

Singapore

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

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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

Singapore has a national Antimicrobial Resistance (AMR) plan for the surveillance, detection, and reporting of priority AMR pathogens. Singapore's National Strategic Action Plan on Antimicrobial Resistance, jointly published by Singapore's Agri-Food and Veterinary Authority, Ministry of Health, National Environment Agency and National Water Agency, [1] includes a specific strategy for surveillance and detection of AMR, as well as reporting at domestic and international levels. This includes a plan for a) integrating surveillance for antimicrobial resistance and antimicrobial utilization across the human, animal, food and environment sectors b) establishing a national coordinating body, and c) publishing and reporting. [1] The Joint External Evaluation of IHR Core Capabilities of Singapore also indicates the existence of a "national system for laboratory testing, detection and reporting of AMR pathogens that is reviewed and updated annually". [2]

[1] Agri-Food & Veterinary Authority, Ministry of Health, National Environment Agency and National Water Agency. "National Strategic Action Plan on Antimicrobial Resistance, Singapore". [<https://www.ncid.sg/About-NCID/OurDepartments/Antimicrobial-Resistance-Coordinating-Office/Documents/National%20Strategic%20Action%20Plan%20on%20Antimicrobial%20Resistance.pdf>]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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: 2

Singapore has a national laboratory system that tests for all 7+1 priority AMR pathogens. According to the Joint External Evaluation of Singapore (JEE), Singapore has a "national system for laboratory testing, detection and reporting of AMR pathogens that is reviewed and updated annually". [1] The JEE states, "all public hospitals have a microbiology laboratory to conduct culture and antibiotic susceptibility testing for the eight priority AMR pathogens with selected isolates sent to the National Public Health Laboratory for further characterization." [1] However, although all priority pathogens are tested for human health, not all are tested for animal health. The JEE indicates that Singapore tests for "priority AMR pathogens for more than 5 years with a system for continuous improvement (Score 5), however the animal sector laboratories detect and

report selected priority AMR pathogens". [1] No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [2, 3, 4, 5, 6]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[4] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[5] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[6] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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 the government of Singapore conducts environmental detection or surveillance activities for antimicrobial residues or AMR organisms. According to the Singapore AMR Action Plan, "Surveillance in the human, animal, food and environment sectors are currently conducted independently by the respective agencies." [1] According to the Joint External Evaluation of Singapore, the National Environmental Agency conducts environmental surveillance on vector and vector borne pathogens. [2] However, AMR organisms was not specifically mentioned. No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [3,4,5,6,7]

[1] Agri-Food & Veterinary Authority, Ministry of Health, National Environment Agency and National Water Agency. "National Strategic Action Plan on Antimicrobial Resistance, Singapore". [<https://www.ncid.sg/About-NCID/OurDepartments/Antimicrobial-Resistance-Coordinating-Office/Documents/National%20Strategic%20Action%20Plan%20on%20Antimicrobial%20Resistance.pdf>]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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

There is publicly available evidence that the government of Singapore requires a prescription for antibiotic usage in humans. According to the Joint External Evaluation of Singapore from April 2018, "antibiotic use in humans is legislated and can only be obtained when prescribed by medical practitioners." [1] Singapore's National Strategic Action Plan on Antimicrobial Resistance states that "therapeutic products which include products containing antimicrobial agents are regulated under the Health Products Act and its subsidiary legislations. Specifically, antibiotics are classified as prescription-only medicine and hence can only be obtained when they are prescribed by licensed healthcare professionals." [2]

Although Singapore's Health Products Act does not directly mention antibiotics, it falls under the definition of "health products" that require prescription, as defined in Section 2 of the Health Products Act. The Health Products Act defines a health product as a "substance, preparation or device...that falls within any of the categories of health products specified in the First Schedule; "health-related purpose" means a therapeutic, preventive, palliative, diagnostic or cosmetic purpose, or any other purpose for the promotion or preservation of human health and well-being, and includes the following... (h) destroying or inhibiting micro-organisms that may be harmful to humans." Section 17 in the Health Products Act also states "No person shall supply any health product unless the supply of the health product is carried out in accordance with such requirements as may be prescribed... in accordance with the conditions of, a license issued by the Authority." [3]

On 4 November 2019, The Ministry of Health released a written answer to a public question, noting that "Antibiotics should only be prescribed when necessary. Antimicrobial Stewardship Programmes have been implemented in all public hospitals since 2011 to guide doctors on appropriate antibiotic use, so as to slow down the emergence of AMR. " [4] There is no evidence to suggest that there is a lack of implementation or gaps in enforcement for requiring prescription for antibiotic usage in humans.

[1] World Health Organization. 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf?sequence=1>]. Accessed 20 December 2020.

[2] The Agri-Food & Veterinary Authority, Ministry of Health, National Environment Agency and National Water Agency, of Singapore. November 2017. "National Strategic Action Plan on Antimicrobial Resistance, Singapore". [<https://www.ncid.sg/About-NCID/OurDepartments/Antimicrobial-Resistance-Coordinating-Office/Documents/National%20Strategic%20Action%20Plan%20on%20Antimicrobial%20Resistance.pdf>]. Accessed 20 December 2020.

[3] Attorney-General Chambers of the Republic of Singapore. Chapter 122D, Act 15 of 2007. "Health Products Act". [<https://sso.agc.gov.sg/Act/HPA2007>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. "Patients Showing Resistance to Antibiotics in Recent Years". [<https://www.moh.gov.sg/news-highlights/details/patients-showing-resistance-to-antibiotics-in-recent-years>]. Accessed 21 January 2021.

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: 0

There is insufficient public evidence that Singapore has legislation or regulations in place requiring prescriptions for antibiotic use for animals. The Joint External Evaluation of Singapore mentions, "currently, veterinary prescription is not required for

administering antibiotics to farm animals; however, AVA (Agri-Food & Veterinary Authority) engages and provides guidance to farmers on antimicrobial stewardship". [1] This is reinforced by Singapore's National Strategic Plan on AMR, which states "Currently, farmers are allowed to administer antimicrobials to their animals without a veterinary prescription." [2]. Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA). [3,4] There is no further evidence on this topic on the websites of the Ministry of Health or the Singapore Food Agency. [4,5]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] The Agri-Food & Veterinary Authority, Ministry of Health, National Environment Agency and National Water Agency, of Singapore. November 2017. "National Strategic Action Plan on Antimicrobial Resistance, Singapore". [<https://www.ncid.sg/About-NCID/OurDepartments/Antimicrobial-Resistance-Coordinating-Office/Documents/National%20Strategic%20Action%20Plan%20on%20Antimicrobial%20Resistance.pdf>]. Accessed 20 December 2020.

[3] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[4] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>] Accessed 21 January 2021.

1.2 ZOONOTIC 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 publicly available evidence that the government of Singapore has a strategy for the surveillance and reporting of zoonotic disease. The Joint External Evaluation of IHR Core Capabilities of Singapore assessment, completed in April 2018, indicates surveillance and reporting of zoonotic disease is known as the One Health framework. [1] The core of this framework is the coordination and collaboration between the Ministry of Health, the National Environment Agency and Agri-Food and Veterinary Authority to address public health needs generally, which includes zoonotic disease. [1] "The One Health framework in Singapore is a successful mechanism for integrating the surveillance and response to threats posed by zoonotic infections, antimicrobial resistance and food-borne illness. The comprehensive risk communication system includes regular coordination within and between key agencies." [1]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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 the government of Singapore has legislation, plan or equivalent strategy document which includes measures for risk identification and reduction for zoonotic diseases spillover events from animals to humans. The National Centre for Infectious Diseases website lists several zoonotic diseases and conditions of concern and includes general guidelines for prevention, but does not address specific spillover risks. [1] Singapore's Infectious Diseases Act, Animal and Birds Act, and Environmental Public Health Act makes no mention of specific strategies for risk identification and reduction of zoonotic disease spillover events. [2,3,4] A publicly posted parliamentary question on the sale of live turtles received an oral reply by the Senior Minister of State for Environment and Water Resources on 5 May 2020, that indicate that the sale and slaughter of animals in wet markets take into consideration international benchmarking and scientific evidence for hygiene standards by the Singapore Food Agency, in consultation with the National Parks Board and National Environment Agency. [5] There is no further mention on this topic on the websites of the Ministry of Sustainability and Environment, the Ministry of Health, the Singapore Food Agency, the National Environment Agency, or the National Parks Board. [6,7,8,9,10]

[1] National Centre for Infectious Diseases of the Republic of Singapore. [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/default.aspx>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers of the Republic of Singapore. Chapter 137, Act 21 of 1976. "Infectious Diseases Act". [<https://sso.agc.gov.sg/Act/IDA1976>]. Accessed 20 December 2020.

[3] Attorney-General's Chambers of the Republic of Singapore. Chapter 7, Ordinance 3 of 1965. "Animals and Birds Act". [<https://sso.agc.gov.sg/Act/ABA1965>]. Accessed 20 December 2020.

[4] Attorney-General's Chambers of the Republic of Singapore. Chapter 95, Act 14 of 1987. "Environmental Public Health Act". [<https://sso.agc.gov.sg/Act/EPHA1987>]. Accessed 20 December 2020.

[5] Ministry of Sustainability and the Environment of the Republic of Singapore. "Parliamentary Question on Sale of Live Turtles - Dr Amy Khor". [<https://www.mse.gov.sg/resource-room/category/2020-05-05-parliament-q-&a-on-sale-of-live-turtles/>]. Accessed 20 December 2020.

[6] Ministry of Sustainability and the Environment of the Republic of Singapore. [<https://www.mse.gov.sg/>]. Accessed 20 December 2020.

[7] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[8] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[9] The National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[10] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

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: 0

The government of Singapore has a national guideline that accounts for surveillance of multiple zoonotic pathogens of public health concern, however there is insufficient evidence to confirm that the guideline also covers control. The Joint External Evaluation of IHR Core Capabilities of Singapore assessment indicates that "there is a well-established One Health framework that applies coordinated, collaborative, multidisciplinary and cross-sectoral approaches at the animal-human-environment interface". [1] Surveillance systems for priority zoonotic diseases/pathogens are well-established and cover Bovine Tuberculosis, Avian Influenza, Salmonella Enteritidis, Brucellosis, and E.coli O157:H7. [1] Surveillance programmes are reviewed regularly. The JEE almost mentions that the AVA (Agri-Food & Veterinary Authority) conducts risk assessments and may scale up surveillance when there are reports of outbreaks from neighboring countries from which Singapore imports

animals and/or animal products." [1] The diseases the framework covers are those listed in the Animal and Birds Act, which includes Bovine Tuberculosis, Avian Influenza, Salmonella Enteritidis, Brucellosis, and E.coli O157:H7. [2]

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA). [3,4]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [3,4,5,6,7]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf?sequence=1>]. Accessed 6 December 2018.

[2] Attorney-General Chambers of the Republic of Singapore. Chapter 7, Ordinance 3 of 1965. "Animals and Birds Act". [<https://sso.agc.gov.sg/Act/HPA2007>]. Accessed 20 December 2020.

[3] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[4] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[6] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[7] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 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 insufficient evidence that indicates the existence of a dedicated zoonotic disease unit that functions across ministries. According to the Joint External Evaluation of Singapore, instead Singapore has a One Health Coordinating Committee comprising of the Ministry of Health, National Environment Agency, and the former Agri-Food and Veterinary Authority (AVA). This Committee is responsible for providing strategic direction and setting priorities for inter-agency coordination and collaboration on zoonotic disease-related matters. According to JEE "the One Health Working Group works under the direction of the Coordinating Committee to formulate, coordinate, implement and review programmes, initiatives and action plans. Project teams may be formed when necessary to focus on specific One Health issues or projects". [1]

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA). As AVS states on their website, "AVS will continue to work alongside with the respective agencies to combat against antimicrobial resistance". [2]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [3,4,5,6,7]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] National Parks Board of the Republic of Singapore. "Antimicrobial resistance". [<https://www.nparks.gov.sg/avs/animals/animal-health-and-veterinarians/animal-diseases-and-antimicrobial-resistance/antimicrobial-resistance>]. Accessed 20 December 2020.

- [3] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [4] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.
- [5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.
- [6] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [7] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 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

Singapore has a national mechanism for livestock owners to conduct and report on disease surveillance. The Animal and Veterinary Service's Guidelines for Reporting Notifiable Diseases (2019 Edition) states that notifiable diseases (suspected or confirmed cases) must be reported to the Animal and Veterinary Service under the National Parks Board, utilizing the prescribed notification template, or a hotline. [1] The guideline includes a list of over 110 notifiable diseases, describing route of transmission, susceptible species, clinical features, risk factors, incubation period, and criteria for reporting. According to the WHO Joint External Evaluation of Singapore completed in 2018, penalties are imposed for not reporting notifiable diseases. [2]

[1] Animal and Veterinary Service of the National Parks Board of the Republic of Singapore. "Guidelines for Reporting Notifiable Diseases". [https://www.nparks.gov.sg/-/media/avs/migrated-content/animals-and-pets/animal-health-and-veterinarians/animal-diseases-and-diagnostic-services/guidelines-for-reporting-nd_2019-edition-final1updatedapr2020.pdf?la=en&hash=5F37609003F48A621A181E060326BB9E02AF5742]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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: 0

There is no evidence to suggest information generated through surveillance is safeguarded and kept confidential. Although Singapore has a Personal Data Protection Act (PDPA), it provides an exemption for government bodies. The Personal Data Protection (Statutory Bodies) Notification 2013 identifies the main government agencies that are exempted, which includes: the Ministry of Health, National Environment Agency, National Parks Board, Health Sciences Authority, and Singapore Food Agency. [1, 2] Though no body of evidence explicitly states this, it can be implied that surveillance data collected from these government agencies are exempted from the PDPA, removing all stipulated safeguards.

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National

Environment Agency, National Parks Board, or Singapore Food Agency. [3,4,5,6,7]

[1] Attorney-General Chambers of the Republic of Singapore. No 26 of 2012. "Personal Data Protection Act 2012". [https://sso.agc.gov.sg/Act/PDPA2012]. Accessed 20 December 2020.

[2] Attorney-General Chambers of the Republic of Singapore. "Personal Data Protection (Statutory Bodies) Notification 2013". [https://sso.agc.gov.sg/SL/PDPA2012-S149-2013]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [https://www.moh.gov.sg/]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [https://www.hsa.gov.sg/]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [https://www.nea.gov.sg/]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [https://www.nparks.gov.sg/]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [https://www.sfa.gov.sg/]. Accessed 20 December 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

The government of Singapore does conduct surveillance of zoonotic diseases in wildlife. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment, surveillance for zoonotic disease in wildlife is conducted by the relevant government agencies under the One Health Framework. Reports of dead wildlife made to National Parks and/or Wildlife Reserves Singapore are shared with Agri-Food and Veterinary Authority of Singapore and Ministry Of Health as part of the One Health framework. [1] Additionally, the National Environment Agency (NEA) has a Surveillance and Epidemiology Programme, which "supports the control of vector-borne diseases conducted by NEA's Regional Offices and other land agencies, through surveillance and risk assessment." [2]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".

[http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf]. Accessed 20 December 2020.

[2] National Environment Agency of the Republic of Singapore. "Surveillance and Epidemiology Programme".

[https://www.nea.gov.sg/corporate-functions/resources/research/surveillance-and-epidemiology-programme/]. Accessed 20 December 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: 15.6

2018

OIE WAHIS database

1.2.4b

Number of veterinary para-professionals per 100,000 people

Input number

Current Year Score: 5.58

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 insufficient evidence to suggest that Singapore's national plan on zoonotic disease include mechanisms for working with the private sector in controlling or responding to zoonoses.

