29 August 2020.

[3] MacGregor, Sandra. 1 July 2020. "Canada Extends Coronavirus Travel Ban On Most Foreign Travelers". Forbes.com. [<https://www.forbes.com/sites/sandramacgregor/2020/07/01/canada-extends-coronavirus-travel-ban-on-most-foreign-travelers/#65ee605170a8>]

[4] World Health Organization. 2019. "Disease Outbreak News - Canada". [<https://www.who.int/csr/don/archive/country/can/en/>]. Accessed 29 August 2020.

[5] World Organisation for Animal Health. 2018. "Koi herpesvirus disease, Canada". [https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=27758]. Accessed 29 August 2020.

[6] World Organisation for Animal Health. 2018. "Rabbit haemorrhagic disease, Canada". [https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=26404]. Accessed 29 August 2020.

[7] World Organisation for Animal Health. 2019. "Infectious hypodermal and haematopoietic necrosis virus". [https://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=31421]. Accessed 29 August 2020.

[8] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[9] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

[10] Global Affairs Canada. 2020. "Global Affairs Canada". [<https://www.international.gc.ca/gac-amc/index.aspx?lang=eng>]. Accessed 29 August 2020.

Category 4: Sufficient and robust health sector to treat the sick and protect health workers

4.1 HEALTH CAPACITY IN CLINICS, HOSPITALS, AND COMMUNITY CARE CENTERS

4.1.1 Available human resources for the broader healthcare system

4.1.1a

Doctors per 100,000 people

Input number

Current Year Score: 261.02

2017

WHO; national sources

4.1.1b

Nurses and midwives per 100,000 people

Input number

Current Year Score: 994.38

2018

WHO; national sources

4.1.1c

Does the country have a health workforce strategy in place (which has been updated in the past five years) to identify fields where there is an insufficient workforce and strategies to address these shortcomings?

Yes = 1, No = 0

Current Year Score: 0

There is no public evidence that Canada has a national health sector workforce strategy in place (which has been updated in the past five years) to identify fields where there is an insufficient workforce and strategies to address these shortcomings. The webpage for the Government of Canada's Health Human Resource Strategy (HHRS) was last updated in 2011. The HHRS provided four Strategic Directions: increasing the supply of health providers, increasing productivity to achieve more

effective use of skills, creating healthy, supportive, learning workplaces, and more effective planning and forecasting. [1] The HHRS led to the development of the "Building the Public Health Workforce for the 21st Century: A Pan-Canadian Framework for Public Health Human Resources Planning" document. The Framework was issued in 2005 and updated in 2007. [2, 3] The Framework focused on coordinating the various players involved in health human resource planning in Canada rather than creating an actual plan. [3] In 2005, the Pan-Canadian Public Health Human Resources Committee (PPHRC) issued the Pan-Canadian Strategy for Public Health Workforce Education, focused on improving educational offerings for public health professionals. [4] At the subnational level, the province of British Columbia's Ministry of Health issued a Provincial Strategy for Health Human Resources as a policy discussion paper in 2015. [5] The websites of the Public Health Agency of Canada and Employment and Social Development Canada (ESDC) do not contain additional information regarding a national health sector workforce strategy. [6, 7] Canada does not have a ministry of education at the federal level. [8] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms that the "Building the Public Health Workforce for the 21st Century" strategy was most recently updated in 2005 (not 2007, as other documents cited above indicate), and says that there is no more recent strategy. [9] The report also notes that since 2007, Canada has been developing a Core Competencies in Public Health framework for workforce development, but that this has not been widely adopted. [9,10]

[1] Government of Canada. 2011. "Health Human Resource Strategy (HHRS)". [<https://www.canada.ca/en/health-canada/services/health-care-system/health-human-resources/strategy.html>]. Accessed 26 August 2020.

[2] The Joint Task Group on Public Health Human Resources. 2005. "Building the Public Health Workforce for the 21st Century: A Pan-Canadian Framework for Public Health Human Resources Planning". [http://publications.gc.ca/collections/collection_2008/phac-aspc/HP5-12-2005E.pdf]. Accessed 26 August 2020.

[3] Health Canada. 2007. "A Framework for Collaborative Pan-Canadian Health Human Resources Planning". [<https://www.canada.ca/en/health-canada/services/health-care-system/reports-publications/health-human-resources/framework-collaborative-canadian-health-human-resources-planning-health-canada-2007.html>]. Accessed 26 August 2020.

[4] Pan-Canadian Public Health Human Resources Committee (PPHRC). 2005. "Pan-Canadian Strategy for Public Health Workforce Education". [<https://phabc.org/wp-content/uploads/2015/07/Pan-Canadian-Strategy-for-Public-Health-Workforce-Education.pdf>]. Accessed 26 August 2020.

[5] British Columbia Ministry of Health. 2015. "ENABLING EFFECTIVE, QUALITY POPULATION AND PATIENT-CENTRED CARE: A PROVINCIAL STRATEGY FOR HEALTH HUMAN RESOURCES CROSS SECTOR POLICY DISCUSSION PAPER". [<https://www.health.gov.bc.ca/library/publications/year/2015/health-human-resources-policy-paper.pdf>]. Accessed 26 August 2020.

[6] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 26 August 2020.

[7] Employment and Social Development Canada. 2019. "Employment and Social Development Canada". [<https://www.canada.ca/en/employment-social-development.html>]. Accessed 26 August 2020.

[8] Canadian Information Centre for International Credentials. 2019. "Ministries/departments responsible for education in Canada". [https://www.cicic.ca/1301/ministries_departments_responsible_for_education_in_canada.canada]. Accessed 16 March 2019.

[9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 26 August 2020.

[10] Public Health Agency of Canada. 2019. "Core Competencies for Public Health in Canada". [<https://www.canada.ca/en/public-health/services/public-health-practice/skills-online/core-competencies-public-health-canada.html>]. Accessed 26 August 2020.

4.1.2 Facilities capacity

4.1.2a

Hospital beds per 100,000 people

Input number

Current Year Score: 252

2019

WHO/World Bank; national sources

4.1.2b

Does the country have the capacity to isolate patients with highly communicable diseases in a biocontainment patient care unit and/or patient isolation room/unit located within the country?

Yes = 1, No = 0

Current Year Score: 1

Canada has the capacity to isolate patients with highly communicable diseases in a biocontainment patient care unit and/or patient isolation facility. The provincial government of British Columbia designated the Surrey Memorial Hospital as the site for suspected and confirmed cases of adult Ebola. The hospital constructed a Biocontainment Treatment Unit with separate controlled entry, dedicated air handling systems, separated controlled "warm" areas for putting on and removing personal protective equipment, separate controlled storage area for PPE, and observation panes to allow experts to observe care activities from outside the biocontainment unit. [1] Canada's Joint External Evaluation (JEE) report, published in 2019, additionally states that "most provinces have isolation units or rooms, and several have negative pressure isolation rooms". However, the JEE does not have information on specific facilities. [2]

[1] Fraser Health. 2014. "The BC Biocontainment Treatment Unit at Surrey Memorial Hospital". [<https://bc.ipac-canada.org/photos/custom/Education%20Day/The%20Biocontainment%20Unit%20at%20SMH%20Past%20Present%20and%20Future%20draft%20%20FINAL.pdf>]. Accessed 27 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 27 August 2020.

4.1.2c

Does the country meet one of the following criteria?

- Is there evidence that the country has demonstrated capacity to expand isolation capacity in response to an infectious disease outbreak in the past two years?
- Is there evidence that the country has developed, updated or tested a plan to expand isolation capacity in response to an infectious disease outbreak in the past two years?

Yes = 1, No = 0

Current Year Score: 1

There is evidence that Canada has demonstrated capacity to expand isolation capacity in response to an infectious disease outbreak in the past two years, though there is no evidence that the country has developed, updated or tested a plan to expand isolation capacity in response to an infectious disease outbreak in the past two years. In response to the COVID-19

pandemic, Canada in 2020 expanded its patient isolation facilities. For example, the Joseph Brant Hospital in Burlington began erecting a 93-bed isolation facility annex in March 2020. In the facility, according to media reports, "each patient will have a dedicated oxygen machine, staff will be equipped with the necessary personal protective equipment and a tunnel will lead into the hospital's South Tower for easy access to critical care space". [1] In another example, the government of Canada in fall 2020 funded voluntary self-isolation facilities in Toronto and Peel, Ontario, to combat the COVID-19 pandemic. [2] Canada's Joint External Evaluation (JEE) report, published in 2019, additionally states that "most provinces have isolation units or rooms, and several have negative pressure isolation rooms". However, the JEE does not have information on specific facilities. [3] There is no other relevant information shared via the public websites of the Public Health Agency of Canada or its Centre for Emergency Preparedness and Response. [4,5] The Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector, last modified in 2016, does not contain relevant provisions. [6] A related document, "Prevention and control for health care settings: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector", last modified in 2017, describes some of the necessary features of influenza patient isolation, but does not include a plan to expand capacity. [7]

[1] La Grassa, Jennifer. 31 March 2020. "Joseph Brant Hospital to erect 93-bed pandemic unit for COVID-19 surge". Canadian Broadcasting Corporation. [<https://www.cbc.ca/news/canada/hamilton/joseph-brant-hospital-to-erect-93-bed-pandemic-unit-for-covid-19-surge-1.5515931>]. Accessed 14 March 2021.

[2] Public Health Agency of Canada. 26 November 2020. "Government of Canada Announces Funding for New COVID-19 Safe Voluntary Isolation Centre in Peel, Ontario". [<https://www.canada.ca/en/public-health/news/2020/11/government-of-canada-announces-funding-for-new-covid-19-safe-voluntary-isolation-centre-in-peel-ontario.html>].

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 27 August 2020.

[4] Public Health Agency of Canada. [<https://www.canada.ca/en/public-health.html>]. Accessed 14 March 2021.

[5] Public Health Agency of Canada. "Center for Emergency Preparedness and Response". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/centre-emergency-preparedness-response.html>]. Accessed 14 March 2021.

[6] Government of Canada. August 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 14 March 2021.

[7] Government of Canada. 2017. "Prevention and control for health care settings: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/prevention-and-control-of-influenza-during-a-pandemic-for-all-healthcare-settings.html>]. Accessed 14 March 2021.

4.2 SUPPLY CHAIN FOR HEALTH SYSTEM AND HEALTHCARE WORKERS

4.2.1 Routine health care and laboratory system supply

4.2.1a

Is there a national procurement protocol in place which can be utilized by the Ministries of Health and Agriculture for the acquisition of laboratory supplies (e.g. equipment, reagents and media) and medical supplies (e.g. equipment, PPE) for routine needs?

Yes for both laboratory and medical supply needs = 2, Yes, but only for one = 1, No = 0

Current Year Score: 2

Canada has a national procurement protocol in place which can be utilized by the Ministries of Health and Agriculture for the acquisition of laboratory needs and medical supplies for routine needs. Government agencies in Canada carry out procurement processes via Public Works and Government Services Canada. Procurement processes must be competitive if the contract exceeds CD\$25,000. [1] The national procurement website lists concluded procurement processes that document that the Public Health Agency of Canada (PHAC) and Agriculture and Agri-Food Canada can acquire laboratory needs or medical supplies via the system. In February 2019, Agriculture and Agri-Food Canada acquired a centrifuge for its laboratory via the public procurement system. [2] In February 2019, PHAC acquired unspecified "laboratory equipment and supplies" via the public procurement system. [3] In July 2019, Health Canada acquired unspecified "medical and surgical instruments, equipment and supplies" via the public procurement system. [4]

[1] Public Works and Government Services Canada. 2019. "The Procurement Process". [<https://buyandsell.gc.ca/for-businesses/selling-to-the-government-of-canada/the-procurement-process>]. Accessed 27 August 2020.

