

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

| | |
|--|-----------|
| CATEGORY 1: PREVENTING THE EMERGENCE OR RELEASE OF PATHOGENS WITH POTENTIAL FOR INTERNATIONAL CONCERN | 4 |
| 1.1 Antimicrobial resistance (AMR) | 4 |
| 1.2 Zoonotic disease | 7 |
| 1.3 Biosecurity | 13 |
| 1.4 Biosafety | 22 |
| 1.5 Dual-use research and culture of responsible science | 26 |
| 1.6 Immunization | 29 |
| CATEGORY 2: EARLY DETECTION AND REPORTING FOR EPIDEMICS OF POTENTIAL INTERNATIONAL CONCERN | 30 |
| 2.1 Laboratory systems strength and quality | 30 |
| 2.2 Laboratory supply chains | 33 |
| 2.3 Real-time surveillance and reporting | 34 |
| 2.4 Surveillance data accessibility and transparency | 37 |
| 2.5 Case-based investigation | 43 |
| 2.6 Epidemiology workforce | 46 |
| CATEGORY 3: RAPID RESPONSE TO AND MITIGATION OF THE SPREAD OF AN EPIDEMIC | 47 |
| 3.1 Emergency preparedness and response planning | 47 |
| 3.2 Exercising response plans | 51 |
| 3.3 Emergency response operation | 53 |
| 3.4 Linking public health and security authorities | 55 |
| 3.5 Risk communications | 56 |
| 3.6 Access to communications infrastructure | 59 |

| | |
|-----------------------------------|----|
| 3.7 Trade and travel restrictions | 60 |
|-----------------------------------|----|

CATEGORY 4: SUFFICIENT AND ROBUST HEALTH SECTOR TO TREAT THE SICK AND PROTECT HEALTH WORKERS 62

| | |
|---|----|
| 4.1 Health capacity in clinics, hospitals, and community care centers | 62 |
|---|----|

| | |
|---|----|
| 4.2 Supply chain for health system and healthcare workers | 65 |
|---|----|

| | |
|--|----|
| 4.3 Medical countermeasures and personnel deployment | 71 |
|--|----|

| | |
|-----------------------|----|
| 4.4 Healthcare access | 72 |
|-----------------------|----|

| | |
|---|----|
| 4.5 Communications with healthcare workers during a public health emergency | 74 |
|---|----|

| | |
|---|----|
| 4.6 Infection control practices and availability of equipment | 76 |
|---|----|

| | |
|--|----|
| 4.7 Capacity to test and approve new medical countermeasures | 77 |
|--|----|

CATEGORY 5: COMMITMENTS TO IMPROVING NATIONAL CAPACITY, FINANCING PLANS TO ADDRESS GAPS, AND ADHERING TO GLOBAL NORMS 79

| | |
|---|----|
| 5.1 International Health Regulations (IHR) reporting compliance and disaster risk reduction | 79 |
|---|----|

| | |
|---|----|
| 5.2 Cross-border agreements on public health and animal health emergency response | 80 |
|---|----|

| | |
|-------------------------------|----|
| 5.3 International commitments | 81 |
|-------------------------------|----|

| | |
|--|----|
| 5.4 Joint External Evaluation (JEE) and Performance of Veterinary Services Pathway (PVS) | 83 |
|--|----|

| | |
|---------------|----|
| 5.5 Financing | 84 |
|---------------|----|

| | |
|--|----|
| 5.6 Commitment to sharing of genetic and biological data and specimens | 88 |
|--|----|

CATEGORY 6: OVERALL RISK ENVIRONMENT AND VULNERABILITY TO BIOLOGICAL THREATS 89

| | |
|---------------------------------|----|
| 6.1 Political and security risk | 89 |
|---------------------------------|----|

| | |
|-------------------------------|----|
| 6.2 Socio-economic resilience | 93 |
|-------------------------------|----|

| | |
|-----------------------------|----|
| 6.3 Infrastructure adequacy | 95 |
|-----------------------------|----|

| | |
|-------------------------|----|
| 6.4 Environmental risks | 96 |
|-------------------------|----|

| | |
|-----------------------------------|----|
| 6.5 Public health vulnerabilities | 97 |
|-----------------------------------|----|

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

India does have a national AMR plan for the surveillance, detection and reporting of priority AMR pathogens. Their "National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021" released in April 2017 is based on national needs and priorities in addition to the 5 priorities of the Global Action Plan on Antimicrobial Resistance put forth by the World Health Assembly in May 2015. [1] One of its key objectives includes the "strengthening [of] knowledge and evidence through surveillance." [1] Under this objective they have three specific strategic intervention and activities in place: to "institutionalise national surveillance system for antimicrobial use (AMU) in humans, animals, agriculture & food sectors," establish a monitoring system to assess antimicrobial consumption in humans, animals & food sectors," and to "foster optimal use of antimicrobials." The policy covers detection by incorporating the generation of quality data on AMR for pathogens of public health importance; to strengthen infection control guidelines and practices. [1] Furthermore, the policy promises an "annual national AMU surveillance report" to be published and disseminated including with working groups in the public health sector, and policymakers. [1]

[1] Government of India.Ministry of Health and Family Welfare. National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021."April 2017.