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. There is also no publicly available information available online on Singapore's One Health Framework. [1,2,3,4,5,6]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[4] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[5] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[6] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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: 0

There is insufficient public evidence that the government of Singapore has a record of facilities in which especially dangerous pathogens and toxins are stored or processed. The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018 states that "facilities meeting regulatory requirements (which include an established biorisk management system) are granted approval to store and handle such pathogens or toxins and must undergo periodic certification, inspection and/or audit by Ministry of Health (MOH) and/or Agri-Food and Veterinary Authority (AVA). High risk facilities are certified annually, while lower risk facilities are inspected/audited once every two to three years by MOH and annually by AVA". [1] This however does not explicitly specify whether there a record of facilities exist. Though the Biological Agents and Toxins Act requires that every operator of a facility to "maintain an inventory of all biological agents and toxins at the facility", it is unclear whether there is a government body with a public record of all facilities with dangerous pathogens and toxins. [2] It is worth noting however, that all facilities possessing or working with Schedule 1 Part 1 and Part 2 biological agents must be certified by a MOH-Approved Facility Certification Body that are credible in certifying biosafety level 3 containment facilities. [3] Although these facilities must also register with MOH, there is no publicly available registry or list of these registered facilities available. Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA). No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, Singapore Food Agency, or the Ministry of Defence. [4,5,6,7,8] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is not accessible to the public, and it is unknown if they contain information on this matter. [9] Finally, no evidence was found via the VERTIC database. [10]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers. Chapter 24A, Act 36 of 2005. "Biological Agents and Toxins Act". [<https://sso.agc.gov.sg/Act/BATA2005>] Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. "Biosafety Committee: Certification". [<https://www.moh.gov.sg/biosafety/certified-facility/certification>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[8] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[9] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 2020.

[10] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>].

Accessed 21 January 2021.

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

There is publicly available evidence that the government of Singapore has legislation related to biosecurity which addresses requirements such as physical containment and operation practices of facilities in which especially dangerous pathogens and toxins are stored or processed. The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018 states "The Infrastructure Protection Act 2017 regulates physical protection, photography, emergency planning and access for protected places, which include facilities with biological agents or toxins as defined by the Biological Agents and Toxins Act." [1]

Additionally, the Biological Agents and Toxins Act is "An Act to prohibit or otherwise regulate the possession, use, import, transshipment, transfer and transportation of biological agents, inactivated biological agents and toxins, to provide for safe practices in the handling of such biological agents and toxins." Part III of this Act also prohibits the "use of biological agents for non-peaceful purpose", for which it includes access restrictions, failure reporting systems, physical containment, and other operation practices. [2]

While the Biological Agents and Toxins Act also states that every operator of a facility shall "establish and implement adequate security systems to control access to the facility itself, to those parts of the facility where the biological agents or toxins are kept or handled, and to such biological agents or toxins themselves," there is no explicit mention of cybersecurity in the Act or the JEE. [1,2]

Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted, and it is unknown if they contain information on this matter. [3]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers. Chapter 24A, Act 36 of 2005. "Biological Agents and Toxins Act". [<https://sso.agc.gov.sg/Act/BATA2005>] Accessed 20 December 2020.

[3] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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 government of Singapore has an established agency responsible for the enforcement of biosecurity legislation and regulations. The Biosafety Committee, under the Biological Agents and Toxins Act "regulates laboratory facilities, possession, import, transshipment, transfer and transport of scheduled biological agents and toxins". [1] The Biosafety Committee does

this by "carrying out the necessary audits/inspections and enforcements as required by the Act and its supplementary legislation; maintaining the national inventory of high-risk biological agents; developing and updating the select agent lists, MOH-approved certification bodies and training providers; processing and evaluating applications for use, possession, import, and transshipment of the scheduled agents; coordinating containment measures and investigating laboratory accidents of public health significance with the assistance of other branches of Operations Group." [1] The Biological Agents and Toxins Act defines biological agents as "(a) any micro-organism (including any bacterium, virus, fungus, rickettsia and parasite); (b) any infectious substance (including any prion); or (c) any component of a micro-organism or an infectious substance (but not including any toxin), that is capable of causing death, disease or other biological malfunction in a human", and defines toxins as "any poisonous substance that is produced and extracted from any micro-organism". Part III of this Act also prohibits the "use of biological agents for non-peaceful purpose", for which it includes access restrictions, failure reporting systems, physical containment, and other operation practices. [2] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted, and it is unknown if they contain information on this matter. [3]

[1] Ministry of Health. "BioSafety; Who We Are". [<https://www.moh.gov.sg/biosafety/about-us>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers. Chapter 24A, Act 36 of 2005. "Biological Agents and Toxins Act". [<https://sso.agc.gov.sg/Act/BATA2005>] Accessed 20 December 2020.

[3] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

While the Biological Agents and Toxins Act also mentions that every operator of the facility shall "establish and implement adequate security systems to control access to the facility itself, to those parts of the facility where the biological agents or toxins are kept or handled, and to such biological agents or toxins themselves," there is no explicit mention of cybersecurity requirements. [2] There is no further mention of cybersecurity

[1] Ministry of Health. "Biosafety Committee: Certification". [<https://www.moh.gov.sg/biosafety/certified-facility/certification>]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[8] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[9] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.

[9] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

There is insufficient public evidence of in-country capacity to conduct Polymerase Chain Reaction (PCR)-based diagnostic testing for Ebola or anthrax in Singapore. While hospitals and clinics in Singapore offer PCR tests such as Shim Clinic and Tanjong Pagar Medical Clinic, they do not specify for whether it can be used specifically for anthrax and/or Ebola. [1, 2] The National Centre for Infectious Diseases' website has an informative page on Anthrax, but on the Investigations section, states to "Contact MOH" for PCR without definitively stating that PCR-based diagnostic testing is available. [3]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [4,5,6,7,8]

[1] Shim Clinic Singapore. "PCR Test". [<https://www.shimclinic.com/singapore/pcr-test>]. Accessed 20 December 2020.

[2] Tanjong Pagar Medical Clinic. [<http://www.tanjongpagarclinic.com/std-hiv>]. Accessed 20 December 2020.

[3] National Centre for Infectious Diseases. "Anthrax". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Anthrax.aspx>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[6] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[7] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[8] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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

There is evidence that Singapore requires 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.

According to the Joint External Evaluation of the IHR Core Capacities of Singapore, conducted in April 2018, Singapore has "Legislative support, MOH-approved training curriculum and trainers certified under the Advanced Certificate in Training and Assessment ensure continuity, consistency and high quality of training". It further details that "Most institutions also run in house biosafety and biosecurity trainings programs, either classroom-based, online or on-the-job basis. Certified facilities possessing dangerous human and animal pathogens are also required to conduct annual joint emergency response exercises with Singapore Civil Defence Force (SCDF). Personnel responsible for packing and shipping of dangerous pathogens and toxins must undergo specialized training and be certified." [1]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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: 0

There is no publicly available information that the government of Singapore specifically requires drug testing, background checks and psychological checks for security and other personnel with access to especially dangerous pathogens, toxins, or biological materials with pandemic potential. According to the Ministry of Health, "personnel who have access to facilities that possess or work with First Schedule, Second Schedule and Fifth Schedule biological agents and toxins must be vetted by the Ministry of Home Affairs." [1]. Although the First Schedule, Second Schedule and Fifth Schedule biological agents and toxins are mentioned in the Biological Agents and Toxins Act, it does mention vetting required for personnel handling such agents and toxins. [2] Although the Ministry of Health has a pre-requirement for personnel working in a facility possessing regulated biological agents and/or toxins gazetted as a protected place (PP) under the Infrastructure Protection Act (IPA), it does not specifically specify what the vetting or screening process entails. [3,4]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, Singapore Food Agency, Ministry of Defence, National Research Foundation or the VERTIC database. [5,6,7,8,9,10,11,12]

Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [13]

[1] Ministry of Health. "Biosafety; About Us". [<https://www.moh.gov.sg/biosafety/about-us>]. Accessed 20 December 2020.

[2] Ministry of Health. "Biological Agents and Toxins Act". No. 36 Of 2005. [<https://sso.agc.gov.sg/Act/BATA2005>]. Accessed 20 December 2020.

[3] Ministry of Health. "Application for Gazette/De-Gazette as a Protected Place under the Protected Areas and Protected Places Act and Personnel Vetting for the Possession of Biological Agents and Toxins listed in the Biological Agents and Toxins Act." [https://www.moh.gov.sg/docs/librariesprovider7/useful-info-and-guidelines-documents/applicationforgazette_jul19.pdf] Accessed 20 December 2020.

[4] Attorney-General's Chambers. No. 41 of 2017. "Infrastructure Protection Act 2017". [<https://sso.agc.gov.sg/Acts-Supp/41-2017/Published/20171031>] Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[7] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[8] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[9] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[10] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[11] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 21 January 2021.

[12] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.

[13] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

There is insufficient evidence that the government of Singapore has national regulations on the safe and secure transport of infectious substances, specifically for Category A and B substances. The Biological Agents and Toxins (Transportation) Regulations covers the transportation of First and Second Schedule biological agents but does not make mention of Category A and B substances. [1] However, the law interprets "biological agent" as "(a) any micro-organism (including any bacterium, virus, fungus, rickettsia and parasite); (b) any infectious substance (including any prion); or (c) any component of a micro-organism or an infectious substance (but not including any toxin), that is capable of causing death, disease or other biological malfunction in a human". [1] This definition is synonymous to IATA's definition of Category A. [2] No further information on this topic was found on the websites of the Ministry of Transport, the Ministry of Health, the Ministry of Defence, Health Sciences Authority, National Environment Agency, National Parks Board, Singapore Food Agency, National Research Foundation, or the VERTIC database [3, 4, 5, 6, 7, 8, 9, 10, 11]. Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [12]

[1] Attorney-General's Chambers of the Republic of Singapore. "Biological Agents and Toxins (Transportation) Regulations". No. 36 of 2005. [<https://sso.agc.gov.sg/SL/BATA2005-RG1>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers of the Republic of Singapore. "Biological Agents and Toxins Act". No. 36 of 2005. [<https://sso.agc.gov.sg/Act/BATA2005>]. Accessed 20 December 2020.

[3] Ministry of Transport. [<https://www.mot.gov.sg/>]. Accessed 20 December 2020.

[4] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[7] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[8] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[9] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[10] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 21 January 2021.

[11] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.

[12] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

There is no evidence found for any national legislation or regulation to oversee cross-border transfer and end-user screening of especially dangerous pathogens. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment, "The import, possession, use, transfer, transport and transshipment of pathogens and toxins of human and animal origin are regulated by the Biological Agents and Toxins Act and Animals and Birds Act, respectively, while the Strategic Goods Control Act regulates their export." [1] In the Strategic Goods Control Act, these are labelled "biological agents" and require special permits for export. [2] However the act is not specific about cross-border transfer or end-user screening. [2] The same applies to the Biological Agents and Toxins (Transportation) Regulations and the Animals and Birds Act [3, 4]. No further information on this topic was found on the websites of the Ministry of Transport, the Ministry of Health, the Ministry of Defence, Health Sciences Authority, National Environment Agency, National Parks Board, Singapore Food Agency, the National Research Foundation, Ministry of Trade and Industry, VERTIC Database or ASEAN Healthcare Services [5,6,7,8,9,10,11,12,13,14]. Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [15]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers of the Republic of Singapore. "Strategic Goods Controls Act." [<https://sso.agc.gov.sg/SL-Supp/S536-2018/Published/20180904>]. Accessed 20 December 2020.

[3] Attorney-General's Chambers of the Republic of Singapore. "Biological Agents and Toxins (Transportation) Regulations". No. 36 Of 2005. [<https://sso.agc.gov.sg/SL/BATA2005-RG1>]. Accessed 20 December 2020.

[4] Attorney-General's Chambers. "Animals and Birds Act". Ordinance 3 of 1965. [<https://sso.agc.gov.sg/Act/ABA1965>]. Accessed 20 December 2020.

[5] Ministry of Transport. [<https://www.mot.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[7] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[8] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[9] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[10] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[11] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[12] ASEAN Healthcare Services. [<http://aseanhealthcare.org/>]. Accessed 22 December 2018.

[13] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.

[14] Ministry of Trade and Industry. [<https://www.mti.gov.sg/>]. Accessed 21 January 2021.

[15] Confidence Building Measures. ""Singapore"". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 21 January 2021.

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

The government of Singapore has a national biosafety legislation. The Biological Agents and Toxins Act 2005 is defined as "An Act to prohibit or otherwise regulate the possession, use, import, transshipment, transfer and transportation of biological agents, inactivated biological agents and toxins, to provide for safe practices in the handling of such biological agents and toxins." [1] The Biosafety Committee empowered by the Act is set up to "administer and enforce the Biological Agents and Toxins Act which regulates laboratory facilities, possession, import, transshipment, transfer and transport of scheduled biological agents and toxins". [2] This is done by "carrying out the necessary audits/inspections and enforcements as required by the Act and its supplementary legislation; maintaining the national inventory of high-risk biological agents; developing and updating the select agent lists, MOH-approved certification bodies and training providers; Processing and evaluating applications for use, possession, import, and transshipment of the scheduled agents; coordinating containment measures and investigating laboratory accidents of public health significance with the assistance of other branches of Operations Group; act as a resource and coordination centre for all biosafety and biosecurity issues in Singapore; provide secretariat support for the National Biosafety Committee, including appointed technical committees; develop policies, procedures and guidelines for biosafety emergencies and response; keep abreast with the latest biosafety and biosecurity development, and to review and update existing policies to ensure policies are always kept in line with the emerging biosafety and biosecurity trends." [2] Additionally, according to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, "Workplace Safety and Health Act provides for safety and health in all workplaces, including bio-laboratories." [3] The Workplace Safety and Health Act covers workplace safety from a general perspective. [4] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [5]

[1] Attorney-General's Chambers of the Republic of Singapore. "Biological Agents and Toxins Act" No. 36 of 2005. [<https://sso.agc.gov.sg/Act/BATA2005>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "Biosafety; About Us". [<https://www.moh.gov.sg/biosafety/about-us>]. Accessed 20 December 2020.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[4] Attorney-General's Chambers of the Republic of Singapore. Chapter 35A, Act 7 of 2006. "Workplace Safety and Health Act". [<https://sso.agc.gov.sg/Act/WSHA2006>]. Accessed 20 December 2020.

[5] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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

The government of Singapore has an established agency responsible for the enforcement of biosafety legislation and regulations. The National Biosafety Committee empowered by the Biological Agents and Toxins Act is set up to "administer and enforce the Biological Agents and Toxins Act which regulates laboratory facilities, possession, import, transshipment, transfer and transport of scheduled biological agents and toxins". [1,2]. This is done by "carrying out the necessary audits/inspections and enforcements as required by the Act and its supplementary legislation. Maintaining the national inventory of high-risk biological agents; Developing and updating the select agent lists, Ministry of health (MOH)-approved certification bodies and training providers; Processing and evaluating applications for use, possession, import, and transshipment of the scheduled agents; Coordinating containment measures and investigating laboratory accidents of public health significance with the assistance of other branches of Operations Group; Act as a resource and coordination centre for all biosafety and biosecurity issues in Singapore; Provide secretariat support for the National Biosafety Committee, including appointed technical committees; Develop policies, procedures and guidelines for biosafety emergencies and response; Keep abreast with the latest biosafety and biosecurity development, and to review and update existing policies to ensure policies are always kept in line with the emerging biosafety and biosecurity trends." [2] The Biological Agents and Toxins Act 2005 is defined as "an Act to prohibit or otherwise regulate the possession, use, import, transshipment, transfer and transportation of biological agents, inactivated biological agents and toxins, to provide for safe practices in the handling of such biological agents and toxins." [2]. Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [3]

[1] Attorney-General's Chambers of the Republic of Singapore. "Biological Agents and Toxins Act" No. 36 of 2005.

[https://sso.agc.gov.sg/Act/BATA2005]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "Biosafety; About Us". [https://www.moh.gov.sg/biosafety/about-us]. Accessed 20 December 2020.

[3] Confidence Building Measures. "Singapore".[https://bwc-ecbm.unog.ch/state/singapore]. Accessed 21 January 2021.

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

The government of Singapore does require biosafety training, using a standardized, required approach for personnel working in facilities housing or working with especially dangerous pathogens, toxins, or biological materials with pandemic potential. The Biological Agents and Toxins Act 2005 mandates training for facility staff: "Every operator of a facility shall ensure that all staff of the facility receive training as may be required by the Director". [1] The Biosafety Committee under the Ministry of Health has a train-the-trainers programme for this purpose. [2] Course guidelines include "Safety organization: roles and responsibilities of biosafety coordinator, operator, other lab employees, etc ;Biosafety standards: comparison of local versus international guidelines; Legislation & regulation of occupational safety and health in Singapore: legislative requirements, governing agencies, contacts for biosafety, other occupational safety and health legislations; Import, export and transfer: procedures and documents required, select agents." [2] The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018 also states "Within the relevant institutions there is a comprehensive multi-tier system of biosafety/biosecurity training programmes that are subsidized by the government. The Biosafety Induction Program and Biosafety Professional Program are based on a set of standard training materials reviewed and endorsed by a panel of subject experts, such as biosafety professionals, bio-containment engineers, and security personnel. These programs include aspects

of biosecurity and are conducted by trainers certified under the Advanced Certificate in Training and Assessment program." [3,4] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is restricted to the public, and it is unknown if they contain information on this matter. [5]

[1] Ministry of Health. "Biological Agents and Toxins Act 2005". No. 36 Of 2005. [https://sso.agc.gov.sg/Act/BATA2005]. Accessed 20 December 2020.