[2] Public Works and Government Services Canada. 2019. "BECKMAN COULTER CANADA INC (01E91-190483/001/TOR~001)". [<https://buyandsell.gc.ca/procurement-data/contract-history/01E91-190483-001-TOR-0>]. Accessed 27 August 2020.

[3] Public Works and Government Services Canada. 2019. "HOLOGIC CANADA ULC (6D063-183923/001/NCS~001)". [<https://buyandsell.gc.ca/procurement-data/contract-history/6D063-183923-001-NCS>]. Accessed 27 August 2020.

[4] Public Works and Government Services Canada. 2019. "NOVA BIOMEDICAL CANADA LTD (H1126-132091/001/TOR~003)". [<https://buyandsell.gc.ca/procurement-data/contract-history/H1126-132091-001-TOR-2>]. Accessed 27 August 2020.

4.2.2 Stockpiling for emergencies

4.2.2a

Does the country have a stockpile of medical supplies (e.g. MCMs, medicines, vaccines, medical equipment, PPE) for national use during a public health emergency?

Yes = 2, Yes, but there is limited evidence about what the stockpile contains = 1, No = 0

Current Year Score: 2

Canada maintains a stockpile of medical supplies for national use during a public health emergency. The National Emergency Strategic Stockpile (NESS) is managed by the Public Health Agency of Canada (PHAC) and contains "health and social service supplies" including "medical and pharmaceutical supplies" to respond "to a variety of emergencies with health impacts, including influenza pandemics, terrorism events, and natural disasters". Supplies include a range of antibiotics and medical units that can be deployed to turn existing buildings into temporary clinics and treatment centres. The NESS maintains a 24-hour response capability with a central warehouse in Ottawa and other warehouses throughout the country. PHAC rotates supplies in and out of the NESS to ensure products do not expire. [1] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, Health Products and Food Branch (HPFB) of Health Canada, and the Department of Public Safety and Emergency Preparedness do not contain additional relevant information. [2, 3, 4, 5] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the existence and deployability of the NESS, noting that it includes "supplies for preventive (vaccines, potassium iodide) as well as curative (antibiotics and antivirals) measures, and equipment to deliver care (ventilators, personal protective equipment), social services supplies (beds, bedding) and mobile clinics". [6] Canada also maintain as a National Antiviral Stockpile as part of its influenza preparation. [7]

[1] Public Health Agency of Canada. 2015. "National Emergency Strategic Stockpile". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/national-emergency-strategic-stockpile.html>]. Accessed 28 August 2020.

[2] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.

[3] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 28 August 2020.

[4] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence". [<https://www.canada.ca/en/department-national-defence.html>]. Accessed 28 August 2020.

[5] Health Canada. 2019. "Health Products and Food Branch". [<https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch.html>]. Accessed 28 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

[7] Government of Canada. 2016. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector.html>]. Accessed 14 March 2021.

4.2.2b

Does the country have a stockpile of laboratory supplies (e.g. reagents, media) for national use during a public health emergency?

Yes = 2, Yes, but there is limited evidence about what the stockpile contains = 1, No = 0

Current Year Score: 0

There is insufficient evidence to confirm that Canada maintains a stockpile of laboratory supplies for national use during a public health emergency. The National Emergency Strategic Stockpile (NESS), which is managed by the Public Health Agency of Canada (PHAC), contains "health and social service supplies" including "medical and pharmaceutical supplies" to respond "to a variety of emergencies with health impacts, including influenza pandemics, terrorism events, and natural disasters". Supplies can be deployed to turn existing buildings into temporary clinics and treatment centres. The NESS maintains a 24-hour response capability with a central warehouse in Ottawa and other warehouses throughout the country. PHAC rotates supplies in and out of the NESS to ensure products do not expire. However, the government website describing the NESS does not mention the inclusion of laboratory supplies or reagents. [1] A 2010 audit of the NESS similarly does not mention laboratory supplies or reagent. [2] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the existence and deployability of the NESS, noting that it includes "supplies for preventive (vaccines, potassium iodide) as well as curative (antibiotics and antivirals) measures, and equipment to deliver care (ventilators, personal protective equipment), social services supplies (beds, bedding) and mobile clinics". However, there is no mention in the JEE of a stockpile of laboratory supplies or reagents. [3] In May 2020, Canada created a new Supply Council to manage the response to the COVID-19 pandemic, but there is no evidence that this council has created a stockpile of laboratory supplies. [4] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, Health Products and Food Branch (HPFB) of Health Canada, and the Department of Public Safety and Emergency Preparedness do not contain additional relevant information. [5,6,7,8]

[1] Public Health Agency of Canada. 2015. "National Emergency Strategic Stockpile". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/national-emergency-strategic-stockpile.html>]. Accessed 28 August 2020.

[2] Public Health Agency of Canada. 2012. "Section 2: Evaluation of the National Emergency Stockpile System (NESS) - Background". [<https://www.canada.ca/en/public-health/corporate/mandate/about-agency/office-evaluation/evaluation-reports/evaluation-national-emergency-stockpile-system/background-context.html#background-2>]. Accessed 28 August 2020.

[3] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 28 August 2020.

[4] Government of Canada. 3 May 2020. "Government of Canada creates COVID-19 supply council in support of Canada's response and recovery". [https://www.canada.ca/en/public-services-procurement/news/2020/05/government-of-canada-creates-covid-19-supply-council-in-support-of-canadas-response-and-recovery.html]. Accessed 28 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [https://www.canada.ca/en/public-health.html]. Accessed 28 August 2020.

[6] Public Safety Canada. 2019. "Public Safety Canada". [https://www.publicsafety.gc.ca/index-en.aspx]. Accessed 28 August 2020.

[7] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence". [https://www.canada.ca/en/department-national-defence.html]. Accessed 28 August 2020.

[8] Health Canada. 2019. "Health Products and Food Branch". [https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch.html]. Accessed 28 August 2020.

4.2.2c

Is there evidence that the country conducts or requires an annual review of the national stockpile to ensure the supply is sufficient for a public health emergency?

Yes = 1, No = 0

Current Year Score: 0

There is insufficient evidence that Canada conducts or requires an annual review of the national stockpile to ensure the supply is sufficient for a public health emergency. There is evidence that Canada reviews both the National Emergency Strategic Stockpile (NESS) and the National Antiviral Stockpile (NAS), but insufficient evidence to confirm the frequency of reviews. A government website describing the NESS states that Canada "continuously assesses the composition of the stockpile and refurbishes supplies that are distributed". [1] The "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17", an audit published in 2018, notes that the NESS "was evaluated in 2011-12". It also notes that the NESS "developed an inventory management system as a result of a review of lessons learned" but does not describe the features of this system. [2] According to the government's "Clinical care guidelines and tools: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector", last modified in 2017, the "size and composition of the [NAS] will be re-assessed on an ongoing basis". However, no more specific information on frequency is provided. [3] Canada's Joint External Evaluation report (JEE), published in 2019, mentions the existence of the NESS, but does not describe the frequency of reviews. [4] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, Health Products and Food Branch (HPFB) of Health Canada, and the Department of Public Safety and Emergency Preparedness do not contain additional relevant information. [5,6,7,8] A peer-reviewed 2020 article in the peer-reviewed Canadian Medical Association Journal suggested various improvements to the management of the NESS, including that the "types of supplies stocked could be reviewed regularly to ensure relevance". [9]

[1] Government of Canada. "National Emergency Supplies Stockpile". [https://www.canada.ca/en/public-health/services/emergency-preparedness-response/national-emergency-strategic-stockpile.html]. Accessed 14 March 2021.

[2] Health Canada and the Public Health Agency of Canada. 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17". [https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html]. Accessed 25 August 2020.

[3] Government of Canada. 2017. "Clinical care guidelines and tools: Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/health-services-clinical-care-guidelines-and-tools.html]. Accessed

24 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.

[6] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 28 August 2020.

[7] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence".

[<https://www.canada.ca/en/department-national-defence.html>]. Accessed 28 August 2020.

[8] Health Canada. 2019. "Health Products and Food Branch". [<https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch.html>]. Accessed 28 August 2020.

[9] Laing, S. and E. Westervelt. 13 JULY 2020. "Canada's National Emergency Stockpile System: time for a new long-term strategy". CMAJ 192

[28] : E810-E811. [<https://www.cmaj.ca/content/192/28/E810>]. Accessed 14 March 2021.

4.2.3 Manufacturing and procurement for emergencies

4.2.3a

Does the country meet one of the following criteria?

- Is there evidence of a plan/agreement to leverage domestic manufacturing capacity to produce medical supplies (e.g. MCMs, medicines, vaccines, equipment, PPE) for national use during a public health emergency?

- Is there evidence of a plan/mechanism to procure medical supplies (e.g. MCMs, medicines, vaccines, equipment, PPE) for national use during a public health emergency?

Needs to meet at least one of the criteria to be scored a 1 on this measure., Yes for both = 1, Yes for one = 1, No for both = 0

Current Year Score: 0

There is no evidence that Canada has a plan to leverage domestic manufacturing capacity to produce medical supplies for national use during a public health emergency, aside from the measures it has launched specifically in response to COVID-19, which do not explicitly have a broader application. The government announced the Plan to Mobilize Industry to fight COVID-19 in March 2020, which includes "new measures to directly support these businesses to rapidly scale up production or re-tool their manufacturing lines to develop products made in Canada that will help in the fight against COVID-19". [1] Supported products include "personal protective equipment, sanitization products, diagnostic and testing products, therapeutics, and disease tracking technology". [2] Measures include "specific challenges through the Innovative Solutions Canada program" and letters of intent signed by various Canadian manufacturers. [2] Aside from the response to the COVID-19 pandemic, however, there is no evidence of relevant plans or agreements. The National Emergency Strategic Stockpile (NESS) is managed by the Public Health Agency of Canada (PHAC) and contains "health and social service supplies" including medical and pharmaceutical supplies. However, government of descriptions of the NESS do not include any mention of relevant plans or agreements for procurement or manufacturing. [3] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, Health Products and Food Branch (HPFB) of Health Canada, and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding an agreement in place with manufacturers or distributors to procure or produce MCMs for national use during a public health emergency. [4, 5,6,7] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the existence and deployability of the NESS, but also does not mention any relevant plans or agreements for procurement or manufacturing. [8] In May 2020, Canada created a new Supply Council to manage the response to the COVID-19 pandemic, but there is no

evidence that this council has developed any relevant plans or agreements. [9]

- [1] Prime Minister of Canada. 20 March 2020. "Prime Minister announces Canada's Plan to Mobilize Industry to fight COVID-19". [<https://pm.gc.ca/en/news/news-releases/2020/03/20/prime-minister-announces-canadas-plan-mobilize-industry-fight-covid>]. Accessed 28 August 2020.
- [2] Prime Minister of Canada. 20 March 2020. "New measures under Canada's Plan to Mobilize Industry to fight COVID-19". [<https://pm.gc.ca/en/news/backgrounders/2020/03/20/new-measures-under-canadas-plan-mobilize-industry-fight-covid-19>]. Accessed 28 August 2020.
- [3] Public Health Agency of Canada. 2019. "National Emergency Strategic Stockpile". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/national-emergency-strategic-stockpile.html>]. Accessed 28 August 2020.
- [4] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.
- [5] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 28 August 2020.
- [6] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence". [<https://www.canada.ca/en/department-national-defence.html>]. Accessed 28 August 2020.
- [7] Health Canada. 2019. "Health Products and Food Branch". [<https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch.html>]. Accessed 28 August 2020.
- [8] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.
- [9] Government of Canada. 3 May 2020. "Government of Canada creates COVID-19 supply council in support of Canada's response and recovery". [<https://www.canada.ca/en/public-services-procurement/news/2020/05/government-of-canada-creates-covid-19-supply-council-in-support-of-canadas-response-and-recovery.html>]. Accessed 28 August 2020.