[2] Ministry of Health. "Biosafety; About Us". [https://www.moh.gov.sg/biosafety/about-us]. Accessed 22 December 2018.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf]. Accessed 20 December 2020.

[4] Koh, V. "Biosafety training structure launched by WDA, various agencies". Today Online. [https://www.todayonline.com/singapore/biosafety-training-structure-launched-wda-various-agencies] Accessed 20 December 2020.

[5] Confidence Building Measures. "Singapore". [https://bwc-ecbm.unog.ch/state/singapore]. Accessed 20 December 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: 0

There is insufficient evidence that Singapore has conducted an assessment to determine whether ongoing research is occurring on especially dangerous pathogens, toxins, pathogens with pandemic potential or other dual-use research. According to the Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, "dual use research of concern is addressed by having biosafety committees in all facilities handling high-risk pathogens and microbial toxins with procedures for risk assessment and mitigation. Work involving genetic manipulation or modification is vetted by the Genetic Modification Advisory Committee and reviewed by Ministry of Health (MOH) or the Agri-Food and Veterinary Authority (AVA). The Biological Agents and Toxins Act prohibits the use of biological agents and toxins for non-peaceful purposes." [1]. This however only indicates that guidelines are in place but does not specifically mention whether any research is ongoing. Although Singapore's largest defense research and development organization, DSO National Laboratories', research work includes biosafety and security, no information about an assessment was available [2].

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

No further information was found on this topic on the websites of the Ministry of Defence, Genetic Modification Advisory Committee, Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, Singapore Food Agency, or the VERTIC database. [3,4,5,6,7,8,9,10,11] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is not accessible to the public, and it is unknown if they contain information on this matter. [12]

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
- [2] DSO National Laboratories. [<https://www.dso.org.sg/>]. Accessed 20 December 2020.
- [3] Genetic Modification Advisory Committee. [<http://www.gmac.sg/index.html>]. Accessed 20 December 2020.
- [4] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.
- [5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.
- [6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.
- [7] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.
- [8] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [9] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [10] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.
- [11] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.
- [12] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

There is insufficient evidence that the government of Singapore has a national policy requiring oversight of research with especially dangerous pathogens, toxins, pathogens with pandemic potential or other dual-use research. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018 "dual use research of concern is addressed by having biosafety committees in all facilities handling high-risk pathogens and microbial toxins with procedures for risk assessment and mitigation. Work involving genetic manipulation or modification is vetted by the Genetic Modification Advisory Committee and reviewed by Ministry of Health (MOH) or the Agri-Food and Veterinary Authority (AVA). The Biological Agents and Toxins Act prohibits the use of biological agents and toxins for non-peaceful purposes." [1] While there is no national policy on dual-use research, the Strategic Goods Control List under the Strategic Goods Act includes dual-use goods and its development (which includes research) in its list. [2] The act's goal is stated to "control the transfer and brokering" of strategic goods, including dual-use goods, but does not make mention of research usage. Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA). No further information was found on this topic on the websites of the Ministry of Defence, Genetic Modification Advisory Committee, Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, Singapore Food Agency, or the VERTIC database. [3,4,5,6,7,8,9,10,11] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is not accessible to the public, and it is unknown if they contain information on this matter. [12]

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
- [2] Attorney-General Chambers of the Republic of Singapore. Chapter 300, Act 40 of 2002. "Strategic Goods (Control) Act". [<https://sso.agc.gov.sg/Act/SGCA2002>]. Accessed 20 December 2020.
- [3] Genetic Modification Advisory Committee. [<http://www.gmac.sg/index.html>]. Accessed 20 December 2020.
- [4] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

- [5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.
- [6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.
- [7] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.
- [8] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [9] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [10] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.
- [11] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.
- [12] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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: 0

There is no publicly available evidence that the government of Singapore has an agency responsible for oversight of research with especially dangerous pathogens, pathogens with pandemic potential, and/or other dual use research. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018 "Dual use research of concern is addressed by having biosafety committees in all facilities handling high-risk pathogens and microbial toxins with procedures for risk assessment and mitigation. Work involving genetic manipulation or modification is vetted by the Genetic Modification Advisory Committee and reviewed by Ministry of Health (MOH) or Agri-Food and Veterinary Authority (AVA). The Biological Agents and Toxins Act prohibits the use of biological agents and toxins for non-peaceful purposes." [1] However there is nothing to suggest an agency that has oversight over all dual use research. No additional evidence was found on biosafety committees in facilities. The Singapore Customs also manages dual-use goods but with regards to transportation and transshipment. [2]

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

No further information was found on this topic on the websites of the Ministry of Defence, Genetic Modification Advisory Committee, Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, Singapore Food Agency, or the VERTIC database. [3,4,5,6,7,8,9,10,11] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is not accessible to the public, and it is unknown if they contain information on this matter. [12]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Attorney-General Chambers of the Republic of Singapore. Chapter 300, Act 40 of 2002. "Strategic Goods (Control) Act". [<https://sso.agc.gov.sg/Act/SGCA2002>]. Accessed 20 December 2020.

[3] Genetic Modification Advisory Committee. [<http://www.gmac.sg/index.html>]. Accessed 20 December 2020.

[4] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[7] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.

- [8] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [9] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [10] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.
- [11] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.
- [12] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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 insufficient evidence that Singapore has legislation or regulations requiring the screening of synthesized DNA against lists of known pathogens and toxins before it is sold.

The Singapore Food Agency has a list of approved genetically modified crops for use as food or as food ingredients in Singapore. [1] The National Centre for Food Science (NCFS) houses the Singapore Food Agency's food inspection services and laboratory testing services for food safety. Testing of Food Microbiology includes "rapid methods and automation for detection, identification and enumeration of food-borne pathogens and microbiological hygiene indicators" with equipment that includes a DNA Sequencer. [2] However, there is no explicit evidence that screening of DNA is done against known pathogens and toxins.

No further information was found on this topic on the websites of the Ministry of Defence, Genetic Modification Advisory Committee, Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, Singapore Food Agency, or the VERTIC database. [3,4,5,6,7,8,9,10,11] Although Singapore has submitted Confidence Building Measures on an annual basis, access to the reports is not accessible to the public, and it is unknown if they contain information on this matter. [11]

- [1] Singapore Food Agency of the Republic of Singapore. "List of approved genetically modified crops for use as food or as food ingredients in Singapore". [<https://www.sfa.gov.sg/docs/default-source/default-document-library/list-of-approved-gm-crops-for-use-as-food-or-as-food-ingredients.pdf>]. Accessed 20 December 2020.
- [2] Singapore Food Agency of the Republic of Singapore. "Food Testing Services". [<https://www.sfa.gov.sg/food-information/food-testing-services/food-testing>]. Accessed 20 December 2020.
- [3] Genetic Modification Advisory Committee. [<http://www.gmac.sg/index.html>]. Accessed 20 December 2020.
- [4] Ministry of Defence. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.
- [5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.
- [6] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.
- [7] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.
- [8] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [9] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [10] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.
- [11] VERTIC Database. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/s/>]. Accessed 21 January 2021.

[12] Confidence Building Measures. "Singapore". [<https://bwc-ecbm.unog.ch/state/singapore>]. Accessed 20 December 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

There is publicly available evidence that the government of Singapore has the capacity to conduct tests for at least 5 of the 10 WHO-defined core tests. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore

assessment, "the national reference laboratories for tuberculosis, poliovirus and HIV are in public hospital laboratories, while the NPHL (National Public Health Laboratory) hosts national reference laboratories for influenza, malaria, measles and rubella." [1]. It does not specify what type of test is used for each core test. However, Singapore receives a score of "5" for question D.1.1, indicating that its national laboratory system is capable of conducting five or more of the ten core tests. [1] Singapore's National Centre for Infectious Diseases notes the following tests, but does not confirm whether the lab can conduct them: polymerase chain reaction (PCR) testing for Influenza virus (flu); serology for HIV; microscopy for mycobacterium tuberculosis (tuberculosis/TB); rapid diagnostic testing for plasmodium spp. (malaria); and bacterial (bone marrow) culture for Salmonella enteritidis serotype Typhi (typhoid). [2,3,4,5,6]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] National Centre for Infectious Diseases of the Republic of Singapore. "Influenza". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Influenza.aspx>]. Accessed 20 December 2020.

[3] National Centre for Infectious Diseases. "HIV/AIDS". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/HIV-AIDS.aspx>]. Accessed 20 December 2020.

[4] National Centre for Infectious Diseases of the Republic of Singapore. "Tuberculosis". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Tuberculosis.aspx>]. Accessed 20 December 2020.

[5] National Centre for Infectious Diseases of the Republic of Singapore. "Malaria". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Malaria.aspx>]. Accessed 20 December 2020.

[6] National Centre for Infectious Diseases of the Republic of Singapore. "Typhoid and Paratyphoid Fever". [<https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Typhoid-and-Paratyphoid-Fever.aspx>]. Accessed 20 December 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: 1

Singapore has evidence of a plan for conducting testing during a public health emergency that includes considerations for testing for novel pathogens. However, there is insufficient evidence that these plans include scaling capacity or defining specific goals for testing. Singapore has a Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases, which was revised in April 2014, that provides general guidelines for responding to a pandemic caused by a novel or re-emerging respiratory disease under the nation's Disease Outbreak Response System Condition (DORSCON) framework. This plan outlines routine and expanded procedures for assessing threats and impacts to public health, and medical directives on case management and infection control measures. It allows an immediate "Whole-of-Government" framework response to infection outbreaks and varying levels of interventions determined by the assessed DORSCON-level. At level orange (moderate to high public health impact), emphasis is placed on aggressively limiting further spread of local cases and clusters through surveillance and management of suspect cases, which includes testing. [1] However, there is no mention in this plan, nor in the Infectious Diseases Act specifically on specific goals on testing (e.g. diagnosing each individual case or sample testing), nor any mention of scaling testing efforts and capacity during a declared public health emergency or pandemic. [2]

For COVID-19 specifically, the Ministry of Health Advisory No. 02/2020 has set out measures to be taken by the Ministry of

Health in supporting the national testing strategy. [1] This includes setting up a Testing Operations Centre (TOC) to aggregate national testing demand and centrally manage allocation of testing capacity. [3]

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] Attorney-General's Chambers of the Republic of Singapore. Chapter 137, Act 21 of 1976. "Infectious Diseases Act". [<https://sso.agc.gov.sg/Act/IDA1976>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. Ministerial Advisory No. 02/2020. "Co-ordination of Testing Resources for Coronavirus Disease 2019 (COVID-19)". [[https://www.moh.gov.sg/docs/librariesprovider5/licensing-terms-and-conditions/moh-advisory-02_2020-co-ordination-of-testing-resources-for-coronavirus-disease-2019-\(covid-19\).pdf](https://www.moh.gov.sg/docs/librariesprovider5/licensing-terms-and-conditions/moh-advisory-02_2020-co-ordination-of-testing-resources-for-coronavirus-disease-2019-(covid-19).pdf)]. Accessed 20 December 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

Singapore's major laboratories that serve as reference facilities are accredited. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, it received a score of "5" on question D.1.4, indicating "all major laboratories fulfilling public health functions are accredited to international standards (ISO 15189, College of American Pathologists or ISO 17025)" [1]. Laboratory accreditation however, is not mandatory. There is no available evidence that specifically indicates the National Public Health Laboratory is accredited. [2]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".

[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] National Centre for Infectious Diseases. "National Public Health Laboratory". [<https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx>]. Accessed 20 December 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

Singapore's laboratories are subject to external quality assurance review. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018 (JEE), Singapore received a score of "5" on question D.1.4, indicating that "the Private Hospitals and Medical Clinics Act and individual accreditation bodies require that laboratories participate in external quality assessment (EQA) programs for every test conducted". [1] The JEE states "All major laboratories fulfilling public health functions are accredited to international standards. [1] As the National Public Health Laboratory is a major laboratory fulfilling public health functions, it can be inferred that it is accredited to international standards and subject to external quality assurance review as per the Private Hospitals and Medical Clinics Act. However, there is no available explicit

evidence that specifically states that the National Public Health Laboratory is subject to external quality assurance review. [2]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, Singapore Food Agency, or the National Centre for Infectious Diseases.

[2,3,4,5,6,7,8] The National Public Health Laboratory does not have its own website, and contains limited information on its webpage as a department of the National Centre for Infectious Diseases. [9]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] National Centre for Infectious Diseases. "National Public Health Laboratory". [<https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[8] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[9] National Centre for Infectious Diseases of the Republic of Singapore. "National Public Health Laboratory". [<https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx>]. Accessed 21 January 2021.

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

There is evidence that a specimen transport system is available nationwide in Singapore. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, "transport of specimens for surveillance and outbreak investigations is contracted to private courier companies with expertise in handling biological samples. Transport of specimens known or confirmed to contain dangerous biological agents or selected microbial toxins is regulated by Biological Agents and Toxins (Transportation) Regulations." [1] Singapore scores a "5" under D.1.2. on its specimen referral and transport system, indicating that Singapore has demonstrated capability to transport specimens to national laboratories. Private courier systems include the National Healthcare Group and M4 Solutions. Although no private couriers explicitly state their services are available nationwide, it can be assumed to be so as Singapore's heavily urbanized island city-state only has a landmass of 725 square kilometers (approximately 280 square miles). M4 Solutions, for example, has an express service for the collection and delivery of specimen from labs, to "respond and deliver within 1.5 hours" regardless of location. [2, 3, 4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] National Healthcare Group. "Courier Service". [https://diagnostics.nhg.com.sg/ourservices_details.aspx?id=154]. Accessed

20 December 2020.

[3] M4 Solutions. "Medical Courier". [<http://m4solutions.com.sg/index.php/medical-courier>]. Accessed 20 December 2020

[4] GovTech of the Republic of Singapore. "Total Land Area of Singapore". [<https://data.gov.sg/dataset/total-land-area-of-singapore>]. Accessed 20 December 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 public evidence that Singapore has a plan 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 Private Hospitals and Medical Clinics (PHMC) Act which covers registration of all licensed private hospitals, medical clinics, clinical laboratories and healthcare establishments does not provide provisions for rapid licensing procedures in the event of an outbreak. [1] The Infectious Diseases Act, the Public Health Preparedness Clinic (PHPC) scheme and the Ministry of Health's Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases make no mention of accelerated licensing or authorizing procedures of laboratories to scale-up testing capacity during an outbreak. [2,3,4]

Despite this, for COVID-19 specifically, Singapore has expanded its list of Ministry of Health-approved COVID-19 Polymerase Chain Reaction (PCR) test providers, and Antigen Rapid Test (ART) providers. [5,6] This includes both healthcare institutions (HCIs) licensed under the Private Hospitals and Medical Clinics (PHMC) Act as well as approved offsite premises. [7,8]

[1] Attorney-General's Chambers of the Republic of Singapore. Chapter 248, Act 27 of 1980. "Private Hospitals and Medical Clinics Act". [<https://sso.agc.gov.sg/Act/PHMCA1980>]. Accessed 20 December 2020.

[2] Attorney-General's Chambers of the Republic of Singapore. Chapter 137, Act 21 of 1976. "Infectious Diseases Act". [<https://sso.agc.gov.sg/Act/IDA1976>]. Accessed 20 December 2020.

[3] Agency for Integrated Care, Primary Care Pages. "Public Health Preparedness Clinic (PHPC)". [[https://www.primarycarepages.sg/practice-management/moh-national-schemes/public-health-preparedness-clinic-\(phpc\)](https://www.primarycarepages.sg/practice-management/moh-national-schemes/public-health-preparedness-clinic-(phpc))]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. "List of Approved Offsite Providers for Polymerase Chain Reaction (PCR) Tests for COVID-19". [[https://www.moh.gov.sg/docs/librariesprovider5/covid19_test_providers/approved-covid-19-pcr-swab-provider-\(17-dec-2020\).pdf](https://www.moh.gov.sg/docs/librariesprovider5/covid19_test_providers/approved-covid-19-pcr-swab-provider-(17-dec-2020).pdf)]. Accessed 20 December 2020.