4.2.3b

Does the country meet one of the following criteria?

- Is there evidence of a plan/agreement to leverage domestic manufacturing capacity to produce laboratory supplies (e.g. reagents, media) for national use during a public health emergency?
- Is there evidence of a plan/mechanism to procure laboratory supplies (e.g. reagents, media) for national use during a public health emergency?

Needs to meet at least one of the criteria to be scored a 1 on this measure., Yes for both = 1, Yes for one = 1, No for both = 0

Current Year Score: 0

There is no evidence that Canada has a plan or agreement to procure or to leverage domestic manufacturing capacity to produce laboratory supplies for national use during a public health emergency. The National Emergency Strategic Stockpile (NESS) is managed by the Public Health Agency of Canada (PHAC) and contains "health and social service supplies" including "medical and pharmaceutical supplies" to respond "to a variety of emergencies with health impacts, including influenza pandemics, terrorism events, and natural disasters". However, government of descriptions of the NESS do not include any mention of relevant plans or agreements for procurement or manufacturing of laboratory supplies. [1] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, Health Products and Food Branch (HPFB) of Health Canada, and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding an agreement in place with manufacturers or distributors to procure or produce laboratory supplies for national use during a public health emergency. [2, 3, 4, 5] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the existence and deployability of the NESS, but also does not mention any relevant plans or agreements for procurement or manufacturing. [6] In May 2020, Canada created a new Supply Council to manage the

response to the COVID-19 pandemic, but there is no evidence that this council has developed any relevant plans or agreements. [7] The government announced the Plan to Mobilize Industry to fight COVID-19 in March 2020, which includes "new measures to directly support these businesses to rapidly scale up production or re-tool their manufacturing lines to develop products made in Canada that will help in the fight against COVID-19". [8] Supported products include "personal protective equipment, sanitization products, diagnostic and testing products, therapeutics, and disease tracking technology". [9] Measures include "specific challenges through the Innovative Solutions Canada program" and letters of intent signed by various Canadian manufacturers. [9] However, the government announcements about the Plan do not include any mention of laboratory supplies, including reagents. [8,9]

- [1] Public Health Agency of Canada. 2015. "National Emergency Strategic Stockpile". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/national-emergency-strategic-stockpile.html>]. Accessed 28 August 2020.
- [2] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.
- [3] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 28 August 2020.
- [4] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence". [<https://www.canada.ca/en/department-national-defence.html>]. Accessed 28 August 2020.
- [5] Health Canada. 2019. "Health Products and Food Branch". [<https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch.html>]. Accessed 28 August 2020.
- [6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.
- [7] Government of Canada. 3 May 2020. "Government of Canada creates COVID-19 supply council in support of Canada's response and recovery". [<https://www.canada.ca/en/public-services-procurement/news/2020/05/government-of-canada-creates-covid-19-supply-council-in-support-of-canadas-response-and-recovery.html>]. Accessed 28 August 2020.
- [8] Prime Minister of Canada. 20 March 2020. "Prime Minister announces Canada's Plan to Mobilize Industry to fight COVID-19". [<https://pm.gc.ca/en/news/news-releases/2020/03/20/prime-minister-announces-canadas-plan-mobilize-industry-fight-covid>]. Accessed 28 August 2020.
- [9] Prime Minister of Canada. 20 March 2020. "New measures under Canada's Plan to Mobilize Industry to fight COVID-19". [<https://pm.gc.ca/en/news/backgrounders/2020/03/20/new-measures-under-canadas-plan-mobilize-industry-fight-covid-19>]. Accessed 28 August 2020.

4.3 MEDICAL COUNTERMEASURES AND PERSONNEL DEPLOYMENT

4.3.1 System for dispensing medical countermeasures (MCM) during a public health emergency

4.3.1a

Does the country have a plan, program, or guidelines in place for dispensing medical countermeasures (MCM) for national use during a public health emergency (i.e., antibiotics, vaccines, therapeutics and diagnostics)?

Yes = 1 , No = 0

Current Year Score: 1

Canada has guidelines in place for dispensing medical countermeasures for national use during a public health emergency. According to the 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events, dispensing medical countermeasures is a subnational responsibility in Canada. The Plan states that provincial and territorial governments are

tasked with "providing medications and/or vaccines to recommended populations" and "sharing information regarding distribution and use of medications and vaccines in their respective jurisdictions". [1] The Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector (CPIP) document reinforces this requirement, stating that during a pandemic provincial and territorial governments "will work collaboratively to provide antiviral medications and, when available, vaccine to recommended populations". [2] For example, at a subnational level, the province of British Columbia's 2012 Pandemic Influenza Response Plan includes an Antiviral Distribution Plan that guides the "distribution of antiviral medication to points throughout the province from which they might be selectively dispensed during a pandemic alert period (phases 4 and 5) and made widely available during an influenza pandemic (phase 6)". [3] Guidance includes triggers for activating various levels of the plan and indications to pre-position medication and identify preferred warehouses and pharmacy networks. The plan states that the province's use of "a central pharmaceutical database" will allow pharmacists to dispense antivirals and monitor their use at the population level during an emergency. The plan prefers to dispense medications via these pharmacists and community pharmacies in order to maintain data updated in the pharmaceutical database, but provides for hospital and temporary site dispensing as well. [3] Canada's Joint External Evaluation (JEE) report, published in 2019, states that "develops strategies for the lifecycle of [medical countermeasures], including procurement, storage, deployment and disposition of [medical countermeasures]", and adds that medical countermeasure "deployment components have been tested in simulation exercises involving ... authorities, neighbouring countries and international partners". [4]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 27 August 2020.

[2] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 27 August 2020.

[3] Province of British Columbia. 2012. "British Columbia's Pandemic Influenza Response Plan (2012) Logistics of Antiviral Distribution". [<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/bc-pandemic-influenza-antiviral-distribution-plan-2012.pdf>]. Accessed 27 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 27 August 2020.

4.3.2 System for receiving foreign health personnel during a public health emergency

4.3.2a

Is there a public plan in place to receive health personnel from other countries to respond to a public health emergency?

Yes = 1 , No = 0

Current Year Score: 1

There is public evidence that Canada has a public plan in place to receive health personnel from other countries to respond to a public health emergency. Canada's Operational framework for mutual aid requests (OMFAR) " is a non-binding mechanism that can be activated by provinces/territories to identify and share healthcare professionals and health assets inter-jurisdictionally during events." The OMFAR overview notes that federal, provincial or territorial entities can make a request for support from health care professionals to the Public Health Agency of Canada (PHAC). PHAC consolidates the offers and provides this to the requesting jurisdiction. The overview notes, "if an offer of assistance is accepted, jurisdictions involved will enter into a negotiation phase whereby they will agree on a Mutual Aid Agreement (MAA) that outlines items

such as: cost recovery, workplace health, licensure, etc." [1] Canada's Joint External Evaluation (JEE) report, published in 2019, notes that "national pandemic plans address personnel deployment", and also cites the OMFAR as an effective policy document. [2] Additionally, there is at least one subnational plan in place to receive health personnel from other countries to respond to a public health emergency, but it does not provide details on how the arrival and movement of foreign health personnel would be facilitated. The province of British Columbia's Pandemic Influenza Health Human Resource Plan includes the possibility to receive foreign health personnel. The Plan sets up five layers of health human resource response. The fifth and final layer, "Recruit Temporary Health Care Workers for the Pandemic" includes the possibility to, "Conduct rapid licensure of foreign trained professionals and other professions as required by the Ministry". [3] At the federal level, in 2012, Canada, Mexico and the United States issued the North American Plan for Animal and Pandemic Influenza. Chapter 4 of the plan includes commitments by the three countries to work "together to facilitate the rapid exchange of public health liaisons, epidemiological, laboratory and medical personnel". However, the plan notes that regulatory and licensing hurdles must be cleared to facilitate such exchanges. [4] The 2007 Emergency Management Act, section 6, states that the Minister of Public Safety and Emergency Preparedness "may develop joint emergency management plans with the relevant United States' authorities", but does not provide details of receiving foreign health personnel. [5] Other plans at the federal level do not mention receiving health personnel from other countries to respond to a public health emergency. The "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document and the Federal/Provincial/Territorial Public Health Response Plan for Biological Events do not mention receiving foreign health personnel. [6,7] The websites of Public Health Agency of Canada, Department of National Defence and the Canadian Armed Forces, and the Department of Public Safety and Emergency Preparedness do not contain additional information regarding a public plan in place to receive health personnel from other countries to respond to a public health emergency. [8, 9, 10]

[1] Public Health Agency of Canada. 2013. "Operational framework for mutual aid requests (OMFAR) / The Centre for Emergency Preparedness and Response, Public Health Agency of Canada".

[<http://www.publications.gc.ca/site/eng/9.828157/publication.html>]. Accessed 27 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 27 August 2020.

[3] Province of British Columbia. 2012. "British Columbia's Pandemic Influenza Response Plan (2012) Human Resource Planning Guideline". [<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/bc-pandemic-influenza-hr-planning-guideline-2012.pdf>]. Accessed 27 August 2020.

[4] Department of Health and Human Services. 2012. "North American Plan For Animal and Pandemic Influenza".

[<https://www.phe.gov/Preparedness/international/Documents/napapi.pdf>]. Accessed 27 August 2020.

[5] Government of Canada. 2019. "Emergency Management Act". [<https://laws-lois.justice.gc.ca/eng/acts/e-4.56/FullText.html>]. Accessed 27 August 2020.

[6] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events".

[<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 27 August 2020.

[7] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 27 August 2020.

[8] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 27 August 2020.

[9] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 27 August 2020.

[10] Department of National Defence and the Canadian Armed Forces. 2019. "National Defence".

[<https://www.canada.ca/en/department-national-defence.html>]. Accessed 27 August 2020.

4.4 HEALTHCARE ACCESS

4.4.1 Access to healthcare

4.4.1a

Does the constitution explicitly guarantee citizens' right to medical care?