[6] Ministry of Health of the Republic of Singapore. "List of Approved Providers for Antigen Rapid Testing for COVID-19 at Offsite Premises". [[https://www.moh.gov.sg/docs/librariesprovider5/covid19_test_providers/approved-covid-19-art-provider-\(17-dec-2020\).pdf](https://www.moh.gov.sg/docs/librariesprovider5/covid19_test_providers/approved-covid-19-art-provider-(17-dec-2020).pdf)]. Accessed 20 December 2020.

[7] Ministry of Health of the Republic of Singapore. "HCI Directory". [<http://hcidirectory.sg/hcidirectory/>]. Accessed 20 December 2020.

[8] Attorney-General's Chambers of the Republic of Singapore. Chapter 248, Act 27 of 1980. "Private Hospitals and Medical Clinics Act". [<https://sso.agc.gov.sg/Act/PHMCA1980>]. Accessed 20 December 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: 1

There is evidence that the government of Singapore conducts ongoing event-based surveillance and analysis of infectious diseases. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, "Singapore has a very robust capacity for indicator and event-based surveillance with mandatory reporting for a comprehensive list of potential pathogens in both human and animal health." [1] The Ministry of Health publishes Weekly Infectious Diseases Bulletin. [2] However there is insufficient evidence to suggest that surveillance data is analyzed on a daily basis. No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, or the Singapore Food Agency. [2,3,4,5,6,7]

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020. National Centre for Infectious Diseases of the Republic of Singapore. "Weekly Infectious Diseases Bulletin". [<https://www.ncid.sg/Health-Professionals/Pages/Weekly-Infectious-Diseases-Bulletin.aspx>]. Accessed 20 December 2020.
- [2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.
- [3] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.
- [4] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.
- [5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.
- [6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.
- [7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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

Singapore reported a public health emergency of international concern (PHEIC) to the WHO within the last two years. On 9 May 2019, the Ministry of Health in Singapore notified WHO of one laboratory-confirmed case of monkeypox. A total of 23 close contacts were traced and contacted, with 1 contact who travelled to Nigeria on 5 May 2019. As of 15 May 2019, 14 persons were vaccinated and close contacts were quarantined and monitored for 21 days since date of exposure to the confirmed case. Due to Singapore's quick actions and risk communication and surveillance, risk of onward spread was determined to be low. [1]

On 23 January 2020, the Ministry of Health confirmed its first imported case of the novel coronavirus infection in Singapore. The confirmed case was quarantined and monitored, and contact tracing and quarantining of close contacts conducted. [2]

Total of 10 cases of the novel coronavirus-19 were reported to the WHO before the WHO declared it a PHEIC. [3]

[1] World Health Organization. "Monkeypox - Singapore". [<https://www.who.int/csr/don/16-may-2019-monkeypox-singapore/en/>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "Confirmed Imported Case of Novel Coronavirus Infection in Singapore; Multi-Ministry Taskforce Ramps up Precautionary Measures". [<https://www.moh.gov.sg/news-highlights/details/confirmed-imported-case-of-novel-coronavirus-infection-in-singapore-multi-ministry-taskforce-ramps-up-precautionary-measures>]. Accessed 20 December 2020.

[3] World Health Organization. "Novel Coronavirus (2019-nCoV) Situation Report - 10" 30 January 2020. [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200130-sitrep-10-ncov.pdf?sfvrsn=d0b2e480_2]

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: 1

The government of Singapore operates an electronic reporting surveillance at national and subnational levels. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, "as part of indicator-based surveillance, medical practitioners, laboratories and educational institutions notify diseases and clusters through an innovative online platform developed by MOH (CD-LENS). The system is linked to medical record systems in public hospitals, enables auto-population of standardized notification templates and triggers providers to report via the on-line system. The system also provides doctors with guidance on notifiable diseases and information on disease trends and outbreaks to relevant stakeholders". [1] The Ministry of Health's CD-LENS or Communicable Diseases Live and Enhanced Surveillance has restricted public access. [2]

[1] World Health Organization. "Monkeypox - Singapore". [<https://www.who.int/csr/don/16-may-2019-monkeypox-singapore/en/>]. Accessed 20 December 2020.

[2] Communicable Diseases Live and Enhanced Surveillance. [<https://www.cdLens.moh.gov.sg/cdLens/>]. Accessed 20 December 2020.

2.3.2b

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

Yes = 1 , No = 0

Current Year Score: 1

The electronic reporting surveillance system in Singapore collects real-time data. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, "as part of indicator-based surveillance, medical practitioners, laboratories and educational institutions notify diseases and clusters through an innovative online platform developed by MOH (CD-LENS)." [1] CD-LENS is Communicable Diseases Live and Enhanced Surveillance, an online platform that has restricted access, but public information indicates it is real-time: "As a one-stop internet portal, it can be accessed anytime, anywhere, for real-time information on infectious disease news." [2, 3]

[1] World Health Organization. "Monkeypox - Singapore". [<https://www.who.int/csr/don/16-may-2019-monkeypox-singapore/en/>]. Accessed 20 December 2020.

[2] Communicable Diseases Live and Enhanced Surveillance. [<https://www.cdLens.moh.gov.sg/cdLens/>]. Accessed 20 December 2020.

[3] Primary Care Pages. "CDLENS". [<https://www.primarycarepages.sg/Pages/Practice%20Management/CDLENS.aspx>]. Accessed 20 December 2020.

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: 1

There is no publicly available evidence that electronic health records are commonly used in Singapore. The Integrated Health Information Systems has a National Electronic Health Record (NEHR) that is deployed across public and private hospitals, but where all public hospitals use this centralized system, private healthcare institutions have been slow in their adoption as of March 2020, with around "27% of doctors with private licenses, including general practitioners and specialists in the ambulatory care settings, accessing it." [1] According to the WHO, adoption of electronic health records as of 2015 is between 50%-75%, but no definitive data to determine what the current adoption rate could be found. [2,3] No further information was found on this topic on the website of the Ministry of Health. [4]

[1] See, Qin Yong. "Attitudes and Perceptions of General Practitioners Towards the National Electronic Health Record (NEHR) in Singapore". [<https://emj.emg-health.com/wp-content/uploads/sites/2/2020/03/Attitudes-and-Perceptions-of-General-Practitioners-towards-the-National-Electronic-Health-Record-NEHR-in-Singapore.pdf>]. Accessed 20 December 2020.

[2] Integrated Health Information Systems. "National Electronic Health Record". [https://www.iHis.com.sg/Latest_News/Media_Releases/Pages/About_the_National_Electronic_Health_Record.aspx]. Accessed 20 December 2020.

[3] World Health Organisation. "Global Observatory for eHealth".

[<https://www.who.int/goe/publications/atlas/2015/sgp.pdf?ua=1>]. Accessed 20 December 2020.

[4] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 20 December 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

The Singapore national public health system has access to electronic health records of individuals in the country. Since 2011, the National Electronic Health Record has consolidated public health records of Singaporeans. "Owned by the Ministry of Health (MOH) and managed by the Integrated Health Information Systems (IHiS), the system collects summary patient health records across different healthcare providers. This enables authorized healthcare professionals to have a holistic and longitudinal view of their patients' healthcare history." [1] The National Electronic Health Record is deployed across public

and private hospitals. [1]

[1] Integrated Health Information Systems. "National Electronic Health Record".
[https://www.ihis.com.sg/Latest_News/Media_Releases/Pages/About_the_National_Electronic_Health_Record.aspx].
Accessed 20 December 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

The data standards of the health records are comparable. The health records use a 'H-Cloud', a cloud computing platform that is ISO 20000 certified. [1] "ISO/IEC 20000-1:2011 is a service management system (SMS) standard. It specifies requirements for the service provider to plan, establish, implement, operate, monitor, review, maintain and improve an SMS. The requirements include the design, transition, delivery and improvement of services to fulfill agreed service requirements. [2]

[1] Integrated Health Information Systems. "H-Cloud".
[https://www.ihis.com.sg/Project_Showcase/Healthcare_Systems/Pages/H-Cloud.aspx]. Accessed 20 December 2020.
[2] International Organization for Standardization. "ISO/IEC 20000-1:2011 "[<https://www.iso.org/standard/51986.html>]].
Accessed 20 December 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

There is public evidence that Singapore has established mechanisms at the relevant ministries to share data. According to the Joint External Evaluation (JEE) of IHR Core Capabilities of Singapore assessment completed April 2018, the One Health framework consisting of the Ministry of Health (MOH), National Environment Agency (NEA) and the former Agri-Food and Veterinary Authority (AVA) coordinates efforts between the three ministries for the purposes of public health, including surveillance. [1] The JEE reports notes that "although the surveillance systems operated by the MOH, AVA and NEA are currently independent, data are regularly shared through the One Health framework on a daily or weekly basis. When relevant, data are also shared with other partner agencies (e.g. the Ministry of Education and Ministry of Manpower)." [1] The JEE assessment gave the country a score 5 for 'reporting networks and protocols in country', stating, "A well-established One Health framework ensures prompt and effective information sharing between the human, animal and environmental sectors and coordinated reporting to WHO, FAO or OIE." [1]

However, no further publicly available information is found online with regards to the One Health Framework. A copy of the Framework could not be located.

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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

Singapore makes de-identified health surveillance data on infectious diseases publicly available. The Communicable Diseases Division of the Ministry of Health publishes a weekly infectious disease bulletin and has done so since 2015. [1]

For COVID-19 specifically, there are daily situation reports updated on the Ministry of Health website showcasing total cases, active cases, number of people in ICU, in isolation, and discharged; this includes visualization and tables for data aggregates. [2]

[1] National Centre for Infectious Diseases of the Republic of Singapore. "Weekly Infectious Diseases Bulletin". [<https://www.ncid.sg/Health-Professionals/Pages/Weekly-Infectious-Diseases-Bulletin.aspx>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "COVID-19 Situation Report". [<https://covidsitrep.moh.gov.sg/>]. Accessed 20 December 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

The government of Singapore makes de-identified COVID-19 surveillance data available through daily situation reports on the Ministry of Health's website. The website showcases COVID-19 total cases, active cases, number of people in ICU, in isolation, and discharged; this includes visualization and tables for data aggregates. [1]

[1] Ministry of Health of the Republic of Singapore. "COVID-19 Situation Report". [<https://covidsitrep.moh.gov.sg/>]. Accessed 20 December 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: 0

There is insufficient evidence that identifiable health records of individuals generated from surveillance activities are kept confidential. The Personal Data Protection Act provides an exemption for government bodies, and the Personal Data Protection (Statutory Bodies) Notification 2013 identifies the main government agencies that are exempted, which includes the Ministry of Health, National Environment Agency, Singapore Food Agency, and National Parks Board. [1, 2] However hospital websites state confidentiality is safeguarded should information be shared with government agencies. [3, 4] A search in the national laboratory system yielded no results for additional information. [5]

[1] Personal Data and Protection Commission Singapore. "Legislation and Guidelines". [<https://www.pdpc.gov.sg/Legislation-and-Guidelines/Personal-Data-Protection-Act-Overview>]. Accessed 20 December 2020.

[2] Ministry of Communications and Information. "Personal Data Protection (Statutory Bodies) Notification 2013". [<https://sso.agc.gov.sg/SL/PDPA2012-S149-2013>]. Accessed 20 December 2020.

[3] SingHealth. "Personal Data Protection Act". [<https://www.singhealth.com.sg/pdpa>] Accessed 20 December 2020.

[4] SingHealth. "SingHealth Data Protection Policy".

[<https://www.singhealth.com.sg/Documents/20181129%20SingHealth%20Grp%20Data%20Protection%20Policy%20Version%2010.pdf>] Accessed 20 December 2020.

[5] National Centre for Infectious Diseases. "National Public Health Laboratory". [<https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx>]. Accessed 20 December 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: 0

There is insufficient evidence that there is legislation or regulations safeguarding the confidentiality of identifiable health records of individuals generated from health surveillance activities include mention of protections from cyber attacks (e.g., ransomware). The Personal Data Protection Act provides personal data protection for individuals, however also provides an exemption for government bodies to access data, and the Personal Data Protection (Statutory Bodies) Notification 2013 identifies the main government agencies that are exempted including the Ministry of Health, National Environment Agency, Singapore Food Agency, and National Parks Board. [1, 2] However hospital websites state confidentiality is safeguarded should information be shared with government agencies. [3, 4] A search in the national laboratory system yielded no results for additional information. [5]

[1] Personal Data and Protection Commission Singapore. "Legislation and Guidelines". [<https://www.pdpc.gov.sg/Legislation-and-Guidelines/Personal-Data-Protection-Act-Overview>]. Accessed 20 December 2020.

[2] Ministry of Communications and Information. "Personal Data Protection (Statutory Bodies) Notification 2013". [<https://sso.agc.gov.sg/SL/PDPA2012-S149-2013>]. Accessed 20 December 2020.

[3] SingHealth. "Personal Data Protection Act". [<https://www.singhealth.com.sg/pdpa>] Accessed 20 December 2020.

[4] SingHealth. "SingHealth Data Protection Policy".

[<https://www.singhealth.com.sg/Documents/20181129%20SingHealth%20Grp%20Data%20Protection%20Policy%20Version%2010.pdf>] Accessed 20 December 2020.

[5] National Centre for Infectious Diseases. "National Public Health Laboratory". [<https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx>]. Accessed 20 December 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 = 2, Yes, commitments have been made to share data only for one disease = 1, No = 0

Current Year Score: 1

There is evidence that Singapore has a commitment to share surveillance data with countries in the region but for one disease only (covid-19).

The foreign minister of Singapore made a joint statement with ASEAN and the People's Republic of China on February 20, 2020 to increase cooperation during the COVID-19 pandemic to share information in a timely manner which includes "exchanging available epidemiological information, technical guidelines and solution for epidemic prevention and control, diagnosis, treatment and surveillance." [1]

The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment also highlighted that "greater efforts could be made to share Singapore's expertise in supporting other countries in their efforts to develop robust surveillance systems." [2] There was no further information on this topic on regional news portals, ASEAN web portal, the websites of the Ministry of Health, Health Sciences Authority, National Research Foundation, National Environment Agency, National Parks Board, or the Singapore Food Agency. [3,4,5,6,7,8,9]

[1] Association for Southeast Asian Nations (ASEAN). "Statement of the Special ASEAN-China Foreign Ministers' Meeting on the Coronavirus Disease 2019 (COVID-19)". [<https://asean.org/statement-special-asean-china-foreign-ministers-meeting-coronavirus-disease-2019-covid-19/>]. Accessed 8 September 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[3] Association of Southeast Asian Nations. "Statements and Communiques". [<https://asean.org/category/asean-statement-communiques/>]. Accessed 21 December 2018.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[6] National Research Foundation of the Republic of Singapore. [<https://www.nrf.gov.sg/>]. Accessed 20 December 2020.

[7] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[8] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[9] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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 some evidence that Singapore has a national system in place to provide additional support at the sub-national level to conduct contact tracing in the event of an active public health emergency.

For the COVID-19 pandemic, contract tracers were activated in Singapore after confirming its first case.[1] The Ministry of Health's Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases, specify the use cases for contact tracing measures depending on possible scenarios under the Disease Outbreak Response System Condition (DORSCON) framework. Contact tracing under the DORSCON framework is utilized for active case detection and monitoring of close contacts, including phone surveillance. [2]

Singapore has expanded its contact tracing efforts through the development of TraceTogether, a community-driven contact tracing phone application and SafeEntry, a free-for-use Cloud-based visitor registration system for business and building owners, developed by the Government Technology Agency (GovTech) in collaboration with the Ministry of Health (MoH). Use of the SafeEntry application is required by all businesses and services currently in operation to log visitors checking into their premises, as well as by taxis to facilitate government contact tracing efforts should the need arise. [3]

There is no further evidence on a national system in place to provide support at the sub-national level to conduct contact tracing in the event of a public health emergency on the websites of the Ministry of Health, the Health Sciences Authority, or the National Centre for Infectious Diseases. [4,5,6]

[1] Ministry of Health of the Republic of Singapore. "How Contact Tracers Track Down the People at Risk of Infection (The Sunday Times, 9 Feb 2020, PA10)". [https://www.moh.gov.sg/news-highlights/details/how-contact-tracers-track-down-the-people-at-risk-of-infection-(the-sunday-times-9-feb-2020-pa10)]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[3] GoBusiness of the Republic of Singapore. "Contact Tracing Support". [https://covid.gobusiness.gov.sg/safemanagement/safeentry/]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [https://www.moh.gov.sg/]. Accessed 20 December 2020.