Guaranteed free = 4, Guaranteed right = 3, Aspirational or subject to progressive realization = 2, Guaranteed for some groups, not universally = 1, No specific provision = 0

Current Year Score: 0

2020

World Policy Analysis Center

4.4.1b

Access to skilled birth attendants (% of population)

Input number

Current Year Score: 97.9

2014

WHO/World Bank/United Nations Children's Fund (UNICEF)

4.4.1c

Out-of-pocket health expenditures per capita, purchasing power parity (PPP; current international \$)

Input number

Current Year Score: 700.84

2017

WHO Global Health Expenditure database

4.4.2 Paid medical leave

4.4.2a

Are workers guaranteed paid sick leave?

Paid sick leave = 2, Unpaid sick leave = 1, No sick leave = 0

Current Year Score: 2

2020

World Policy Analysis Center

4.4.3 Healthcare worker access to healthcare

4.4.3a

Has the government issued legislation, a policy, or a public statement committing to provide prioritized healthcare services to healthcare workers who become sick as a result of responding to a public health emergency?

Yes = 1 , No = 0

Current Year Score: 0

There is no public evidence that Canada has issued legislation, a policy or a public statement committing to provide prioritised health care services to healthcare workers who become sick as a result of responding to a public health emergency. The 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events sets a goal to "protect responders and health care providers", but the activities associated with this goal do not mention prioritised medical care. Instead they include education for health care workers, infection control practices, prophylactic use of medical countermeasures, and access to and use of personal protection equipment (PPE). [1] The "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document also sets out a responsibility to support health care workers, but does not mention prioritised health care. Support services outlined in the document include "basic personal support" such as food and services, emotional support and counselling, family care, job protection, and others. [2] The document also mentions the ethics of supporting health care workers as they "face disproportionate burdens", but again does not mention prioritised health care. [2] At the subnational level, the province of British Columbia's Pandemic Influenza Health Human Resource Plan sets up five layers of health human resource response. The first layer, "Protect and Support Existing Health Care Workers to Maximize Supply", includes many of the measures mentioned above, but does not mention prioritised health care. [3] The website of the Public Health Agency of Canada (PHAC) does not contain additional information regarding prioritised health care services to healthcare workers who become sick as a result of responding to a public health emergency. [4] Canada's "COVID-19 pandemic guidance for the health care sector" lists various measures adopted to support health care professionals in response to the pandemic, including medical advice, skills training, and a safe work environment. However, there is no mention of a policy of prioritized health care services for such workers. [5] Other governmental information sources on the response to the COVID-19 pandemic, including "Coronavirus disease (COVID-19): For health professionals", do not contain information about prioritized treatment. [6] Canada's Joint External Evaluation (JEE) report, published in 2019, does not contain relevant information. [7]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 27 August 2020.

[2] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 27 August 2020.

[3] Province of British Columbia. 2012. "British Columbia's Pandemic Influenza Response Plan (2012) Human Resource Planning Guideline". [<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/bc-pandemic-influenza-hr-planning-guideline-2012.pdf>]. Accessed 27 August 2020.

[4] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 27 August 2020.

[5] Government of Canada. 2020. "COVID-19 pandemic guidance for the health care sector". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/covid-19-pandemic-guidance-health-care-sector.html#a432>]. Accessed 27 August 2020.

[6] Government of Canada. 2020. "Coronavirus disease (COVID-19): For health professionals". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals.html>]. Accessed 27 August 2020.

[7] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 27 August 2020.

4.5 COMMUNICATIONS WITH HEALTHCARE WORKERS DURING A PUBLIC HEALTH EMERGENCY

4.5.1 Communication with healthcare workers

4.5.1a

Is there a system in place for public health officials and healthcare workers to communicate during a public health emergency?

Yes = 1 , No = 0

Current Year Score: 1

Canada has a system in place for public health officials and healthcare workers to communicate during a public health emergency. The Health Portfolio Operations Centre (HPOC), provides communications services between officials and health care workers during an emergency. The HPOC is "the point of contact for providing emergency management governance support and operational communications". It "supports and facilitates emergency operations by expediting and facilitating the sharing of information" and supporting subnational response activities and communications with regional operations centers and laboratories. [1] Communication between public health officials at the HPOC and healthcare workers is supported by the six Regional Emergency Coordination Centres (RECC) which provide situational awareness information from healthcare workers to officials at the HPOC. [5] The communications capacity of Canada's emergency operations centers system includes "satellite, cellular, two-way radios and land line phone connections to facilitate communicating with anyone anywhere". [2] The "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document states that public health authorities will use web-based reporting systems to share data from the field efficiently. [3] At the subnational level, the province of British Columbia Emergency Response Management System (BCERMS) uses an Incident Command System (ICS) structure that categorizes communications into four basic types of information functions: "direction, situation reporting, resource requests, and general information". The system utilises the categories to properly direct and prioritize communications. [4] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the picture of robust emergency communications systems, stating that "Canada has a comprehensive system in place to communicate during emergencies at all levels of government and with a wide variety of stakeholders". It further notes that the government's Public Health Network Communications Working Group is a "centralized coordination mechanism" that regularly brings together federal, provincial and territorial representatives "to ensure that communications with the public on public health issues are consistent and well-coordinated". However, the JEE does not specifically discuss communication between public health officials and healthcare works. [6]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html]. Accessed 28 August 2020.

[2] Public Health Agency of Canada. 2019. "Bioterrorism and Emergency Preparedness". [https://www.canada.ca/en/public-health/services/emergency-preparedness-response/bioterrorism-emergency-preparedness.html]. Accessed 28 August 2020.

[3] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html]. Accessed 28 August 2020.

[4] Province of British Columbia. 2012. "British Columbia's Pandemic Influenza Response Plan (2012) Communication and

Education Framework". [<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/bc-pandemic-influenza-communication-and-education-framework-2012.pdf>]. Accessed 28 August 2020.

[5] Health Canada and the Public Health Agency of Canada. 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17". [<https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html>]. Accessed 28 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

4.5.1b

Does the system for public health officials and healthcare workers to communicate during an emergency encompass healthcare workers in both the public and private sector?

Yes = 1, No = 0

Current Year Score: 0

There is insufficient evidence to show that Canada's national or federal system for public health officials and healthcare workers to communicate during an emergency that encompasses healthcare workers in both the public and private sector. A description of the health sector emergency operations center, the Health Portfolio Operations Centre (HPOC), in the 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events states the HPOC is "the point of contact for providing emergency management governance support and operational communications". However, there is no specific mention of HPOC systems to communicate with healthcare workers in the private sector. [1] Communication between public health officials at the HPOC and healthcare workers is supported by the six Regional Emergency Coordination Centres (RECC) which provide situational awareness information from healthcare workers to officials at the HPOC. [2] However, descriptions of these communication channels do not mention the private sector. Of note, Canada's federal guidelines for communication between public health officials and healthcare workers to communicate during an emergency state that "provinces and territories maintain their respective response plans which describe emergency response governance, linkages and channels of communication between ministries, programs and agencies of government, non-governmental organizations and the private sector". [1] Subnational planning in Canada do include provisions for communication that include the private sector. Ontario's Ministry of Health and Long-Term Care's Emergency Response Plan, published in May 2013, provides two methods for communications between public health officials and healthcare workers during an emergency--so-called Important Health Notices, and a Health Care Provider Hotline--and the Plan does not distinguish between healthcare workers in the public and private sectors. [3] British Columbia's Pandemic Influenza Response Plan Communication and Education Framework, for its part, describes "preparation of [plans for] pandemic communication" that include "information for communication to and from health care workers/professionals in the health sector", and explicitly involves the private sector. [4] The websites of Public Health Agency of Canada, its Center for Emergency Preparedness and Response, and the Department of Public Safety and Emergency Preparedness, and do not contain additional relevant information. [5, 6,7] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms the picture of robust emergency communications systems, stating that "Canada has a comprehensive system in place to communicate during emergencies at all levels of government and with a wide variety of stakeholders". However, the JEE does not specifically discuss communication between public health officials and healthcare works. [8]

[1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 28 August 2020.

[2] Health Canada and the Public Health Agency of Canada. 2018. "Evaluation Report - Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17". [<https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/evaluation/2012-2013-2016-2017-evaluation-report-emergency-preparedness-response-activities.html>]. Accessed 28 August 2020.

[3] Province of Ontario. 2013. "Ministry of Health and Long-Term Care's Emergency Response Plan".

[http://www.health.gov.on.ca/en/pro/programs/emb/pan_flu/docs/emerg_resp_plan.pdf]. Accessed 28 August 2020.

[4] Province of British Columbia. 2012. "British Columbia's Pandemic Influenza Response Plan (2012) Communication and Education Framework". [<https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/reports-publications/bc-pandemic-influenza-communication-and-education-framework-2012.pdf>]. Accessed 28 August 2020.

[5] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.

[6] Public Safety Canada. 2019. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 28 August 2020.

[7] Public Health Agency of Canada. "Center for Emergency Preparedness and Response". [<https://www.canada.ca/en/public-health/services/emergency-preparedness-response/centre-emergency-preparedness-response.html>]. Accessed 14 March 2021.

[8] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

4.6 INFECTION CONTROL PRACTICES AND AVAILABILITY OF EQUIPMENT

4.6.1 Healthcare associated infection (HCAI) prevention and control programs

4.6.1a

Is there evidence that the national public health system is monitoring for and tracking the number of healthcare associated infections (HCAI) that take place in healthcare facilities?

Yes = 1, No = 0

Current Year Score: 1

Canada's national public health system monitors and tracks the number of health care associated infections (HCAI) that take place in healthcare facilities. The Canadian Nosocomial Infection Surveillance Program (CNISP) was established in 1994 as a collaborative effort between the Canadian Hospital Epidemiology Committee (CHEC), a subcommittee of the Association of Medical Microbiology and Infectious Disease Canada and the Centre for Communicable Diseases and Infection Control of the Public Health Agency of Canada (PHAC). CNISP's objectives include providing rates and trends on HCAI in the country and sharing data that can inform the development of national guidelines to prevent HCAI. The CNISP network comprises 54 sentinel hospitals in 10 provinces across Canada. [1] Canada's Joint External Evaluation (JEE) report, published in 2019, assigns Canada a score of 5 for its "health care-associated infection (HCAI) prevention and control programmes" and says that "many health workers trained in [infection prevention and control] accredited courses informed by federal guidelines, and aligned with provincial, territorial and facility guidelines, standards and protocols". However, the JEE does not specifically provide information about tracking the number of HCAs in healthcare facilities. [2]

[1] Public Health Agency of Canada. 2012. "The Canadian Nosocomial Infection Surveillance Program". [<http://www.phac-aspc.gc.ca/nois-sinp/survprog-eng.php>]. Accessed 28 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1]. Accessed 28 August 2020.

4.7 CAPACITY TO TEST AND APPROVE NEW MEDICAL COUNTERMEASURES

4.7.1 Regulatory process for conducting clinical trials of unregistered interventions

4.7.1a

Is there a national requirement for ethical review (e.g., from an ethics committee or via Institutional Review Board approval) before beginning a clinical trial?