[5] Health Sciences Authority of the Republic of Singapore. [https://www.hsa.gov.sg/]. Accessed 20 December 2020.

[6] National Centre for Infectious Diseases of the Republic of Singapore. "National Public Health Laboratory". [https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx]. Accessed 21 January 2021.

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

Singapore provides economic support to enable infected people and their contacts to self-isolate as recommended, but there is insufficient evidence that it also provides medical attention services.

During the COVID-19 pandemic, The Quarantine Order (QO) Allowance Scheme was set up to mitigate the financial impact for those who have been served Quarantine Orders under the Infectious Diseases Act. Although this scheme is not specific to COVID-19 itself, as the issuance of QOs fall under the Infectious Diseases Act, it is unclear for how long this scheme will continue being active. Under this scheme, claims of \$100 SGD can be made per day for those under Quarantine Orders. [1] Additionally, for foreign workers who are issued a QO, a suitable quarantine facility centrally managed by the Government is provided if the foreign worker's housing is assessed to be unsuitable for quarantine purposes. Individuals under QO will be monitored by video calls at least three times a day, and spot checks will be carried out to ensure strict adherence to regulations during the QO period specified. [2] However, aside from daily monitoring, no law or plan stipulates special provisions of medical attention provided to quarantined individuals.

Under the Public Health Preparedness Clinic (PHPC) scheme, which are activated during instances of national need, subsidies are provided for treatment, investigations, and medications during public health outbreaks. [3]

In the case of COVID-19 specifically, subsidies are provided for patients diagnosed with respiratory infections. If assessed to have symptoms suggestive of COVID-19, a swab test can be performed if the clinic is participating in the Swab and Send Home (SASH) initiative. [4]

No further information was found on this topic on the websites of the Ministry of Health, Health Sciences Authority, or the National Centre for Infectious Diseases. [5,6,7]

[1] Ministry of Health of the Republic of Singapore. "Quarantine Order Allowance Scheme". [https://www.moh.gov.sg/docs/librariesprovider5/2019-ncov/quarantine-order-allowance-scheme-23-apr-2020.pdf]. Accessed 20 December 2020.

[2] Ministry of Manpower of the Republic of Singapore. "FAQs on Stay-Home Notice (SHN) and quarantine matters". [https://www.mom.gov.sg/covid-19/frequently-asked-questions/shn-quarantine-matters]. Accessed 20 December 2020.

[3] Government Technology Agency of the Republic of Singapore. "Public Health Preparedness Clinic". [https://flu.gowhere.gov.sg/faq]. Accessed 20 December 2020.

[4] Agency for Integrated Care. "Swab and Send Home (SASH)". [https://www.primarycarepages.sg/Pages/COVID-19%20Resource%20Page/Swab-And-Send-Home-(SASH).aspx]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [https://www.moh.gov.sg/]. Accessed 20 December 2020.

[6] Health Sciences Authority of the Republic of Singapore. [https://www.hsa.gov.sg/]. Accessed 20 December 2020.

[7] National Centre for Infectious Diseases of the Republic of Singapore. "National Public Health Laboratory". [https://www.ncid.sg/About-NCID/OurDepartments/National-Public-Health-Laboratory/Pages/default.aspx]. Accessed 21 January 2021.

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: 1

The government of Singapore provides de-identified COVID-19 contact tracing efforts and surveillance data available through daily situation reports on the Ministry of Health's website showcasing imported and non-imported cases broken down into subcategories: "isolated before detection" and "detected through surveillance". The number of issuances of Stay Home Notices (SHNs) and Quarantine Orders (QOs) are also listed, as well as the active number of persons under quarantine. This includes visualization and tables for data aggregates. [1]

[1] Ministry of Health of the Republic of Singapore. "COVID-19 Situation Report". [<https://covidsitrep.moh.gov.sg/>]. Accessed 20 December 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 Singapore 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.

According to the Joint External Evaluation of IHR Core Capabilities of Singapore, completed in April 2018, Singapore utilizes a whole-of-government approach and the Homefront Crisis Management System (HCMS) and Ministry of Health (MOH) works closely with all security agencies, such as the Singapore Police Force, Singapore Civil Defence Force (SCDF), and Immigration and Checkpoints Authority (ICA). Standard Operating Procedures or agreements exist for coordinating joint risk assessments and responding to public health and other emergencies. [1] More specifically, Singapore's Infectious Disease Act, Part V "Prevention of International Spread of Infectious Diseases," outlines the responsibilities of Port Health Officers in quarantining vessels or persons suspected of carrying an infection. [2] This is further elaborated in Singapore's Infectious Diseases (Quarantine) Regulations, which detail procedures related to medical inspections of aircraft crew and passengers, as well as disease reporting and surveillance and other communication requirements for international travelers entering and departing ports of entry. [3]

For COVID-19 specifically, as of 22 December 2020, the ICA published border/health control measures barring most short-term from entry to Singapore, while returning Singapore residents are required to be swab tested upon arrival and serve a Stay-at-Home-Notice (SHN), with some required to do so at an SHN Dedicated Facility. [4] Those under SHN or Quarantine Orders are required to download the Homer App for health monitoring. [5]

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
- [2] Attorney-General's Chambers of the Republic of Singapore. Chapter 137, Act 21 of 1976. "Infectious Diseases Act". [<https://sso.agc.gov.sg/Act/IDA1976>]. Accessed 20 December 2020.
- [3] Attorney-General's Chambers of the Republic of Singapore. Chapter 137, Section 64, G.N. No. S 168/1977, Revised Edition 1990. "Infectious Diseases (Quarantine) Regulations". [<https://sso.agc.gov.sg/SL/137-RG1>]. Accessed 20 December 2020.
- [4] Immigrations and Checkpoints Authority of the Republic of Singapore. "Summary of SHN and Swab Requirements for Travellers". [<https://safetravel.ica.gov.sg/files/SHN-and-swab-summary.pdf>]. Accessed 20 December 2020.
- [5] Homer of the Republic of Singapore. [<https://homer.gov.sg/>]. Accessed 20 December 2020.

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

The government of Singapore has applied epidemiology programs available in country but insufficient evidence that resources are provided by the government to send citizens to another country to participate in applied epidemiology training programs.

Singapore has epidemiology programs available in-country, offered by the National University of Singapore and TEPHINET in collaboration with the Ministry of Health. [1, 2] According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, "workforce training programs include the MOH two-year Singapore Field Epidemiology Training Programme (S-FETP), AVA's professional development framework and the Specialist Diploma in One Health course for the National Environment Agency (NEA) and Agri-Food and Veterinary Authority (AVA)." [3] Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

No information was found on whether resources are provided by the government to send citizens abroad to participate in applied epidemiology programs, the closest being Singapore's participation in the ASEAN Field Epidemiology Training Network which mostly operates as a sharing platform. [4] No further information on this topic was found on the website of the Ministry of Health. [5]

[1] National University of Singapore. "Graduate Diploma in Applied Epidemiology". [<https://www.sph.nus.edu.sg/study/graduate/gdae>]. Accessed 20 December 2020.

[2] TEPHINET. "Singapore Field Epidemiology Training Program". [<https://www.tephinet.org/training-programs/singapore->

field-epidemiology-training-program]. Accessed 20 December 2020.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[4] ASEAN PLUS THREE FIELD EPIDEMIOLOGY TRAINING NETWORK. "Who we are" [<http://www.aseanplus3fetn.net/?s=1&j=whoweare>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 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: 0

There are no applied epidemiology programs are explicitly inclusive of animal health professionals. [1, 2] According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, it recommends as a priority action: "Expanding the Singapore Field Epidemiology Training Program (S-FETP) to include public health officers from Agri-Food and Veterinary Authority (AVA) and National Environment Agency (NEA)." [3] No evidence was found of a specific animal health field epidemiology training program. There was no further information on this topic on the websites of the Ministry of Health and ASEAN+ 3 Field Epidemiology Training Network. [4, 5]

[1] National University of Singapore. "Graduate Diploma in Applied Epidemiology". [<https://www.sph.nus.edu.sg/study/graduate/gdae>]. Accessed 20 December 2020.

[2] TEPHINET. "Singapore Field Epidemiology Training Program". [<https://www.tephinet.org/training-programs/singapore-field-epidemiology-training-program>]. Accessed 20 December 2020.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] ASEAN PLUS THREE FIELD EPIDEMIOLOGY TRAINING NETWORK. "Who we are" [<http://www.aseanplus3fetn.net/?s=1&j=whoweare>]. Accessed 20 December 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: 0

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

There is publicly available evidence that the government of Singapore has an overarching national public health emergency response plan in place which addresses planning for multiple communicable diseases with epidemic or pandemic potential.

Singapore has an overarching national public health emergency response plan for influenza and other acute respiratory diseases (Severe Acute Respiratory Syndrome-associated Coronavirus (SARS-CoV) and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), which addresses planning for multiple communicable diseases with pandemic potential. [1] It states "This document covers the readiness and response plan for novel acute respiratory infections with pandemic potential (e.g. influenza or SARS) and recommends appropriate public health measures and response actions prior to and during a pandemic. This plan can be applied to any acute respiratory pathogen (virus or bacteria) and guidance will be provided by the Ministry of Health (MOH) for individual novel pathogens where necessary." [1]

The Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018 contains a section for emergency response but only specifies a general plan: "In an emergency, the Ministry of Home Affairs coordinates the whole of government response and activates the relevant government agencies. A Crisis Management Group specific to the emergency may lead the response. In a health-related emergency (e.g. major disease outbreak), the MOH will lead the Crisis Management Group for Health to coordinate inter-agency operations." [2] Singapore has a Disease Outbreak Response System Condition (DORSCON) framework for public health responses which are general guidelines for interventions in the event of an infection outbreak or public health emergency. [3] No other information was found on the websites of the Ministry of Health and Singapore Civil Defence Force. [4, 5]

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020

[3] Ministry of Health of the Republic of Singapore. "Being Prepared for a Pandemic". [<https://www.moh.gov.sg/diseases-updates/being-prepared-for-a-pandemic>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 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: 0

There are no emergency preparedness plans in Singapore that have been updated in the last three years. The Ministry of Health's Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases, last updated April 2014, is the only publicly available plan that addresses multiple communicable diseases, and has not been updated within the last three years. [1] No other information was found from the Ministry of Health and the Singapore Civil Defence Force's websites and The Joint External Evaluation of IHR Core Capabilities of Singapore that was completed in April 2018 [2, 3, 4].

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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 an overarching plan in place but does not include considerations for pediatric or vulnerable populations. Singapore's Ministry of Health Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases does not include specific considerations for both pediatric and other vulnerable populations. [1] While both groups are mentioned, it is done so broadly and only within specific scenarios. For example, one of the scenarios within the DORSCON (Disease Outbreak Response System Condition) framework states "Scenario B: Disease spreads easily from person to person and causes generally mild illness, but can cause serious illness in vulnerable groups." [1] No other information was found from the Ministry of Health and the Singapore Civil Defence Force's websites and The Joint External Evaluation of IHR Core Capabilities of Singapore that was completed in April 2018 [2, 3, 4].

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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 no publicly available evidence that the government of Singapore has a specific mechanism for engaging with the private sector to assist with outbreak emergency preparedness. Sources checked include The Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, the Ministry of Health, Singapore Civil Defence Force, and the National Environmental Agency. [1, 2, 3, 4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020

[2] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] National Environment Agency. [<https://www.nea.gov.sg/>]. Accessed 20 December 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

Singapore has a plan for implementing non-pharmaceutical interventions (NPI) in the event of an epidemic, covering more than one specific disease. According to the Ministry of Health's Readiness Response Plan for Influenza and Other Acute Respiratory Diseases, Singapore's Disease Outbreak Response System Condition (DORSCON) provides a framework that assesses the risk and severity of outbreak according to the four DORSCON levels: Green, Yellow, Orange and Red. Based on the DORSCON level established, and based on level of virulence and transmissibility of the disease in question, an appropriate response can be enacted, which include NPIs such as: quarantine, temperature screening in institutions and buildings,

restriction of visitors at hospitals, school closures, work from home orders, and social distancing measures. [1]

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

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

There is evidence that Singapore has activated their national emergency response plan for an infectious disease outbreak in the past year but not that the country completed a national-level biological threat-focused exercise in the past year.

There is evidence that Singapore has implemented the measures stipulated in its Ministry of Health's Readiness Response Plan for Influenza and Other Acute Respiratory Diseases in the past year. There is also evidence that Singapore's Disease Outbreak Response System Condition (DORSCON) framework is being utilized and that stipulations under the Infectious Diseases Act have been enacted. For example, contact tracing, testing, and closure of workplace premises and schools have been implemented. [1]

There is no publicly available evidence that Singapore has completed a national-level biological threat-focused exercise or activated their national emergency response plan in 2018 or 2019, either from the World Health Organization and the Ministry of Health. [2, 3, 4, 5] Although the Joint External Evaluation of IHR Core Capabilities of Singapore from 2018 (JEE) indicates that the IHR Exercise Crystal is conducted annually, there is no evidence from the Ministry of Health or WHO website to indicate one was conducted in 2018 or 2019. [5, 6] The JEE also noted that Singapore performs "regular Crisis Management exercises led by the MOH Contingency Task Force." [6] However no public documentation could be found of such exercises on the websites of the Ministry of Health or the WHO for 2018 and 2019.

[1] Ministry of Health of the Republic of Singapore. "Circuit Breaker to Minimise Further Spread of COVID-19". [<https://www.moh.gov.sg/news-highlights/details/circuit-breaker-to-minimise-further-spread-of-covid-19>]. Accessed 20 December 2020.

[2] World Health Organization. "Simulation Exercise". [<https://extranet.who.int/sph/simulation-exercise>]. Accessed 21 January 2021.

[3] World Health Organization. "Singapore". [<https://www.who.int/countries/sgp/en/>] Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] World Health Organization. "Calendar 2020". [<https://extranet.who.int/sph/calendar>]. Accessed 20 December 2020.

[6] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".

[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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 no publicly available evidence that Singapore has completed an assessment within the last year to identify a list of gaps and best practices, either from the World Health Organization or the Ministry of Health. [1, 2, 3]

Although the Joint External Evaluation of IHR Core Capabilities of Singapore from 2018 indicates that Singapore regularly performs "Crisis Management exercises led by the MOH Contingency Task Force" and that "after action reviews are conducted to improve future response operations", there is insufficient public evidence that could be found of such exercises or after-action reviews on the websites of the Ministry of Health and World Health Organization for 2019 and 2020. [1,2,3]

[1] World Health Organization. "After Action Review; Country Profile: Singapore". [<https://extranet.who.int/sph/after-action-review?region=All&country=355>]. Accessed 20 December 2020.

[2] World Health Organization. "Singapore". [<https://www.who.int/countries/sgp/en/>] Accessed 20 December 2020.

[3] World Health Organization. "Simulation Exercise". [<https://extranet.who.int/sph/simulation-exercise>]. Accessed 21 January 2021.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 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 publicly available evidence to indicate that Singapore has completed a national-level biological threat-focused exercise in 2019, and hence, there is also no evidence of private sector participation. No evidence was found either from the World Health Organization or the Ministry of Health. [1,2,3,4] Although the World Health Organization's Joint External Evaluation of IHR Core Capabilities of Singapore from 2018 indicates that Singapore regularly performs "Crisis Management exercises led by the MOH Contingency Task Force" and that "after action reviews are conducted to improve future response operations," there is insufficient public evidence that could be found of such exercises or after-action reviews on the websites of the Ministry of Health and World Health Organization for 2019 and 2020. [1,2,3,4]

[1] World Health Organization. "After Action Review; Country Profile: Singapore". [<https://extranet.who.int/sph/after-action-review?region=All&country=355>]. Accessed 20 December 2020.

[2] World Health Organization. "Singapore". [<https://www.who.int/countries/sgp/en/>] Accessed 20 December 2020.

[3] World Health Organization. "Simulation Exercise". [<https://extranet.who.int/sph/simulation-exercise>]. Accessed 21 January 2021.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 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

Singapore has in place an emergency operations center (EOC). The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment indicates Singapore has an EOC. [1] The document also states "in a health-related emergency (e.g. major disease outbreak), the Ministry of Health (MOH) will lead the Crisis Management Group for Health to coordinate inter-agency operations... the response to public health incidents is coordinated from the MOH EOC using an all hazards approach. The MOH EOC is staffed by duty officers who perform initial information gathering, risk assessment, classification of the incident, appropriate escalation and options for response". [1] The Ministry of Health's "Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases" states that "The HCEG is supported by various Crisis Management Groups (CMG)s that deal with the operational issues under their charge. MOH chairs the Crisis Management Group (CMG) (Health)". [2] There is no further publicly available information on the Emergency Operations Center in Singapore.

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 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 public evidence to show that the Emergency Operations Center (EOC) is required to conduct a drill for public health emergency scenario or that it conducts a drill at least once per year. According to the Joint External Evaluation of IHR Core Capabilities of Singapore from 2018 (JEE), Singapore utilizes a whole-of-government approach for inter-agency crisis management and is coordinated by the Ministry of Home Affairs. Depending on the type of national crises, there are different lead agencies. The Ministry of Health (MOH) is the lead agency for public health related incidents. This MOH Crisis Management System includes the MOH EOC which monitors the crisis situation and coordinates the operations and implementation of responses. [1] Although the JEE indicates that Singapore has "regular Crisis Management exercises led by the Ministry of Health (MOH) Contingency Task Force," there is insufficient public evidence that could be found of such exercises being conducted or annual drills or their requirement, on the websites of the Ministry of Health, the Singapore Civil

Defence Force, or the Centre for Disaster Management and Humanitarian Excellence, for 2019 and 2020. [1,2,3,4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force of the Republic of Singapore. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] Centre for Disaster Management and Humanitarian Excellence. "Singapore Disaster Management Reference Handbook". [<https://reliefweb.int/sites/reliefweb.int/files/resources/disaster-mgmt-ref-hdbk-singapore.pdf>]. Accessed 20 December 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 that Singapore's Emergency Operations Center has conducted within the last year a coordinated emergency response exercised activated within 120 minutes of the identification of the public health emergency/scenario. However, according to the Joint External Evaluation of IHR Core Capabilities of Singapore assessment completed April 2018, Singapore received a score 5 for 'emergency operations programme' stating "regular activations and exercises are conducted that test emergency operations" which indicates Singapore's capability to respond within 120 minutes. [1]

There was no further information on this topic on the websites of the Ministry of Health, or the Singapore Civil Defence Force. [2,3]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 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: 1

There is public evidence that public health and national security authorities in Singapore have carried out an exercise to respond to a potential deliberate biological event (i.e. bioterrorism attack) and that there are 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. According to the Joint External Evaluation (JEE) of IHR Core Capabilities of Singapore assessment from 2018, an anthrax decontamination scenario was tested in 2017 with both public health and security authorities participating. [1] There is no publicly available evidence of a more recent exercise that was conducted.

The JEE report also notes that the "SOPs or agreements exist for the coordination of joint risk assessment and response to public health and other emergencies at PoEs where both public health and security authorities have operational safety and health security responsibilities" and that the "Singapore Police Force maintains a joint response plan for deliberate biological events, known as the National Emergency Response Team for Biological Incidents. MOH has developed and operationalized response plans to address the deliberate release of anthrax and smallpox and these pathogens are included in the Singapore Police Force operational plan." [1] However no public versions of the SOPs or agreements could be located, including from the websites of the Ministry of Health and the Singapore Civil Defence Force, and the Singapore Disaster Management Handbook [2, 3, 4].

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] Centre for Disaster Management and Humanitarian Excellence. "Singapore Disaster Management Reference Handbook". [<https://reliefweb.int/sites/reliefweb.int/files/resources/disaster-mgmt-ref-hdbk-singapore.pdf>]. Accessed 20 December 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 publicly available evidence that the government of Singapore has a strategy for messages targeted at groups with different communication needs. According to the Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018, a communications strategy is in place to deal with public health emergencies, which sees "fully operational whole of government system for risk communication." [1] The Ministry of Health (MOH) has a dedicated Communications and

Engagement Group, with officers seconded from the Ministry of Communications and Information (MCI) who are skilled in managing corporate communications, media relations, online communications, public engagement and strategic communications. During crises and national emergencies, surge staff are available from MCI. "The communication strategy outlines how it will reach those with different communication needs, stating "targeted messages are developed according to the needs of at-risk communities and key messages are tested during the creative concept development process." [1] "MOH has many platforms to disseminate information to the public, including statements to mainstream media, the MOH website and Facebook page, online platforms of healthcare institutions, having stakeholders deliver public communications and public education campaigns." [1]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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

There is publicly available evidence that the government of Singapore has a communication plan specifically for public health emergencies. According to the Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018, a communications strategy is in place to deal with public health emergencies, which sees "fully operational whole of government system for risk communication." [1] The Ministry of Health (MOH) has a dedicated Communications and Engagement Group, with officers seconded from the Ministry of Communications and Information (MCI) who are skilled in managing corporate communications, media relations, online communications, public engagement and strategic communications. During crises and national emergencies, surge staff are available from MCI." [1] "The MOH Disease Outbreak Response System is the generic preparedness and response plan against disease outbreaks. The Disease Outbreak Response System Condition (DORSCON) framework is a colour-coded alert, response and risk communications system for assessing potential public health risk and impact." [1, 2] With regards to stakeholders and public engagements, "MOH has many platforms to disseminate information to the public, including statements to mainstream media, the MOH website and Facebook page, online platforms of healthcare institutions, having stakeholders deliver public communications and public education campaigns. MOH maintains good relations with media representatives, with whom they have frequent interactions and engagements for the purposes of communicating announcements and facilitating responses to media queries. MOH can quickly produce communication products by accessing whole-of -government resources. The MOH research team can conduct surveys for public reaction to key messages." [1]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 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: 0

Singapore's risk communication plans used to guide national public health response does not include a specific position within the government designated as the primary spokesperson to the public during a public health emergency.

In the Ministry of Health's Pandemic Readiness and Response Plans for Influenza and Other Acute Respiratory Diseases, it indicates that "guidance will be provided by MOH for individual novel pathogens where necessary." [2] Singapore's Communicable Disease Control Plan indicate that "MOH employs various communications platforms for information sharing with medical practitioners and other stakeholders", which include media channels such as "television, newspaper and social media." However, it does not indicate a specific position or person within the Ministry of Health responsible for this. [3]

For the COVID-19 pandemic specifically, a website is dedicated to give timely updates and press releases of daily infections and public advisories and communications. While this webpage is housed under the Ministry of Health's website, its authors range from multiple different ministries. [4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[3] The Singapore Field Epidemiology Training Programme (S-FETP). "Communicable Diseases Control". [<https://www.moh.gov.sg/docs/librariesprovider5/resources-statistics/communicable-diseases-control--the-singapore-fetp-enterprise.pdf>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. "Updates on COVID-19 (Coronavirus Disease 2019) Local Situation". [<https://www.moh.gov.sg/covid-19>]. Accessed 20 December 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

The government of Singapore uses media platforms to actively share messages via online media platforms to inform the public about ongoing public health concerns.

For COVID-19, the Ministry of Health publishes daily updates regarding COVID-19 cases and other advisories on their website,

facebook and twitter. [1,2,3]

According to a study published in the International Journal of Environmental Research and Public Health, social media was used effectively by Singapore health agencies to inform the public about public health emergencies, in this case on the Zika outbreak in 2016. [4] The same evidence was also found in The Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018, where it mentions the Ministry of Health's (MOH) many platforms for disseminating information to the public, including: statements to mainstream media, the MOH website, MOH Facebook page, and online platforms of healthcare institutions. The JEE also mentions that Singapore delivers public communications and public education campaigns. Additionally, the JEE notes that "MOH maintains good relations with media representatives, with whom they have frequent interactions and engagements for the purposes of communicating announcements and facilitating responses to media queries." [5]

[1] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/covid-19>]. Accessed 21 January 2021.

[2] Ministry of Health, Singapore. Facebook. [<https://www.facebook.com/sghealthministry/>]. Accessed 21 January 2021.

[3] Singapore's Ministry of Health. [<https://twitter.com/sporemoh?lang=en>]. Accessed 21 January 2021.

[4] Lwin, M, Lu, J, Sheldenkar, A., and Schulz, P. J. 2018. "Strategic Uses of Facebook in Zika Outbreak Communication: Implications for the Crisis and Emergency Risk Communication Model". International Journal of Environmental Research and Public Health, 15:1974. 1-19.

[5] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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 insufficient evidence to suggest that senior leaders have shared misinformation on infectious diseases in the past two years (2018 and 2019). There are no news articles from national news sources that indicate the spread of misinformation in 2018 and 2019. [1,2,3,4,5]

Singapore's Protection from Online Falsehoods and Manipulation Act dictates that websites must run government "correction notices" alongside content the government deems false. Under the law, the government may also issue a "take down" order requiring content removal by social media companies, news organizations, or individuals. [6]

[1] Channel News Asia. [<https://www.channelnewsasia.com/news/international>]. Accessed 20 December 2020.

[2] The Straits Times. [<https://www.straitstimes.com/global>]. Accessed 20 December 2020.

[3] Zao Bao. [<https://www.zaobao.com.sg/>]. Accessed 20 December 2020.

[4] Asia One. [<https://www.asiaone.com/>]. Accessed 20 December 2020.

[5] Today. [<https://www.todayonline.com/>]. Accessed 20 December 2020.

[6] Attorney-General Chambers of the Republic of Singapore. Chapter 122D, Act 15 of 2007. "Protection from Online Falsehoods and Manipulation Act 2019". No. 18 of 2019. [<https://sso.agc.gov.sg/Acts-Supp/18-2019/Published/20190625?DocDate=20190625>]. Accessed 20 December 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: 88.95

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: 156.38

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: 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: 4.0

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 insufficient evidence that Singapore has issued a restriction, without international support, on the export/import of medical goods due to an infectious disease outbreak.

On the other hand, during the COVID-19 pandemic, on 31 January 2020 Singapore issued temporary relaxations of import licensing requirements for hand sanitizers, masks, thermometers and protective gear. On 16 April 2020, Singapore also eliminated tariffs and other duties on essential goods including: medical, hygiene, pharmaceutical products and agricultural products. [1,2,3]

There is no further evidence on this topic on the websites of the Ministry of Health, National Environment Agency, National Parks Board, Singapore Food Agency, or Ministry of Foreign Affairs. [4,5,6,7,8]

[1] Health Sciences Authority of the Republic of Singapore. "Guidance on the Import of Hand Sanitisers, Masks, Thermometers, and Protective Gear". [<https://www.hsa.gov.sg/announcements/regulatory-updates/import-of-hand-sanitisers-masks-thermometers-and-protective-gear>]. Accessed 20 December 2020.

[2] Ministry of Foreign Affairs of the Republic of Singapore. "Singapore-New Zealand Declaration on Trade in Essential Goods". [<https://www.mfa.gov.sg/Overseas-Mission/Geneva/Mission-Updates/2020/04/Singapore-New-Zealand-Declaration-on-Trade-in-Essential-Good>]. Accessed 20 December 2020.

[3] International Trade Centre. "COVID-19 Temporary Trade Measures". [<https://www.macmap.org/covid19>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[6] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[7] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 2020.

[8] Ministry of Foreign Affairs of the Republic of Singapore. [<https://www.mfa.gov.sg/>]. Accessed 20 December 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 insufficient evidence to suggest that Singapore has issued a restriction, without international support, on the export/import of non-medical goods due to an infectious disease outbreak. There is no further information on this topic on

the websites of the Ministry of Health, Singapore Customs, Ministry of Foreign Affairs, or the International Trade Centre. [1,2,3,4]

[1] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[2] Singapore Customs of the Republic of Singapore. [<https://www.customs.gov.sg/>]. Accessed 20 December 2020.

[3] Ministry of Foreign Affairs of the Republic of Singapore. [<https://www.mfa.gov.sg/>]. Accessed 20 December 2020.

[4] International Trade Centre. "COVID-19 Temporary Trade Measures". [<https://www.macmap.org/covid19>]. Accessed 20 December 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

Singapore has implemented several bans on travelers arriving from specific countries due to an infectious disease outbreak in 2020.

Due to the COVID-19 pandemic, on 15 March 2020, Singapore implemented border control measures whereby short-term visitors from Mainland China, France, Germany, Italy, Iran, Republic of Korea, and Spain were not allowed entry or transit in Singapore. By 22 March, 2020, all short-term visitors from all countries were not allowed entry or transit. [2] As of 20 December 2020, these restrictions are still active, and no short-term visitors from any country are allowed entry. [3]

[1] Ministry of Health of the Republic of Singapore. "Additional Precautionary Measures to Prevent Further Importation of COVID-19 Cases". [<https://www.moh.gov.sg/news-highlights/details/additional-precautionary-measures-to-prevent-further-importation-of-covid-19-cases>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "Additional Border Control Measures to Reduce Further Importation of COVID-19 Cases". [<https://www.moh.gov.sg/news-highlights/details/additional-border-control-measures-to-reduce-further-importation-of-covid-19-cases>]. Accessed 20 December 2020.

[3] Immigration and Checkpoints Authority of the Republic of Singapore. "Travelling to Singapore". [<https://safetravel.ica.gov.sg/arriving/overview>]. Accessed 20 December 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: 229.36

2016

WHO; national sources

4.1.1b

Nurses and midwives per 100,000 people

Input number

Current Year Score: 624.32

2017

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: 1

There is public evidence that Singapore has a public workforce strategy in place. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment dated April 2018, "The One Health framework is used to coordinate public health work among MOH (Ministry of Health), AVA (Agri-food and Veterinary Authority) and NEA (National Environment Agency). All three agencies have workforce strategies to ensure adequate workforce capabilities into the future." [1] The JEE assessment provides some examples of training programmes: "Workforce training programs include the MOH two-year Singapore Field Epidemiology Training Programme (S-FETP), AVA's professional development framework and the Specialist Diploma in One Health course for NEA and AVA. Ninety-percent of S-FETP graduates continue to work at the MOH, emphasizing the role of S-FETP in strengthening the MOH public health workforce." [1]

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary

Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

No further information on this topic was found on the websites of the Ministry of Health, Ministry of Education, or the Ministry of Manpower. [2, 3, 4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Ministry of Education of the Republic of Singapore. [<https://www.moe.gov.sg/>]. Accessed 20 December 2020.

[4] Ministry of Manpower of the Republic of Singapore. [<https://www.mom.gov.sg/>]. Accessed 20 December 2020.

4.1.2 Facilities capacity

4.1.2a

Hospital beds per 100,000 people

Input number

Current Year Score: 249.0

2017

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

The government of Singapore has the capacity to isolate patients through a High-Level Isolation Unit situated within the National Centre for Infectious Diseases (NCID). [1] According to the NCID, the "High-Level Isolation Unit (HLIU) is sited within NCID to safely contain and manage high consequence pathogens (HCP) and novel pathogens. The HLIU is a state-of-the-art facility to provide the best care possible for patients with infections that are highly virulent and can be spread from person to person, such as Ebola. For maximum containment, the unit will have on-site capability for laboratory testing and waste management. The HLIU will also have facilities and staff capable of providing intensive care to HCP patients who are critically ill or who may require surgery. The facility has been thoughtfully designed with a view to patient, staff and equipment flows, decontamination needs, and providing a supportive environment for patients & their families." [1] In addition to this facility, the NCID also houses negative pressure wards and isolation wards. [2]

[1] National Centre For Infectious Diseases. "High Level Isolation Unit". [<https://www.ncid.sg/Facilities-Services/Wards-Room-Types/Pages/High-Level-Isolation-Unit.aspx>]. Accessed 20 December 2020.

[2] National Centre For Infectious Diseases. "Negative Pressure Wards". [<https://www.ncid.sg/Facilities-Services/Wards-Room-Types/Pages/Negative-Pressure-Wards.aspx>]. Accessed 20 December 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 Singapore has demonstrated capacity to expand isolation capacity in response to an infectious disease outbreak within the past two years.