Yes = 1, No = 0

Current Year Score: 1

Canada has a national requirement for ethical review from a Research Ethics Board before beginning a clinical trial. Section C.03.306 of the Food and Drug Regulations defines a Research Ethics Board (REB) and specifies that it must be made up of men and women of various disciplines. Section C.05.010 states that approval of an REB is required before beginning a clinical trial. [1] Health Canada's "Guidance Document For Clinical Trial Sponsors: Clinical Trial Applications" provides detailed guidance regarding ethics reviews for clinical trials. Section 2.7.1 states that "prior to initiating a clinical trial or implementing an amendment to a clinical trial at a site, the proposed trial protocol and ICF (Informed Consent Form) must be reviewed and approved by a REB as defined in the Regulations". [2]

[1] Government of Canada. 2019. "Food and Drug Regulations".

[https://laws.justice.gc.ca/eng/regulations/c.r.c.,_c._870/FullText.html]. Accessed 28 August 2020.

[2] Health Canada. 2013. "Guidance Document For Clinical Trial Sponsors: Clinical Trial Applications".

[https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/clinical-trials/clinical-trial-sponsors-applications.html]. Accessed 28 August 2020.

4.7.1b

Is there an expedited process for approving clinical trials for unregistered medical countermeasures (MCM) to treat ongoing epidemics?

Yes = 1, No = 0

Current Year Score: 0

There is no public evidence that Canada has an expedited process for approving clinical trials for unregistered medical countermeasures to treat ongoing pandemics. The Food and Drug Regulations establish requirements for clinical trials in Canada and do not mention an expedited process for approving a clinical trial. [1] Health Canada's "Guidance Document For Clinical Trial Sponsors: Clinical Trial Applications" provides more detailed guidance. The document mentions the possibility of an expedited review process for approving a clinical trial for "comparative bioavailability studies", which can be approved in as little as 7 days, compared to the standard 30-day review period. The document states that the 7-day timeframe is a target and not a requirement. However, the document does not mention any other type of expedited review process that would be applicable to an ongoing pandemic. [2] The websites of the Public Health Agency of Canada and Innovation, Science and Economic Development Canada do not contain additional information regarding an expedited process for approving clinical

trials for unregistered medical countermeasures to treat ongoing pandemics. [3, 4] In response to the COVID-19 pandemic, Health Canada on 18 March, 2020, issued the "Interim Order Respecting the Importation and Sale of Medical Devices for Use in Relation to COVID-19". The order enables "an expedited review of medical devices indicated to diagnose, treat, mitigate or prevent COVID-19, at no cost". The order does not mention a new timeframe or clinical trials. [5,6] There is no evidence that this expedited review process has yet been enshrined in legislation. [7] A Canadian government website describing the government's response to the COVID-19 pandemic states that "Canada is working with international regulators to help fast-track clinical trials and applications for vaccines, treatments and diagnostic tests", but does not provide more details on what this process entails. [8] Canada's Joint External Evaluation (JEE), published in 2019, does not discuss clinical trials. [9]

[1] Government of Canada. 2019. "Food and Drug Regulations". [https://laws.justice.gc.ca/eng/regulations/c.r.c.,_c._870/FullText.html]. Accessed 28 August 2020.

[2] Health Canada. 2013. "Guidance Document For Clinical Trial Sponsors: Clinical Trial Applications". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/clinical-trials/clinical-trial-sponsors-applications.html>]. Accessed 28 August 2020.

[3] Public Health Agency of Canada. 2019. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 28 August 2020.

[4] Innovation, Science and Economic Development Canada. 2019. "ISED". [<https://www.ic.gc.ca/eic/site/icgc.nsf/eng/home>]. Accessed 28 August 2020.

[5] Health Canada. 18 March 2020. "Notice: Expedited Review of Health Product Submissions and Applications to address COVID-19". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/announcements/notice-expedited-review-health-products-covid-19.html>]. Accessed 28 August 2020.

[6] Health Canada. 18 March 2020. "Interim order respecting the importation and sale of medical devices for use in relation to COVID-19". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/announcements/interim-order-importation-sale-medical-devices-covid-19.html>]. Accessed 28 August 2020.

[7] Torys LLP. 25 March 2020. "COVID-19 prompts expedited review of health products". [<https://www.torys.com/insights/publications/2020/03/covid-19-prompts-expedited-review-of-health-products>]. Accessed 28 August 2020.

[8] Government of Canada. 2020. "Coronavirus disease (COVID-19): Canada's response". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>]. Accessed 29 August 2020.

[9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

4.7.2 Regulatory process for approving medical countermeasures

4.7.2a

Is there a government agency responsible for approving new medical countermeasures (MCM) for humans?

Yes = 1, No = 0

Current Year Score: 1

Canada has a government agency responsible for approving new medical countermeasures for humans. The Health Products and Food Branch (HPFB) of Health Canada is tasked with regulating, evaluating and monitoring the safety, efficacy, and quality of therapeutic and diagnostic products available to Canadians", including drugs, medical devices, disinfectants and sanitizers. HPFB defines drugs to include "both prescription and nonprescription pharmaceuticals; biologically-derived products such as vaccines, blood derived products, and products produced through biotechnology; tissues and organs;

disinfectants; and radiopharmaceuticals". [1] The approval process is outlined in the Food and Drug Regulations. [2]

[1] Health Canada. 2019. "How Drugs are Reviewed in Canada". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/fact-sheets/drugs-reviewed-canada.html>]. Accessed 28 August 2020.

[2] Government of Canada. 2019. "Food and Drug Regulations".

[https://laws.justice.gc.ca/eng/regulations/c.r.c.,_c._870/FullText.html]. Accessed 28 August 2020.

4.7.2b

Is there an expedited process for approving medical countermeasures (MCM) for human use during public health emergencies?

Yes = 1 , No = 0

Current Year Score: 1

Canada has an expedited process for approving medical countermeasures for human use during public health emergencies. Section C.08.002.01 of the 2019 Food and Drug Regulations describes the process for applying for "an extraordinary use new drug submission". The medical countermeasure can be approved under the extraordinary procedure if it is intended for use in emergency situations "where persons have been exposed to a chemical, biological, radiological or nuclear substance and action is required to treat, mitigate or prevent a life-threatening or other serious disease, disorder or abnormal physical state, or its symptoms, that results, or is likely to result, from that exposure" or "preventative use in persons who are at risk of exposure to a chemical, biological, radiological or nuclear substance that is potentially lethal or permanently disabling". The approval allows the drug to be approved without a traditional clinical trial or other requirements at the discretion of the regulator. [1] The Health Products and Food Branch (HPFB), Canada's medical countermeasures regulator defines drugs to include "both prescription and nonprescription pharmaceuticals; biologically-derived products such as vaccines, blood derived products, and products produced through biotechnology; tissues and organs; disinfectants; and radiopharmaceuticals". [2] In addition, the "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document states that the Minister of Health can provisionally approve a drug with an "Interim Order". [3] This appears to be a measure employed in response to the COVID-19 pandemic. On 18 March 2020, Health Canada issued the "Interim Order Respecting the Importation and Sale of Medical Devices for Use in Relation to COVID-19". The order enables "an expedited review of medical devices indicated to diagnose, treat, mitigate or prevent COVID-19, at no cost". The order does not mention a new timeframe. [5,6] Canada's Joint External Evaluation (JEE), published in 2019, does not discuss an expedited review process. [6]

[1] Government of Canada. 2019. "Food and Drug Regulations".

[https://laws.justice.gc.ca/eng/regulations/c.r.c.,_c._870/FullText.html]. Accessed 28 August 2020.

[2] Health Canada. 2019. "How Drugs are Reviewed in Canada". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/fact-sheets/drugs-reviewed-canada.html>]. Accessed 28 August 2020.

[3] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 28 August 2020.

[4] Health Canada. 18 March 2020. "Notice: Expedited Review of Health Product Submissions and Applications to address COVID-19". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/announcements/notice-expedited-review-health-products-covid-19.html>]. Accessed 28 August 2020.

[5] Health Canada. 18 March 2020. "Interim order respecting the importation and sale of medical devices for use in relation to COVID-19". [<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/announcements/interim-order-importation-sale-medical-devices-covid-19.html>]. Accessed 28 August 2020.

[6] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

Category 5: Commitments to improving national capacity, financing plans to address gaps, and adhering to global norms

5.1 INTERNATIONAL HEALTH REGULATIONS (IHR) REPORTING COMPLIANCE AND DISASTER RISK REDUCTION

5.1.1 Official IHR reporting

5.1.1a

Has the country submitted IHR reports to the WHO for the previous calendar year?

Yes = 1 , No = 0

Current Year Score: 1

2020

World Health Organization

5.1.2 Integration of health into disaster risk reduction

5.1.2a

Are epidemics and pandemics integrated into the national risk reduction strategy or is there a standalone national disaster risk reduction strategy for epidemics and pandemics?

Yes = 1 , No = 0

Current Year Score: 1

Pandemics are mentioned in Canada's Emergency Management Framework. The third edition of "An Emergency Management Framework for Canada" was issued in 2017. The Framework "aligns with key international agreements, including the Sendai Framework for Disaster Risk Reduction 2015-2030, which builds on previous agreements, including Hyogo (2005) and Yokohama (1994), to advance disaster risk reduction priorities". The Framework takes an "all-hazards" approach, which includes "biological hazards, for example animal or human health diseases that risk causing a pandemic". The Framework is based on the following principles: Responsibility, Comprehensive, Partnerships, Coherency of Action, Risk-Based, All-Hazards, Resilience, Clear Communications, Continuous Improvement, and Ethical. The Framework outlines coordination between federal and subnational authorities. [1] Canada's Joint External Evaluation (JEE) report, published in 2019, confirms that the Framework is the latest document to deal with public health risk reduction. [2]

[1] Public Safety Canada. 2017. "An Emergency Management Framework for Canada - Third Edition".

[<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/2017-mrgnc-mngmnt-frmwrk/2017-mrgnc-mngmnt-frmwrk-en.pdf>].

Accessed 28 August 2020.

[2] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

5.2 CROSS-BORDER AGREEMENTS ON PUBLIC HEALTH AND ANIMAL HEALTH EMERGENCY RESPONSE

5.2.1 Cross-border agreements

5.2.1a

Does the country have cross-border agreements, protocols, or MOUs with neighboring countries, or as part of a regional group, with regards to public health emergencies?

Yes = 2, Yes, but there is evidence of gaps in implementation = 1, No = 0

Current Year Score: 2

Canada has a number of cross-border agreements, protocols and MOUs with the United States with regards to public health emergencies. In 2014, the heads of the respective health ministries and departments in Canada, Mexico and the United States signed a Declaration of the Intention to Coordinate Communication in Public Health Emergencies. The three countries committed to clear, transparent and timely information sharing regarding public health emergencies. In addition, each year the three countries should carry out a communications exercise to improve coordination. [1] In addition, in 2012, Canada, Mexico and the United States issued the North American Plan for Animal and Pandemic Influenza. Chapter 4 of the plan includes commitments by the three countries to work "together to facilitate the rapid exchange of public health liaisons, epidemiological, laboratory and medical personnel". [2] At a subnational level, the Great Lakes Border Health Initiative groups the "health agencies for the U.S. states of Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and the Canadian province of Ontario as well as local health agencies near international borders". The group's mandate is "to share public health related data, both individually identified and population-related, for the purpose of preventing, detecting or responding to a public health event". [3] There is no evidence of gaps in implementation of these cross-border agreements, including in Canada's 2019 Joint External Evaluation (JEE) report, which notes robust international cooperation in several areas related to public health. [4]

[1] Ministry of Foreign Relations (Secretaria de Relaciones Exteriores). 2014. "Mexico, United States and Canada strengthen the exchange of information in health emergencies" ("México, Estados Unidos y Canadá fortalecen el intercambio de información en emergencias sanitarias"). [<https://embamex.sre.gob.mx/canada/index.php/es/comunicados-de-prensa/646-mayo-2014/5934-mexico-estados-unidos-y-canada-fortalecen-el-intercambio-de-informacion-en-emergencias-sanitarias>]. Accessed 28 August 2020.

[2] Department of Health and Human Services. 2012. "North American Plan For Animal and Pandemic Influenza". [<https://www.phe.gov/Preparedness/international/Documents/napapi.pdf>]. Accessed 28 August 2020.

[3] Great Lakes Border Health Initiative. 2017. "Terms of Reference". [https://www.michigan.gov/documents/mdhhs/GLBHI_TOR_7-2015_510018_7.pdf]. Accessed 28 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

5.2.1b

Does the country have cross-border agreements, protocols, or MOUs with neighboring countries, or as part of a regional group, with regards to animal health emergencies?

Yes = 2, Yes, but there is evidence of gaps in implementation = 1, No = 0

Current Year Score: 2

Canada has a number of cross-border agreements, protocols and MOUs with the United States and other countries with regards to animal health emergencies.

Canada, the United States and Mexico have a regional plan in place for response on animal and pandemic influenza. The plan includes agreements to share avian influenza vaccines and to provide veterinary assistance as needed. [1] In 2016, Canada joined Australia, Ireland, New Zealand, United Kingdom and United States of America in signing three agreements to facilitate cross-border cooperation for animal health emergencies. The International Animal Health Emergency Reserve agreement provides "participating countries with a supplementary emergency response team in the event of an animal disease outbreak" in order to "act rapidly and effectively to control and eradicate the outbreak". [2] The Sharing of vaccines for Foot and Mouth Disease agreement "supports the sharing of a vaccine bank for Foot and Mouth Disease (FMD) between participating countries" in order to "facilitate the rapid consideration of requests for additional vaccine doses, thereby assisting the affected country/countries to benefit from an increased number of available vaccine doses". [2] The Supporting the recognition of zoning for foreign animal disease outbreaks agreement manages "risks while minimizing trade disruptions in the event of a foreign animal disease outbreak in a participating country" in order to "support the continuation of safe trade from areas that remain free from the disease". [2] The World Organisation for Animal Health (OIE)'s 2017 PVS Evaluation report for Canada notes the country's participation in the International Animal Health Emergency Reserve and the FMD vaccine bank. [3] There is no evidence of gaps in implementation, including in Canada's Joint External Evaluation (JEE) report, published in 2019. [4]

[1] Public Safety Canada. April 2012. "North America Plan for Animal and Pandemic Influenza."

[<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/nml-pndmc-nflnz/index-en.aspx>]. Accessed 28 August 2020.

[2] Government of Canada. 2016. "Government of Canada Signs International Arrangements for Mutual Support in the Event of an Animal Disease Outbreak". [<https://www.canada.ca/en/food-inspection-agency/news/2016/05/government-of-canada-signs-international-arrangements-for-mutual-support-in-the-event-of-an-animal-disease-outbreak.html>]. Accessed 28 August 2020.

[3] World Organisation for Animal Health. 2017. "PVS Evaluation Report Canada".

[http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/201804_09_final_OIE_PVS_Evaluation_report_Canada_Eng.pdf]. Accessed 28 August 2020.

[4] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada".

[<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 28 August 2020.

5.3 INTERNATIONAL COMMITMENTS

5.3.1 Participation in international agreements

5.3.1a

Does the county have signatory and ratification (or same legal effect) status to the Biological Weapons Convention?

Signed and ratified (or action having the same legal effect) = 2, Signed = 1, Non-compliant or not a member = 0

Current Year Score: 2

2021

Biological Weapons Convention

5.3.1b

Has the country submitted confidence building measures for the Biological Weapons Convention in the past three years?

Yes = 1 , No = 0

Current Year Score: 1

2021

Biological Weapons Convention

5.3.1c

Has the state provided the required United Nations Security Council Resolution (UNSCR) 1540 report to the Security Council Committee established pursuant to resolution 1540 (1540 Committee)?

Yes = 1 , No = 0

Current Year Score: 1

2021

Biological Weapons Convention

5.3.1d

Extent of United Nations Security Council Resolution (UNSCR) 1540 implementation related to legal frameworks and enforcement for countering biological weapons:

Very good (60+ points) = 4, Good (45–59 points) = 3, Moderate (30–44 points) = 2, Weak (15–29 points) = 1, Very weak (0–14 points) or no matrix exists/country is not party to the BWC = 0

Current Year Score: 4

2021

Biological Weapons Convention

5.3.2 Voluntary memberships

5.3.2a

Does the country meet at least 2 of the following criteria?

- Membership in Global Health Security Agenda (GHSA)
- Membership in the Alliance for Country Assessments for Global Health Security and IHR Implementation (JEE Alliance)
- Membership in the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (GP)

- Membership in the Australia Group (AG)
- Membership in the Proliferation Security Initiative (PSI)

Needs to meet at least two of the criteria to be scored a 1 on this measure. , Yes for five = 1 , Yes for four = 1 , Yes for three = 1 , Yes for two = 1 , Yes for one = 0 , No for all = 0

Current Year Score: 1

2021

Global Health Security Agenda; JE Alliance; Global Partnership; Australia Group; PSI

5.4 JOINT EXTERNAL EVALUATION (JEE) AND PERFORMANCE OF VETERINARY SERVICES PATHWAY (PVS)

5.4.1 Completion and publication of a Joint External Evaluation (JEE) assessment and gap analysis

5.4.1a

Has the country completed a Joint External Evaluation (JEE) or precursor external evaluation (e.g., GHSA pilot external assessment) and published a full public report in the last five years?

Yes = 1 , No = 0

Current Year Score: 1

2021

WHO Strategic Partnership for IHR and Health Security (SPH); Global Health Security Agenda

5.4.1b

Has the country completed and published, within the last five years, either a National Action Plan for Health Security (NAPHS) to address gaps identified through the Joint External Evaluation (JEE) assessment or a national GHSA roadmap that sets milestones for achieving each of the GHSA targets?

Yes = 1 , No = 0

Current Year Score: 0

2021

WHO Strategic Partnership for IHR and Health Security (SPH); Global Health Security Agenda

5.4.2 Completion and publication of a Performance of Veterinary Services (PVS) assessment and gap analysis

5.4.2a

Has the country completed and published a Performance of Veterinary Services (PVS) assessment in the last five years?

Yes = 1 , No = 0

Current Year Score: 1

2021

OIE PVS assessments

5.4.2b

Has the country completed and published a Performance of Veterinary Services (PVS) gap analysis in the last five years?

Yes = 1 , No = 0

Current Year Score: 0

2021

OIE PVS assessments

5.5 FINANCING

5.5.1 National financing for epidemic preparedness

5.5.1a

Is there evidence that the country has allocated national funds to improve capacity to address epidemic threats within the past three years?

Yes = 1 , No = 0

Current Year Score: 0

There is no public evidence that Canada has allocated national funds to improve capacity to address epidemic threats within the past three years. The websites of the Public Health Agency of Canada, Global Affairs Canada, the WHO and the UN do not contain relevant information regarding such an allocation. [1,2,3,4] However, Canada has committed more than CAN\$1 billion to "public health measures to ensure the health and safety of Canadians" in response to the COVID-19 pandemic. [5]

[1] Global Affairs Canada. 2020. "Global Affairs Canada". [<https://www.international.gc.ca/gac-amc/index.aspx?lang=eng>]. Accessed 29 August 2020.

[2] United Nations. 2020. "Search Results && Canada". [https://news.un.org/en/search/canada/field_news_topics/health-82]. Accessed 29 August 2020.

[3] World Health Organization. 2020. "Search results". [<https://www.who.int/search?query=canada%20funding%20epidemic&page=1&pagesize=10&sort=relevance&sortdir=desc&default=AND&f.Countries.size=100&f.Lang.filter=en&f.RegionalSites.size=100&f.Topics.size=100&f.contentType.size=100&f.doctype.size=101&facet.field=RegionalSites&facet.field=Topics&facet.field=doctype&facet.field=Countries&facet.field=contentType&facet.field=Lang&tune=true&tune.0=3&tune.1=2&tune.2=2&tune.3=3&tune.4=180&tune.5=75>]. Accessed 29 August 2020.

[4] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[5] Government of Canada. 11 June 2020. "Government of Canada takes action on COVID-19". [<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas->

reponse/government-canada-takes-action-covid-19.html]. Accessed 29 August 2020.

5.5.2 Financing under Joint External Evaluation (JEE) and Performance of Veterinary Services (PVS) reports and gap analyses

5.5.2a

Does the Joint External Evaluation (JEE) report, National Action Plan for Health Security (NAPHS), and/or national GHSA roadmap allocate or describe specific funding from the national budget (covering a time-period either in the future or within the past five years) to address the identified gaps?

Yes = 1 , No/country has not conducted a JEE = 0

Current Year Score: 0

2021

WHO Strategic Partnership for IHR and Health Security (SPH); Global Health Security Agenda

5.5.2b

Does the Performance of Veterinary Services (PVS) gap analysis and/or PVS assessment allocate or describe specific funding from the national budget (covering a time-period either in the future or within the past five years) to address the identified gaps?

Yes = 1 , No/country has not conducted a PVS = 0

Current Year Score: 0

2021

OIE PVS assessments

5.5.3 Financing for emergency response

5.5.3a

Is there a publicly identified special emergency public financing mechanism and funds which the country can access in the face of a public health emergency (such as through a dedicated national reserve fund, an established agreement with the World Bank pandemic financing facility/other multilateral emergency funding mechanism, or other pathway identified through a public health or state of emergency act)?