During the COVID-19 pandemic, Singapore has built new isolation facilities in addition to increasing isolation wards and intensive care units by repurposing existing beds and hospital facilities. Chia et al. (2020) notes that "several isolation centers called Community Care Facilities (CCFs) were set up throughout the country to house patients with COVID-19," and that "Singapore's public health system is divided into 3 clusters, each of which was tasked with operating the several CCFs rapidly." Specifically, the CCFExpo facility, a large isolation facility, had a maximum capacity of 8000 beds. [1,2,3]

[1] Begum, Shabana. 14 July 2020. "New isolation ward more than doubles isolation rooms in SGH".

[<https://www.straitstimes.com/singapore/contact-free-patient-monitoring-at-new-isolation-facility-in-sgh>]. The Straits Times. Accessed 24 April 2021.

[2] Baker, Jalelah Abu. 28 April 2020. "COVID-19: More than 18,000 bed spaces for isolation and care needs, with 23,000 more in pipeline". [<https://www.channelnewsasia.com/news/singapore/covid-19-more-than-18-000-bed-spaces-for-isolation-and-care-12683558>]. Channel News Asia. Accessed 24 April 2021.

[3] Chia, M. L., Him Chau, D. H., Lim, K. S., Yang Liu, C. W., Tan, H. K., & Tan, Y. R. 2021. "Managing COVID-19 in a Novel, Rapidly Deployable Community Isolation Quarantine Facility". *Annals of Internal Medicine*. 174

[2]. [<https://doi.org/10.7326/M20-4746>]. Accessed 24 April 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

The government of Singapore has a national procurement protocol in place. GeBiz is the government's central procurement portal used for most standard procurement procedures by Ministries. [1] A search on the portal indicates laboratory and medical equipment can be acquired by the relevant ministries through this channel which has been used by the Ministry of Health and the former Agri-food and Veterinary Authority in the past. [2]

[1] GeBIZ. "About us". [<https://www.gebiz.gov.sg/about-us.html>]. Accessed 20 December 2020.

[2] GeBIZ. "Search for Opportunities". [<https://www.gebiz.gov.sg/ptn/opportunity/BOListing.xhtml>]. Accessed 20 December 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

Singapore has a stockpile of medical supplies (e.g. MCMs, medicines, vaccines, medical equipment, PPE) for national use during a public health emergency. According to the 2018 Joint External Evaluation of Singapore, the Ministry of Health manages emergency response stockpiles for therapeutics (e.g. antivirals, antidotes), vaccines, non-pharmaceutical, medical consumables including personal protective equipment, surge equipment (e.g. ventilators) and screening/detection equipment. The Ministry of Health's Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases also recommends that agencies maintain 3 to 6 months stockpile of PPE, modified by agencies' own requirement estimations based on their operations, with a guideline of one mask per shift for hospitals. A circular from 1 October 2011 also indicates new licensing conditions for all healthcare institutions under the Private Hospitals and Medical Clinics (PHMC) Act to maintain a stockpile of N95 facemasks, isolation gowns and examination gloves of at least one week's supply for immediate use during a public health emergency. [3] Additionally, Chua et. al (2020) mentions that "drawing lessons from the previous SARS outbreak, the government ensured adequate national stockpiles of personal protective equipment (PPE) and essential medicines for up to 6 months". [4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. "Licensing Terms and Conditions of Maintaining a Supply of Personal Protective Equipment for Use During Public Health Emergencies". [[https://www.moh.gov.sg/docs/librariesprovider5/licensing-terms-and-conditions/licensing-terms-and-conditions-on-maintaining-a-supply-of-personal-protective-equipment-for-use-during-public-health-emergencies-\(issued-on-18-jul-2011\).pdf](https://www.moh.gov.sg/docs/librariesprovider5/licensing-terms-and-conditions/licensing-terms-and-conditions-on-maintaining-a-supply-of-personal-protective-equipment-for-use-during-public-health-emergencies-(issued-on-18-jul-2011).pdf)]. Accessed 20 December 2020.

[4] Chua, A.Q., et. al. 2020. "Health system resilience in managing the COVID-19 pandemic: lessons from Singapore". *BMJ Global Health*. 5:19. [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7496566/>]. Accessed 21 January 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 that Singapore has a stockpile of laboratory supplies for national use during a public health emergency. According to the Joint External Evaluation of Singapore from 2018, the Ministry of Health "makes arrangements with the suppliers for reagent stockpiling." but there is no mention of a domestic stockpile. During major outbreaks, the Ministry of Health provides support in securing reagents, as necessary. [1] Chua et. al (2020) mentions that "drawing lessons from the previous SARS outbreak, the government ensured adequate national stockpiles of personal protective equipment (PPE) and essential medicines for up to 6 months". [2] However, there is no mention of stockpiles of laboratory supplies. There is no further evidence found on the stockpile of laboratory supplies on the websites of the Ministry of Health, Health Sciences Authority, Ministry of Defence, or the Ministry of Home Affairs. [3,4,5,6]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Chua, A.Q., et. al. 2020. "Health system resilience in managing the COVID-19 pandemic: lessons from Singapore". *BMJ Global Health*. 5:19. [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7496566/>]. Accessed 21 January 2021.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Home Affairs of the Republic of Singapore. [<https://www.mha.gov.sg/>]. Accessed 21 January 2021.

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 public evidence to show that Singapore conducts or requires an annual review of the national stockpile to ensure the supply is sufficient for a public health emergency.

According to the Joint External Evaluation of IHR Core Capacities of Singapore from 2018, Singapore scored a 4 on "R.1.2 Priority public health risks and resources mapped and utilized." When referencing the scoring rubric of the JEE Evaluation Tool Second Edition indicator of "strategic emergency risk assessments conducted and emergency resources identified and mapped," this indicates that "national level resource mapping has been reviewed at least on an annual basis, and stockpiles for responding to priority biological, chemical and radiological events and other emergencies are accessible." However, apart from this score reference, there is no public evidence available to confirm that Singapore conducts an annual review of its national stockpile or that it ensures sufficient supply for a public health emergency in the JEE, or on the websites of the Ministry of Health, the Singapore Civil Defence Force, or the Centre for Disaster Management and Humanitarian Excellence. [1,2,3,4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".

[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Singapore Civil Defence Force of the Republic of Singapore. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[4] Centre for Disaster Management and Humanitarian Excellence. "Singapore Disaster Management Reference Handbook". [<https://reliefweb.int/sites/reliefweb.int/files/resources/disaster-mgmt-ref-hdbk-singapore.pdf>]. Accessed 20 December

2020.

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 insufficient evidence that Singapore has a plan or 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 nor of a mechanism to procure medical supplies (e.g. MCMs, medicines, vaccines, equipment, PPE) for national use during a public health emergency.

The terms "medical supplies" (and associated terms) and "public health emergencies" are not explicitly covered, according to the Government Procurement Regulations 2014, and under a "state of urgency," tender awards can be made under accelerated procedures. There is no explicit statement denoting what "state of urgency" covers, including if it covers "health emergencies". Stipulations also exist for "extreme urgency" where the relevant contracting authority can perform further accelerated procedures. [1] This includes selective tendering whereby the contracting authority can make the award directly to its suppliers of choice, rather than through the default GeBIZ open tendering system. [2] Additionally, according to the Joint External Evaluation of IHR Core Capabilities of Singapore from 2018, the Health Sciences Authority can provide regulatory clearance or exemptions on an urgent basis for importing unlicensed products into Singapore. [3] There is no further evidence found on this topic on the websites of the Ministry of Health, Health Sciences Authority, Ministry of Defence, or the Ministry of Home Affairs. [4,5,6,7]

[1] Attorney-General Chambers of the Republic of Singapore. Chapter 120. "Government Procurement Regulations 2014". [<https://sso.agc.gov.sg/SL/GPA1997-S269-2014>]. Accessed 20 December 2020.

[2] Ministry of Finance of the Republic of Singapore. "Government's Procurement of Goods and Services during COVID-19 Pandemic". [<https://www.mof.gov.sg/news-publications/parliamentary-replies/government's-procurement-of-goods-and-services-during-covid-19-pandemic>]. Accessed 20 December 2020.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[7] Ministry of Home Affairs of the Republic of Singapore. [<https://www.mha.gov.sg/>]. Accessed 21 January 2021.

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 insufficient evidence that Singapore has a mechanism to produce or procure laboratory supplies (e.g. reagents, media) for national use during a public health emergency.

The terms "laboratory supplies" (and associated terms) and "public health emergencies" are not explicitly covered, according to the Government Procurement Regulations 2014, and under a "state of urgency," tender awards can be made under accelerated procedures. There is no explicit statement denoting what "state of urgency" covers, including if it covers "health emergencies". Stipulations also exist for "extreme urgency" where the relevant contracting authority can perform further accelerated procedures. [1] This includes selective tendering whereby the contracting authority can make the award directly to its suppliers of choice, rather than through the default GeBIZ open tendering system. [2] According to the Joint External Evaluation of Singapore (JEE), procurement of necessary media and reagents is managed by material management teams in individual institutions who liaise with commercial vendors directly. The Ministry of Health (MOH) makes arrangements with the suppliers for reagent stockpiling, and MOH provides support in securing reagents as necessary. [3] Additionally, according to the JEE, the Health Sciences Authority can provide regulatory clearance or exemptions on an urgent basis for importing unlicensed products into Singapore. [3] There is no further evidence found on this topic on the websites of the Ministry of Health, Health Sciences Authority, Ministry of Defence, or the Ministry of Home Affairs. [4,5,6,7]

[1] Attorney-General Chambers of the Republic of Singapore. Chapter 120. "Government Procurement Regulations 2014". [<https://sso.agc.gov.sg/SL/GPA1997-S269-2014>]. Accessed 20 December 2020.

[2] Ministry of Finance of the Republic of Singapore. "Government's Procurement of Goods and Services during COVID-19 Pandemic". [<https://www.mof.gov.sg/news-publications/parliamentary-replies/government-s-procurement-of-goods-and-services-during-covid-19-pandemic>]. Accessed 20 December 2020.

[3] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[7] Ministry of Home Affairs of the Republic of Singapore. [<https://www.mha.gov.sg/>]. Accessed 21 January 2021.

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: 0

There is insufficient public evidence that Singapore has a plan for dispensing medical countermeasures for national use during a public health emergency. The Ministry of Health's Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases note that "Initially, when vaccines are in short supply, vaccination will be provided to priority groups, such as those at higher risk of disease-related complications and personnel providing essential services (e.g. healthcare workers). As vaccines become more readily available, vaccination will be expanded to the rest of the population." [1] The DORSCON matrix also has a column for "vaccination" to indicate actions related to vaccination for different possible scenarios, such as "procure and offer vaccine available" or "distribute vaccine to mitigate impact". However, there is no information on how these countermeasures will reach individuals logistically.

The Joint External Evaluation of IHR Core Capabilities of Singapore assessment, completed April 2018, mentions a plan for animal health outbreaks: "For animal health outbreaks, there are animal health contingency plans to mobilize countermeasures. AVA [Agri-Food & Veterinary Authority of Singapore] has contracts with vaccine and logistics providers for the rapid deployment of supplies and conducts tabletop and field simulation exercises to ensure readiness." [2]

Though the AVA was disbanded on 1 April 2019, its responsibilities have been transferred to the Animal and Veterinary Service (AVS) of the National Parks Board (NParks), and the Singapore Food Agency (SFA).

No further information on this topic is available on the websites of the Ministry of Health, Ministry of Defence, or Singapore Civil Defence Force [3,4,5].

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[3] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020

[4] Ministry of Defence [<https://www.mindef.gov.sg/web/portal/mindef/home>]. Accessed 20 December 2020

[5] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 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: 0

There is insufficient evidence that Singapore has a public plan that outlines how personnel would be received from other countries. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, the Ministry of Health "can receive medical experts during major crises as necessary. The Singapore Medical Council can provide temporary professional registration to allow foreign medical experts to practice in Singapore if required." [1] However a plan detailing these procedures is not publicly available. No further information on this topic was found on the websites of the Ministry of Health, Ministry of Defence and Singapore Civil Defence Force. [2, 3, 4].

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf]. Accessed 20 December 2020.
- [2] Ministry of Health. [https://www.moh.gov.sg/]. Accessed 20 December 2020
- [3] Ministry of Defence [https://www.mindef.gov.sg/web/portal/mindef/home]. Accessed 20 December 2020
- [4] Singapore Civil Defence Force. [https://www.scdf.gov.sg/]. Accessed 20 December 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: 99.6

2016

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: 1371.73

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

The government of Singapore does not have 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. However, there is evidence of the government of Singapore providing priority to healthcare workers in an emergency response plan. The influenza response plan revised 2014 states "Initially, when vaccines are in short supply, vaccination will be provided to priority groups, such as those at higher risk of disease-related complications and personnel providing essential services (e.g. healthcare workers)". [1] No further evidence was found on this topic on the websites of the Ministry of Health or National Environment Agency. [2, 3, 4]

[1] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 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: 0

There is insufficient public evidence that Singapore has a system in place for public health officials and healthcare workers to communicate during a public health emergency. There is no further information on this topic in The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, the Ministry of Health's Pandemic Readiness and response Plan for Influenza an Other Acute Respiratory Diseases, or on the websites of the Ministry of Health, Ministry of Defence, or the Singapore Civil Defence Force. [1, 2, 3, 4, 5] There is also no further publicly available information on the Emergency

Operations Center in Singapore.

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
- [2] Ministry of Health of the Republic of Singapore. "Singapore's Healthcare System". [<https://www.moh.gov.sg/our-healthcare-system>]. Accessed 20 December 2020.
- [3] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.
- [4] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.
- [5] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 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 no public evidence found on a communication system between public health officials and healthcare workers. There is no further information on this topic in The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, the Ministry of Health's Pandemic Readiness and response Plan for Influenza and Other Acute Respiratory Diseases, or on the websites of the Ministry of Health, Ministry of Defence, or the Singapore Civil Defence Force. [1, 2, 3, 4, 5] There is also no further publicly available information on the Emergency Operations Center in Singapore.

- [1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
- [2] Ministry of Health of the Republic of Singapore. "Singapore's Healthcare System". [<https://www.moh.gov.sg/our-healthcare-system>]. Accessed 20 December 2020.
- [3] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.
- [4] Singapore Civil Defence Force. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.
- [5] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 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

The government of Singapore monitors and tracks health care associated infections (HCAI). According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment (JEE), it received a score of "5" on question P.3.3, indicating that designated facilities have conducted all HCAI programs for five years with a system for continuous improvement. [1] The JEE also indicated that "the national system for HCAI prevention and control is reviewed and updated every three years; all public and private acute healthcare facilities, as well as step-down care facilities, are legislated to have infection control programmes; and all acute healthcare facilities, including tertiary hospitals, have designated and trained Infection, Prevention and Control physicians and nurses." [1] One area that the JEE indicated requires attention is that "monitoring of national infection control indicators in private hospitals is voluntary and not all private hospitals participate". [1]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 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

The government of Singapore has a requirement for ethical review before beginning a clinical trial. The Health Science Authority through the Health Products Act and Medicines Act requires those performing clinical trials to obtain an ethics approval. [1] According to the Health Science Authority, "the system of regulation requires that Principal Investigators (PI) conducting clinical trials to obtain both ethics and regulatory approvals before initiating a study. The ethics approval is from the hospital's Institutional Review Board (IRB). In order to receive regulatory approval from HSA to conduct clinical trials here, companies must provide relevant evidence that the investigational drug is acceptably safe and the design and conduct of the trial provide adequate levels of protection for participants" [1]. Additionally, "companies or research institutions sponsoring clinical trials and doctors conducting them are expected to abide by the protocol, applicable clinical trials and clinical research material regulations, ICH E6 Good Clinical Practice (GCP) Guidelines and Standard Operating Procedures (SOPs). The ICH E6 GCP Guidelines is based on international ethical and scientific quality standards. The conduct of clinical trials in accordance with the principles of GCP helps ensure that the participants' rights and interests are adequately protected and they are not exposed to undue risk, and that safety and efficacy data generated from the research are valid and accurate." [1,2,3]

[1] Health Sciences Authority of the Republic of Singapore. "Participating in clinical trials". [<https://www.hsa.gov.sg/clinical-trials/participating>]. Accessed 20 December 2020.