Yes = 1 , No = 0

Current Year Score: 0

There is no public evidence that Canada has a publicly identified special emergency public financing mechanism and funds which the country can access in the face of a public health emergency. The 2017 Federal/Provincial/Territorial Public Health Response Plan for Biological Events does not mention an emergency public financing mechanism. [1] The "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document does not mention an emergency public financing mechanism. [2] Canada does have the Disaster Financial Assistance Arrangement program (DFAA), which is "a federal transfer payment program that provides financial assistance to a province/territory (PT) for a natural disaster that is declared a provincial/territorial emergency to be of concern to the federal government". [3] However, the DFAA's Guidelines state that it cannot be used for "chronic or pandemic health emergencies, including recurring or new public health

threats". [4] The websites of the Public Health Agency of Canada and Public Safety Canada do not contain additional information regarding a publicly identified special emergency public financing mechanism and funds which the country can access in the face of a public health emergency. [5, 6] Additionally, while there is a fund through Public Safety Canada for assistance for large-scale natural disasters, the Disaster Financial Assistance Arrangements (DFAA), the guidance specifically states "The DFAA are intended to address natural disasters resulting in extensive property damage or disruption of the delivery of essential goods and services. They do not apply to [among others]....chronic or pandemic health emergencies, including recurring or new public health threats." [7,8] Canada's Joint External Evaluation (JEE) report, published in 2019, notes that the Canada Health Transfer (CHT), "the government's transfer payment programme in support of the health systems of provinces and territories, covers an average of 23% of the costs for public health and health care, public health emergency preparedness, and responses to local health events". The JEE also notes that provinces, territories and local governments may ask for "additional assistance from the federal government, for emergencies that exceed provincial and territorial capacity". However, the JEE does not describe a specific mechanism for emergency public financing. [9]

- [1] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 29 August 2020.
- [2] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 29 August 2020.
- [3] Public Safety Canada. 2018. "2016-2017 Evaluation of the Disaster Financial Assistance Arrangements". [<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/vltn-dsstr-fnncl-ssstnc-2016-17/index-en.aspx>]. Accessed 29 August 2020.
- [4] Public Safety Canada. 2019. "Guidelines for the Disaster Financial Assistance Arrangements". [<https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rcvr-dsstrs/gdlns-dsstr-ssstnc/index-en.aspx>]. Accessed 29 August 2020.
- [5] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.
- [6] Public Safety Canada. 2020. "Public Safety Canada". [<https://www.publicsafety.gc.ca/index-en.aspx>]. Accessed 29 August 2020.
- [7] Public Safety Canada. 2020. "Disaster Financial Assistance Arrangements (DFAA)". [<https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rcvr-dsstrs/dsstr-fnncl-ssstnc-rrngmnts/index-en.aspx>]. Accessed 29 August 2020.
- [8] Public Safety Canada. 2019 "Guidelines for the Disaster Financial Assistance Arrangements." [<https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rcvr-dsstrs/gdlns-dsstr-ssstnc/index-en.aspx#s3>]. Accessed 29 August 2020.
- [9] World Health Organization (WHO). 2019. "Joint External Evaluation of IHR Core Capacities of Canada". [<https://extranet.who.int/iris/restricted/bitstream/handle/10665/326138/WHO-WHE-CPI-2019.62-eng.pdf;jsessionid=4095270B628AEACD815342622215684F?sequence=1>]. Accessed 29 August 2020.

5.5.4 Accountability for commitments made at the international stage for addressing epidemic threats

5.5.4a

Is there evidence that senior leaders (president or ministers), in the past three years, have made a public commitment either to:

- Support other countries to improve capacity to address epidemic threats by providing financing or support?
- Improve the country's domestic capacity to address epidemic threats by expanding financing or requesting support to improve capacity?

Needs to meet at least one of the criteria to be scored a 1 on this measure., Yes for both = 1, Yes for one = 1, No for both = 0

Current Year Score: 1

There is evidence that Canadian senior leaders have made public commitment to support other countries to improve capacity to address epidemic threats by providing financing or support in the past three years. In 2018, the Canadian government partnered with several institutions in the African continent to fund "a range of innovative research projects aimed at improving Ebola response capacities to prevent or mitigate the impact of future outbreaks in the Democratic Republic of the Congo (DRC) and other at-risk countries." At the time of launch, the Minister of Health, Minister of International Development and Minister of Science and Sport all spoke in favor of the project. Ginette Petitpas Taylor, Minister of Health, stated "The research projects receiving funding today are further evidence that Canadian scientists continue to have important contributions to make in the global fight against the Ebola virus, as they have shown already with the development of the world's first Ebola vaccine. I applaud the institutions and researchers in Canada and Africa that have come together to increase pandemic response capacity." [1] Additionally, when Canada announced a new commitment to the Contingency Fund for Emergencies (CFE) at the G20 Health Ministers' Meeting in May 2017, former health minister Jane Philpott stated "Canada recognizes the importance for [the World Health Organization] to have a sustained capacity to mount a rapid and predictable response in health emergencies, and that is why we are replenishing our contribution this year." [2] Additionally, Canada has provided funding for response efforts. In April 2020 the Minister of International Development, announced that Canada would spend \$159.5 million to support international efforts to fight the COVID-19 pandemic. [3] On the other hand, there is no public evidence that senior leaders have made a public commitment to improve the country's domestic capacity to address epidemic threats by expanding financing or requesting support to improve capacity, aside from commitments made specifically in response to the COVID-19 pandemic. Canada has committed more than CAN\$1 billion to "public health measures to ensure the health and safety of Canadians" in response to the COVID-19 pandemic. [4] These measures have been publicly promoted by the prime minister, Justin Trudeau, but are specific to responding to COVID-19 rather than generalized capacity-building for responding to epidemics. [5]

[1] International Development Research Centre. November 2018. "Rapid Research Fund for Ebola to support four new projects." [https://www.idrc.ca/en/news/rapid-research-fund-ebola-support-four-new-projects]. Accessed 29 August 2020.

[2] World Health Organisation. July 2017. "Canada increases commitment to CFE by CAD 1 million." [https://www.who.int/emergencies/funding/contingency-fund/canada-increases-commitment-to-cfe/en]. Accessed 29 August 2020.

[3] Government of Canada. 5 April 2020. "Canada's support for international efforts to fight the COVID-19 pandemic". [https://www.canada.ca/en/global-affairs/news/2020/04/canadas-support-for-international-efforts-to-fight-the-covid-19-pandemic.html]. Accessed 29 August 2020.

[4] Government of Canada. 11 June 2020. "Government of Canada takes action on COVID-19". [https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/government-canada-takes-action-covid-19.html]. Accessed 29 August 2020.

[5] Canadian Broadcasting Corporation. 11 March 2020. "Trudeau announces \$1B COVID-19 package as WHO calls global outbreak a pandemic". [https://www.cbc.ca/news/politics/liberals-support-workers-businesses-covid-19-1.5493454]. Accessed 10 September 2020.

5.5.4b

Is there evidence that the country has, in the past three years, either:

- Provided other countries with financing or technical support to improve capacity to address epidemic threats?
- Requested financing or technical support from donors to improve the country's domestic capacity to address epidemic threats?

Needs to meet at least one of the criteria to be scored a 1 on this measure., Yes for both = 1, Yes for one = 1, No for both = 0

Current Year Score: 1

There is evidence that Canada has invested finances to support other countries to improve capacity to address epidemic threats in the past three years. There is evidence via the Global Health Security Funding Tracker that Canada has provided funding to a number of other countries to improve their capacity to address epidemic threats. For example, from 2014-2020 Canada provided US\$7.15 million to Sierra Leone and Nigeria for Ebola Response and Biosecurity. [1] In another example of international assistance, Canada in 2019 provided US\$19.5 million to the World Health Organization for "COVID-19 preparedness and emergency response". [1] Additionally, the Report to Parliament on the Government of Canada's Official Development Assistance 2017-2018 notes that Canada has supported the Vaccine Alliance with CD\$120m to "scale up innovative programming initiatives that improve vaccine delivery". [3] There is no evidence that Canada has requested financing or technical support from donors to improve the country's domestic capacity to address epidemic threats. The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and Global Affairs Canada do not contain additional relevant information. [4,5,6] There is no evidence of such requests by Canada provided by the World Health Organization (WHO), the United Nations, media reports, or academic studies.

[1] Global Health Security Funding Tracker. 2020. "Canada: GHSA funding only".

[<https://tracking.ghscosting.org/table/40/funder>]. Accessed 29 August 2020.

[2] Global Health Security Funding Tracker. 2020. [<https://tracking.ghscosting.org/#/data>]. Accessed 29 August 2020.

[3] Government of Canada. February 2020. "Report to Parliament on the Government of Canada's Official Development Assistance 2017-2018". [<https://international.gc.ca/gac-amc/publications/odaaa-lrmado/report-rapport-17-18.aspx?lang=eng>]. Accessed 29 August 2020.

[4] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[5] Agriculture and Agri-Food Canada. 2020. "Agriculture and Agri-Food Canada".

[<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

[6] Global Affairs Canada. 2020. "Global Affairs Canada". [<https://www.international.gc.ca/gac-amc/index.aspx?lang=eng>]. Accessed 29 August 2020.

[7] World Health Organization. 2020. "Canada". [<https://www.who.int/countries/can/en/>]. Accessed 10 September 2020.

5.5.4c

Is there evidence that the country has fulfilled its full contribution to the WHO within the past two years?

Yes = 1 , No = 0

Current Year Score: 1

2021

Economist Impact analyst qualitative assessment based on official national sources, which vary by country

5.6 COMMITMENT TO SHARING OF GENETIC AND BIOLOGICAL DATA AND SPECIMENS

5.6.1 Commitment to sharing genetic data, clinical specimens, and/or isolated specimens (biological materials) in both emergency and nonemergency research

5.6.1a

Is there a publicly available plan or policy for sharing genetic data, clinical specimens, and/or isolated specimens (biological materials) along with the associated epidemiological data with international organizations and/or other countries that goes beyond influenza?

Yes = 1, No = 0

Current Year Score: 1

There is evidence to confirm that Canada has a publicly available plan or policy for sharing genetic data, epidemiological data, clinical specimens, and/or isolated specimens (biological materials) with international organizations and/or other countries that goes beyond influenza. There is evidence of Canada's participation in bodies and agreements that would seem to entail the existence of such a plan or policy, but there is no evidence that the government of Canada has published such plans or policies. Canada is a member of the Global Health Security Initiative (GHSI), which has developed a "voluntary agreement to facilitate the rapid sharing of non-influenza biological materials among GHSI members during a potential or actual public health emergency." [1,2] Additionally, Canada has committed to sharing "public health information" via the Multilateral Information Sharing Agreement (MLISA) and under IHR(International Health Regulation) obligations, according to the Federal/Provincial/Territorial Public Health Response Plan for Biological Events. However, the Plan does not mention sharing genetic data or clinical specimens. [3] In 2012, Canada, Mexico and the United States issued the North American Plan for Animal and Pandemic Influenza. Chapter 4 of the Agreement commits the countries to "review and facilitate border and custom procedures for the rapid exchange of laboratory samples, reagents, supplies, and specimens", but this agreement does not extend beyond influenza. [4] Despite Canada's participation in these agreements, the country does not appear to have released an independent policy regarding data or specimen sharing. The websites of the Public Health Agency of Canada, Agriculture and Agri-Food Canada, and Innovation, Science and Economic Development Canada do not contain additional relevant information. [5, 6, 7]

[1] Global Health Security Initiative. "GHSI Members." [<http://ghsi.ca/ghsi-members/>]. Accessed 29 August 2020.

[2] Global Health Security Initiative. 24 February 2017. "Seventeenth Ministerial Meeting of the Global Health Security Initiative (GHSI)." [<http://ghsi.ca/ministerial-statements/brussels-february-2017/>]. Accessed 29 August 2020.

[3] Government of Canada. 2017. "Federal/Provincial/Territorial Public Health Response Plan for Biological Events". [<https://www.canada.ca/en/public-health/services/emergency-preparedness/public-health-response-plan-biological-events.html>]. Accessed 29 August 2020.

[4] Department of Health and Human Services. 2012. "North American Plan For Animal and Pandemic Influenza". [<https://www.phe.gov/Preparedness/international/Documents/napapi.pdf>]. Accessed 29 August 2020.

[5] Public Health Agency of Canada. 2020. "Public Health Agency of Canada". [<https://www.canada.ca/en/public-health.html>]. Accessed 29 August 2020.

[6] Agriculture and Agri-Food Canada. 2019. "Agriculture and Agri-Food Canada". [<http://www.agr.gc.ca/eng/home/?id=1395690825741>]. Accessed 29 August 2020.