[2] Attorney-General Chambers of the Republic of Singapore. Chapter 122D, Act 15 of 2007. "Health Products Act". [<https://sso.agc.gov.sg/Act/HPA2007>]. Accessed 20 December 2020.

[3] Attorney-General Chambers of the Republic of Singapore. Chapter 176, Act 52 of 1975. "Medicines Act".
[<https://sso.agc.gov.sg/Act/MA1975>]. Accessed 20 December 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 evidence for an expedited process for approving clinical trials for unregistered countermeasures. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, the Health Science Authority can provide regulatory clearance or exemptions on an urgent basis for importing unlicensed products into Singapore" but does not specifically mention an expedited process for clinical trials. [1] No further information on this topic can be found on the websites of the Health Sciences Authority, and the Ministry of Health [2, 3].

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".
[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020. [1] Health Sciences Authority of the Republic of Singapore. "Participating in clinical trials".
[<https://www.hsa.gov.sg/clinical-trials/participating>]. Accessed 20 December 2020.
[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 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

Singapore has an agency responsible for approving new countermeasures. According to the 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, the Health Science Authority (HSA) can provide regulatory clearance or exemptions on an urgent basis for importing unlicensed products into Singapore." [1] HSA is an agency under the Ministry of Health. [2] According to the Medicines Act, the HSA is the main licensing authority referenced in the act. [3] The HSA is also in charge of approving other medical-related items beyond medicine: "it ensures that drugs, innovative therapeutics, medical devices and health-related products are wisely regulated and meet appropriate safety, quality and efficacy standards. " [2]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".
[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.
[2] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.
[3] Attorney-General Chambers of the Republic of Singapore. Chapter 176, Act 52 of 1975. "Medicines Act".
[<https://sso.agc.gov.sg/Act/MA1975>]. Accessed 20 December 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

The government of Singapore has an expedited process for approving medical countermeasures for human use. According to The 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment, "the Health Science Authority can provide regulatory clearance or exemptions on an urgent basis for importing unlicensed products into Singapore" [1]. HSA is an agency under the Ministry of Health. [2] According to the Medicines Act, the HSA has the authority to approve new drugs. [3] The HSA mandate extends to drugs manufactured locally as well. According to the Health Products Act, all manufacturers must obtain a license from the HSA in order to manufacture medicine. [4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[3] Attorney-General Chambers of the Republic of Singapore. Chapter 176, Act 52 of 1975. "Medicines Act".

[<https://sso.agc.gov.sg/Act/MA1975>]. Accessed 20 December 2020.

[4] Attorney-General Chambers of the Republic of Singapore. Chapter 122D, Act 15 of 2007. "Health Products Act".

[<https://sso.agc.gov.sg/Act/HPA2007>]. Accessed 20 December 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: 0

There is no publicly available evidence that pandemics are integrated into the national risk reduction strategy or that there is a standalone national disaster risk reduction strategy for pandemics in Singapore. There was no evidence of such a strategy from the Centre for Disaster Management and Humanitarian Excellence, Singapore Civil Defence Force or Ministry of Health. [1, 2, 3]

[1] Centre for Disaster Management and Humanitarian Excellence. "Singapore Disaster Management Reference Handbook". [<https://reliefweb.int/sites/reliefweb.int/files/resources/disaster-mgmt-ref-hdbk-singapore.pdf>]. Accessed 20 December 2020.

[2] Singapore Civil Defence Force of the Republic of Singapore. [<https://www.scdf.gov.sg/>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 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: 0

There is no publicly available evidence that Singapore has cross-border agreements for public health emergencies. There is no evidence of such agreements in the 2018 Joint External Evaluation of IHR Core Capabilities of Singapore assessment. [1] Singapore used to be part of the ASEAN Plus Three Emerging Infectious Diseases (EID) Programme but this Programme has been inactive since 2009. [2] No other evidence was found, including from the Ministry of Health. [3] The Ministry of Health's "Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases" states that "The HCEG is supported by various Crisis Management Groups (CMG)s that deal with the operational issues under their charge. MOH chairs the Crisis Management Group (CMG) (Health)." [4] However, no further evidence could be found publicly on the CMG. [4]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore".

[<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Association of Southeast Asian Nations. "Joint Statement of the Third ASEAN Plus Three Health Ministers Meeting Manila". [<https://asean.org/joint-statement-of-the-third-asean-plus-three-health-ministers-meeting-manila/>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Ministry of Health of the Republic of Singapore. "MOH Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases (Revised April 2014)". [https://www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf]. Accessed 20 December 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: 0

Singapore does not have a cross-border agreement, protocol, or MOU with neighboring countries, or as part of a regional group, with regards to animal health emergencies. According to the JEE, there are no formal agreements for cross border deployment of veterinary countermeasures or personnel during animal health emergencies. However, Singapore has formed an agreement on 7 October 2016 on the establishment of the ASEAN coordinating centre for animal health and zoonoses, which aim "to address current priority animal diseases and implement regional strategies." [1] The Joint External Evaluation of Singapore (JEE) also notes that Singapore "has sufficient resources for responding to public health and animal health emergencies." [2]

There is no further evidence found on this topic on the websites of the Ministry of Health, Health Sciences Authority, Ministry of Defence, or the Ministry of Home Affairs. [3,4,5,6]

[1] Association of Southeast Asian Nations (ASEAN). "Agreement on the Establishment of the ASEAN Coordinating Centre for Animal Health and Zoonoses". [<http://agreement.asean.org/media/download/20161108071810.pdf>]. Accessed 20 December 2020.

[2] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[3] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[4] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[5] Ministry of Defence of the Republic of Singapore. [<https://www.mindef.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Home Affairs of the Republic of Singapore. [<https://www.mha.gov.sg/>]. Accessed 21 January 2021.

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: 0

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 insufficient evidence that Singapore has allocated national funds to improve capacity to address epidemic threats within the past three years. To combat COVID-19, Singapore's President has given in-principle support to draw up to \$52 billion from Past Reserves. The 2020 Budget includes the Resilience, Solidarity, and Fortitude Budgets which aim to support workers and livelihoods, protect jobs and workers, and help businesses and workers. A budget allocated for Strengthening Supply Chains includes building up national stockpiles of essential health supplies, and a combination of local production, stockpiling, and diversification of imported sources to ensure food security during the COVID-19 pandemic. [1,2] However, excluding the budget prioritization of 2020 to address COVID-19, Singapore's 2018 and 2019 budget prioritization make no mention of improving capacity to address epidemic threats. [3] There is no further evidence found on the websites of the Ministry of Health or the Singapore Food Agency. [4,5]

[1] Government of Singapore. "Budget Booklet". [https://www.singaporebudget.gov.sg/budget_2020/budget-measures/budget-booklet]. Accessed 20 December 2020.

[2] Government of Singapore. "Clarification on Yeoh Lian Chuan's post on Ministry of Finance Addendum to the President's Address". [<https://www.gov.sg/article/clarification-on-yeoh-lian-chuan-post-on-mof-addendum-to-the-presidents-address>]. Accessed 20 December 2020.

[3] Government of Singapore. "Budget Archives". [https://www.singaporebudget.gov.sg/budget_2020/budget-archives].

[4] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[5] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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: 1

The government of Singapore has access to emergency public financing in the face of a public health emergency. According to The Joint External Evaluation of IHR Core Capabilities of Singapore assessment from 2018, the "Singapore Government finances all necessary systems and programs without external funding support. Ministries have access to both annual block funding for routine activities (e.g., disease outbreak response, preparedness, surveillance, etc.) and emergency supplemental funding by request. There is also a dedicated funding stream in ministries and government agencies for preparedness activities." [1] To combat COVID-19, there is insufficient evidence that this specific emergency supplemental funding mechanism has been utilized, but Singapore's President has given in-principle support to draw up to \$52 billion (approximately 39 billion USD) from past reserves. [2]

[1] World Health Organization, 16-20 April 2018. "Joint External Evaluation of IHR Core Capabilities of Singapore". [<http://apps.who.int/iris/bitstream/handle/10665/275410/WHO-WHE-CPI-REP-2018.25-eng.pdf>]. Accessed 20 December 2020.

[2] Government of Singapore. "Clarification on Yeoh Lian Chuan's post on Ministry of Finance Addendum to the President's Address". [<https://www.gov.sg/article/clarification-on-yeoh-lian-chuan-post-on-mof-addendum-to-the-presidents-address>]. Accessed 20 December 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 Singapore's leaders have made public commitments to either support other countries to improve capacity to address epidemic threats by providing financing and to improve its own domestic capacity to address epidemic threats by expanding financing or requesting support to improve capacity, in the past three years. The Joint Statement from Health Ministers of ASEAN and the United States on COVID-19 Cooperation (30 April 2020) addresses funding and capacity development for future disease outbreaks by stating that the Ministers "[welcome] the announcement of the ASEAN Member States' plan to establish the COVID-19 Response Fund to address COVID-19 and future public health emergencies, and a Regional Reserve of Medical Supplies to enable rapid response to emergency medical supply needs, with the partnership of external partners." [1] There is additionally evidence of support for response efforts. On 23 March 2020, the Ministry of Foreign Affairs and Ministry of Health released a joint press statement that the Government of Singapore will be contributing 500,000 USD to support the WHO's Strategic Preparedness and Response Plan (SPRP) for COVID-19. Prime Minister Lee Hsien Loong posted on Facebook in support of Singapore's contribution to the WHO. [2] According to Georgetown's Global Health Security Tracking website, this is the only IHR-related funding Singapore has committed to since 2016. [3,4] There is no further evidence on this topic on the websites of the Ministry of Health, Ministry of Foreign Affairs or the World Health Organisation. [5,6]

[1] Association of Southeast Asian Nations (ASEAN). 30 April 2020. "Joint Statement Special Video Conference of Health Ministers of ASEAN and the United States in Enhancing Cooperation on Coronavirus Disease 2019 (COVID-19) Response". [https://asean.org/storage/2020/05/Adopted_ASEAN-US-Joint-Statement-on-COVID-19.pdf]. Accessed September 2020.

[2] Channel News Asia. "Singapore contributes US\$500,000 to support WHO efforts against COVID-19". 23 March 2020. [<https://www.channelnewsasia.com/news/singapore/singapore-contributes-s-500-000-to-support-who-covid-19-efforts-125685666>]. Accessed 5 February 2021.

[3] Ministry of Foreign Affairs of the Republic of Singapore. "Singapore's Contribution to the World Health Organisation's (WHO) Strategic Preparedness and Response Plan (SPRP) for COVID-19". [https://www.mfa.gov.sg/Newsroom/Press-Statements-Transcripts-and-Photos/2020/03/230320_SgWHOSPRPCovid]. Accessed 20 December 2020.

[4] Georgetown University Medical Center. "Funder Profile: Singapore; total fund provided from 2014 to 2020". [<https://tracking.ghscosting.org/details/201/funder>]. Accessed 20 December 2020.

[5] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[6] Ministry of Foreign Affairs of the Republic of Singapore. [<https://www.mfa.gov.sg/>]. Accessed 21 January 2021.

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 Singapore has in the past three years received financing or technical support from donors to improve the country's domestic capacity to address epidemic threats but there is insufficient evidence that it has provided other countries support with financing or technical support to improve capacity to address epidemic threats. According to the Georgetown University Global Health Security Tracking Website, Singapore has been disbursed 169.26k USD for developing capacities in the areas of zoonotic disease management and antimicrobial resistance. [1] According to the same tracker, although the country has also provided funds to the World Health Organization, there is no evidence of the purpose of this funding. [2] There is no further public evidence of funding provided to other countries to improve their capacity via the World Health Organization, Ministry of Health, National Environment Agency, Ministry of Foreign Affairs, and other public news sources. [3, 4, 5, 6]

[1] Georgetown University Medical Center. "Recipient Profile: Singapore; total fund provided from 2014 to 2020".

[<https://tracking.ghscosting.org/details/201/recipient>]. Accessed 20 December 2020.

[2] Georgetown University Medical Center. "Funder Profile: Singapore; total fund provided from 2014 to 2020".

[<https://tracking.ghscosting.org/details/201/funder>] Accessed 20 December 2020.

[3] World Health Organization. [<http://who.int>]. Accessed 01 February 2020.

[4] Ministry of Health. [<https://www.moh.gov.sg/>]. Accessed 01 February 2020.

[5] National Environment Agency. [<https://www.nea.gov.sg/>]. Accessed 01 February 2020.

[6] Ministry of Foreign Affairs. [<https://www1.mfa.gov.sg/>] Accessed 01 February 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: 0

There is no 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. No further information on this topic was found on the websites of the World Health Organization, Ministry of Health, Health Sciences Authority, National Environment Agency, National Parks Board, or Singapore Food Agency. [1, 2, 3, 4, 5,6]

[1] World Health Organization. [<http://who.int>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] Health Sciences Authority of the Republic of Singapore. [<https://www.hsa.gov.sg/>]. Accessed 20 December 2020.

[4] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 2020.

[5] National Parks Board of the Republic of Singapore. [<https://www.nparks.gov.sg/>]. Accessed 20 December 2020.

[6] Singapore Food Agency of the Republic of Singapore. [<https://www.sfa.gov.sg/>]. Accessed 20 December 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 Singapore has not shared samples in accordance with the PIP framework in the past two years. Sources checked include World Health Organization, Ministry of Health, National Environment Agency, and public news sources. [1, 2, 3]

[1] World Health Organization. [<http://who.int>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 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 public evidence that Singapore has not shared pandemic pathogen samples during an outbreak in the past two years. This includes COVID-19 samples. Sources checked include the World Health Organization, Ministry of Health, National Environment Agency, and public news sources. [1, 2, 3]

[1] World Health Organization. [<http://who.int>]. Accessed 20 December 2020.

[2] Ministry of Health of the Republic of Singapore. [<https://www.moh.gov.sg/>]. Accessed 20 December 2020.

[3] National Environment Agency of the Republic of Singapore. [<https://www.nea.gov.sg/>]. Accessed 20 December 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: 3

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: 85

2020

Transparency International

6.1.1f

Accountability of public officials (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 4

2020

Economist Intelligence

6.1.1g

Human rights risk (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 2

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: 3

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: 4

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: 4

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: 4

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: 2

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: 97.34

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: 0.94

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: 0.23

2008-2018

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

According to the ASEAN Regional Study on Informal Employment Statistics to Support Decent Work Promotion in ASEAN, Singapore has no government-released measure of informal employment of the entire country, and no official definition of informal employment. However, the study also notes that Singapore is a highly formalized economy where the vast majority of workers are afforded regulatory oversight and employment protection in its labor laws and regulations. [1]

There is no data from ILOSTAT or World Bank Data on Informal employment (%of total non-agricultural employment) for Singapore. [2,3]

[1] Association of Southeast Asian Nations. "Regional Study on Informal Employment Statistics to Support Decent Work Promotion in ASEAN". [<https://asean.org/storage/2012/05/13-Regional-Study-on-Informal-Employment-Statistics-to-Support-Decent-Wo....pdf>]. Accessed 20 December 2020.

[2] World Bank. "Informal employment (% of total non-agricultural employment) – Singapore". [<https://data.worldbank.org/indicator/SL.ISV.IFRM.ZS?locations=SG>]. Accessed 20 December 2020.

[3] International Labour Organization. "Statistics on the informal economy". [<https://ilostat.ilo.org/topics/informality/>].

Accessed 20 December 2020.

6.2.3c

Coverage of social insurance programs (% of population)

Scored in quartiles (0-3, where 3=best)

Current Year Score: 1

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: 1

2021

Economist Intelligence Democracy Index

6.2.6 Inequality

6.2.6a

Gini coefficient

Scored 0-1, where 0=best

Current Year Score: 0.46

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: 4

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: 4

2021

Economist Intelligence

6.4 ENVIRONMENTAL RISKS

6.4.1 Urbanization

6.4.1a

Urban population (% of total population)

Input number

Current Year Score: 100

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: -2.67

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: 83.15

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: 234.8

2019

WHO

6.5.1c

Population ages 65 and above (% of total population)

Input number

Current Year Score: 12.39

2019

World Bank

6.5.1d

Prevalence of current tobacco use (% of adults)

Input number

Current Year Score: 16.5

2018

World Bank

6.5.1e

Prevalence of obesity among adults

Input number

Current Year Score: 6.1

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: 2234.97

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: 2

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