[7] Innovation, Science and Economic Development Canada. 2019. "ISED". [<https://www.ic.gc.ca/eic/site/icgc.nsf/eng/home>]. Accessed 29 August 2020.

5.6.1b

Is there public evidence that the country has not shared samples in accordance with the Pandemic Influenza Preparedness (PIP) framework in the past two years?

Yes = 0, No = 1

Current Year Score: 1

There is no public evidence that Canada has not shared samples in accordance with the PIP framework in the past two years. The 2018 "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector" document states that Canada has responsibilities under the PIP framework, including "ensuring the timely sharing of influenza viruses with human pandemic potential with the Global Influenza Surveillance and Response System (GISRS); contributing to the pandemic influenza benefit-sharing system; and continuing to support the GISRS". [1] The World Health Organization's website does not contain any information regarding Canada not sharing samples. [2] Local and international media do not contain reports of non-sharing.

[1] Public Health Agency of Canada. 2018. "Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector". [<https://www.canada.ca/en/public-health/services/flu-influenza/canadian-pandemic-influenza-preparedness-planning-guidance-health-sector/table-of-contents.html>]. Accessed 29 August 2020.

[2] World Health Organization. 2020. "Countries - Canada". [<https://www.who.int/countries/can/en/>]. Accessed 29 August 2020.

5.6.1c

Is there public evidence that the country has not shared pandemic pathogen samples during an outbreak in the past two years?

Yes = 0, No = 1

Current Year Score: 1

There is no publicly available evidence that Canada has not shared pandemic pathogen samples during an outbreak in the past two years, including in the context of the COVID-19 pandemic. Aside from the COVID-19 pandemic, the World Health Organization shows no outbreaks in Canada during the last two years. [1,2] Local and international media do not contain reports of non-sharing in Canada.

[1] World Health Organization. 2019. "Countries - Canada". [<https://www.who.int/countries/can/en/>]. Accessed 29 August 2020.

[2] World Health Organization. "WHO Coronavirus Disease (COVID-19) Dashboard". [https://covid19.who.int/?gclid=CjwKCAjwnef6BRAGEiwAgv8mQfRf_Q66Hc1ltd5fDKvmqtlDEnhWFpg5ZhtstfXNpYojZX5qBoqQTRoC3zkQAvD_BwE]. Accessed 10 September 2020.

Category 6: Overall risk environment and vulnerability to biological threats

6.1 POLITICAL AND SECURITY RISK

6.1.1 Government effectiveness

6.1.1a

Policy formation (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 4

2020

Economist Intelligence

6.1.1b

Quality of bureaucracy (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 4

2020

Economist Intelligence

6.1.1c

Excessive bureaucracy/red tape (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 4

2020

Economist Intelligence

6.1.1d

Vested interests/cronyism (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 3

2020

Economist Intelligence

6.1.1e

Country score on Corruption Perception Index (0-100, where 100=best)

Input number

Current Year Score: 77

2020

Transparency International

6.1.1f

Accountability of public officials (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 3

2020

Economist Intelligence

6.1.1g

Human rights risk (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 4

2020

Economist Intelligence

6.1.2 Orderly transfers of power

6.1.2a

How clear, established, and accepted are constitutional mechanisms for the orderly transfer of power from one government to another?

Very clear, established and accepted = 4, Clear, established and accepted = 3, One of the three criteria (clear, established, accepted) is missing = 2, Two of the three criteria (clear, established, accepted) are missing = 1, Not clear, not established, not accepted = 0

Current Year Score: 4

2021

Economist Intelligence

6.1.3 Risk of social unrest

6.1.3a

What is the risk of disruptive social unrest?

Very low: Social unrest is very unlikely = 4, Low: There is some prospect of social unrest, but disruption would be very limited = 3, Moderate: There is a considerable chance of social unrest, but disruption would be limited = 2, High: Major social unrest is likely, and would cause considerable disruption = 1, Very high: Large-scale social unrest on such a level as to seriously challenge government control of the country is very likely = 0

Current Year Score: 4

2021

Economist Intelligence

6.1.4 Illicit activities by non-state actors

6.1.4a

How likely is it that domestic or foreign terrorists will attack with a frequency or severity that causes substantial disruption?

No threat = 4, Low threat = 3, Moderate threat = 2, High threat = 1, Very high threat = 0

Current Year Score: 3

2021

Economist Intelligence

6.1.4b

What is the level of illicit arms flows within the country?

4 = Very high, 3 = High, 2 = Moderate, 1 = Low, 0 = Very low

Current Year Score: 0

2020

UN Office of Drugs and Crime (UNODC)

6.1.4c

How high is the risk of organized criminal activity to the government or businesses in the country?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 3

2021

Economist Intelligence

6.1.5 Armed conflict

6.1.5a

Is this country presently subject to an armed conflict, or is there at least a moderate risk of such conflict in the future?

No armed conflict exists = 4, Yes; sporadic conflict = 3, Yes; incursional conflict = 2, Yes, low-level insurgency = 1, Yes; territorial conflict = 0

Current Year Score: 4

2021

Economist Intelligence

6.1.6 Government territorial control

6.1.6a

Does the government's authority extend over the full territory of the country?

Yes = 1, No = 0

Current Year Score: 1

2021

Economist Intelligence

6.1.7 International tensions

6.1.7a

Is there a threat that international disputes/tensions could have a negative effect?

No threat = 4, Low threat = 3, Moderate threat = 2, High threat = 1, Very high threat = 0

Current Year Score: 3

2021

Economist Intelligence

6.2 SOCIO-ECONOMIC RESILIENCE

6.2.1 Literacy

6.2.1a

Adult literacy rate, population 15+ years, both sexes (%)

Input number

Current Year Score: 99.9

2008-2018

United Nations Development Programme (UNDP); United Nations Educational, Scientific and Cultural Organization (UNESCO);
The Economist Intelligence Unit

6.2.2 Gender equality

6.2.2a

United Nations Development Programme (UNDP) Gender Inequality Index score

Input number

Current Year Score: 0.92

2018

United Nations Development Programme (UNDP); The Economist Intelligence Unit

6.2.3 Social inclusion

6.2.3a

Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)

Input number

Current Year Score: 0.1

2017

World Bank; Economist Impact

6.2.3b

Share of employment in the informal sector

Greater than 50% = 2, Between 25-50% = 1, Less than 25% = 0

Current Year Score: 0

The share of employment in Canada's informal sector is low, well below 25%. Neither the World Bank and nor the International Labour Organization report data on the size of informal employment in Canada. [1,2,3] A 2019 study by the Bank of Canada estimated that 3.5% of the labor force was engaged in the informal, "gig" economy. [4]

[1] ILOSTAT Data Explorer. 2020. "Informal employment and informal sector as a percent of employment by sex". [https://www.ilo.org/shinyapps/bulkexplorer51/?lang=en&segment=indicator&id=IFL_XIEM_SEX_ECO_IFL_RT_A]. Accessed 30 August 2020.

[2] World Bank. 2020. "Informal employment (% of total non-agricultural employment) - Canada". [<https://data.worldbank.org/indicator/SL.ISV.IFRM.ZS?locations=CA>]. Accessed 30 August 2020.

[3] International Labour Organization. 2020. "Statistics on the Informal Economy". [<https://ilostat.ilo.org/topics/informality/>]. Accessed 30 August 2020.

[4] Bank of Canada. 2019. "The Size and Characteristics of Informal ("Gig") Work in Canada". [<https://www.bankofcanada.ca/wp-content/uploads/2019/02/san2019-6.pdf>]. Accessed 30 August 2020.

6.2.3c

Coverage of social insurance programs (% of population)

Scored in quartiles (0-3, where 3=best)

Current Year Score: 3

2016, or latest available

World Bank; Economist Impact calculations

6.2.4 Public confidence in government

6.2.4a

Level of confidence in public institutions

Input number

Current Year Score: 2

2021

Economist Intelligence Democracy Index

6.2.5 Local media and reporting

6.2.5a

Is media coverage robust? Is there open and free discussion of public issues, with a reasonable diversity of opinions?

Input number

Current Year Score: 2

2021

Economist Intelligence Democracy Index

6.2.6 Inequality

6.2.6a

Gini coefficient

Scored 0-1, where 0=best

Current Year Score: 0.33

Latest available.

World Bank; Economist Impact calculations

6.3 INFRASTRUCTURE ADEQUACY

6.3.1 Adequacy of road network

6.3.1a

What is the risk that the road network will prove inadequate to meet needs?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 4

2021

Economist Intelligence

6.3.2 Adequacy of airports

6.3.2a

What is the risk that air transport will prove inadequate to meet needs?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 3

2021

Economist Intelligence

6.3.3 Adequacy of power network

6.3.3a

What is the risk that power shortages could be disruptive?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 3

2021

Economist Intelligence

6.4 ENVIRONMENTAL RISKS

6.4.1 Urbanization

6.4.1a

Urban population (% of total population)

Input number

Current Year Score: 81.48

2019

World Bank

6.4.2 Land use

6.4.2a

Percentage point change in forest area between 2006–2016

Input number

Current Year Score: -0.05

2008-2018

World Bank; Economist Impact

6.4.3 Natural disaster risk

6.4.3a

What is the risk that the economy will suffer a major disruption owing to a natural disaster?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 4

2021

Economist Intelligence

6.5 PUBLIC HEALTH VULNERABILITIES

6.5.1 Access to quality healthcare

6.5.1a

Total life expectancy (years)

Input number

Current Year Score: 81.95

2018

United Nations; World Bank, UNICEF; Institute for Health Metrics and Evaluation (IHME); Central Intelligence Agency (CIA)
World Factbook

6.5.1b

Age-standardized NCD mortality rate (per 100 000 population)

Input number

Current Year Score: 301.3

2019

WHO

6.5.1c

Population ages 65 and above (% of total population)

Input number

Current Year Score: 17.65

2019

World Bank

6.5.1d

Prevalence of current tobacco use (% of adults)

Input number

Current Year Score: 17.5

2018

World Bank

6.5.1e

Prevalence of obesity among adults

Input number

Current Year Score: 29.4

2016

WHO

6.5.2 Access to potable water and sanitation

6.5.2a

Percentage of homes with access to at least basic water infrastructure

Input number

Current Year Score: 99

2017

UNICEF; Economist Impact

6.5.2b

Percentage of homes with access to at least basic sanitation facilities

Input number

Current Year Score: 99

2017

UNICEF; Economist Impact

6.5.3 Public healthcare spending levels per capita

6.5.3a

Domestic general government health expenditure per capita, PPP (current international \$)

Input number

Current Year Score: 3821.55

2018

WHO Global Health Expenditure database

6.5.4 Trust in medical and health advice

6.5.4a

Trust medical and health advice from the government

Share of population that trust medical and health advice from the government , More than 80% = 2, Between 60-80%, or no data available = 1, Less than 60% = 0

Current Year Score: 1

2018

Wellcome Trust Global Monitor 2018

6.5.4b

Trust medical and health advice from medical workers

Share of population that trust medical and health advice from health professionals , More than 80% = 2, Between 60-80%, or no data available = 1, Less than 60% = 0

Current Year Score: 2

2018

Wellcome Trust Global Monitor 2018