[http://apps.who.int/datacol/answer_upload.asp?survey_id=666&view_id=722&question_id=13163&answer_id=19958&respondent_id=225611]. Accessed 02 September 2020

1.1.1b

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

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

Current Year Score: 1

India's national laboratory/laboratory system can test for some, but not all 7+1 AMR pathogens. While the National Centre for Disease Control, as part of their 12th five year "National Programme on the Containment of Antimicrobial Resistance", were to "establish a laboratory based AMR surveillance system of 30 network laboratories, generating quality data on AMR for pathogens of public health importance," only 10 such "network laboratories have been identified in the first phase of the programme." [1] Furthermore, only "four pathogens of public health importance are being tracked" including *Klebsiella* spp, *E. coli* and *Staphylococcus aureus*, out of which only the latter two are priority AMR pathogens. [1] Similarly, the HAI Surveillance India project also mentions tracking for these three AMR pathogens in a hospital-based setting, but does not mention the remaining 7+1 AMR pathogens. [2] No further information is available via the "Roadmap for Preparing National

Public Health Laboratory Services Framework" policy document, from April of 2010, which outlines the capabilities of public health laboratories. [3] Lastly, there is no other evidence of India being able to test for all the 7+1 priority pathogens on their Ministry of Health, Ministry of Agriculture or National Centre for Disease Control website. [4,5,6]

[1] Government of India Ministry of Health and Family Welfare. "National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021." April 2017.

[http://apps.who.int/datacol/answer_upload.asp?survey_id=666&view_id=722&question_id=13163&answer_id=19958&respondent_id=225611]. Accessed 02 September 2020

[2] All India Institute of Medical Services. 2017-2018. "Capacity Building and Strengthening of Hospital Infection Control to detect and prevent Antimicrobial resistance in India."

[https://www.haisindia.com/upload/fileuploads/1535613297_TOT%20Jan%202018.pdf] Accessed 02 September 2020

[3] Government of India. "Roadmap for Preparing National Public Health Laboratory Services Framework". April 2010.

[https://www.academia.edu/3213109/Roadmap_for_strengthening_national_public_health_laboratory_services]. Accessed 02 September 2020

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 September 2020

[5] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 02 September 2020

[6] Government of India National Centre for Disease Control. "Annual Report 2016-17".

[<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf>]. Accessed 02 September 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 no evidence that India conducts detection or surveillance activities (e.g. in soil, waterways, etc.) for antimicrobial residues or AMR organisms. One of the primary objectives of the "National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021" aims to "strengthen surveillance for AMR in humans, animals, food and environment" and a sub strategy to this is to "standardize data analysis and information management for AMR surveillance" by defining "mechanisms and modalities for data analysis and information management at central, state and district level for AMR surveillance in environment." [1] According to the NAP-AMR, "the AMRSN [Antimicrobial Resistance Surveillance Research Network], although currently limited to the human health side, plans to scale up on a national scale and expand its ambit to include samples from a wider spectrum of sources, including animal, environmental and food samples, to reflect the principles of a One Health approach based surveillance system." [1] However, this does not seem to be in place as of yet and there is no evidence of it on their Ministry of Environment, Forest and Climate Change, Ministry of Health or National Centre for Disease Control website. [2,3,4]

[1] Government of India Ministry of Health and Family Welfare. "National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021." April 2017.

[http://apps.who.int/datacol/answer_upload.asp?survey_id=666&view_id=722&question_id=13163&answer_id=19958&respondent_id=225611]. Accessed 02 September 2020

[2] Government of India. Ministry of Environment, Forest and Climate Change. [<http://moef.gov.in/rules-and-regulations/environment-protection/environmental-labs/>]. Accessed 02 September 2020.

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 September 2020.

[4] Government of India. National Centre for Disease Control. "Annual Report 2016-17".

[<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf>]. Accessed by 02 September 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: 1

India has national legislation or regulation in place requiring prescriptions for antibiotic use for humans, but there is evidence of gaps in enforcement. In December 2016, India's Ministry of Health and Family Welfare issued "The Drugs and Cosmetics Act and Rules" which is a combination of The Drugs and Cosmetics Act of 1940 and The Drugs and Cosmetics Rules of 1945. [1] A separate "Schedule H-1 has been incorporated in Drug and Cosmetic rules to regulate the sale of antimicrobials" since March of 2014. [2] "About 24 antimicrobials belonging to third and fourth generation cephalosporins and carbapenems are covered under the schedule. These antimicrobials cannot be sold without a proper medical prescription and these drug packaging are required to be labelled with the following text along with red border. Schedule H1 drugs in particular come with a warning which outlines its dangerous nature when taken outside of medical advice. In addition, such drugs are "not to be sold by retail without the prescription of a registered medical practitioner." [1] A separate register has to be maintained by the pharmacist giving details of the prescriber, the patient as well as the drug sold." [1] There is suggestive evidence that antimicrobial legislation needs strengthening. For example, the National Action Plan on Antimicrobial Resistance notes that the government of India still wants to "strengthen legislation to regulate prescription and dispensing of antimicrobials" as they are aware that the adherence to these laws are still lax and that the current legislation does not comprehensively cover all types of antibiotics. For this purpose, the government wants to "organize a consultation with regulatory bodies to review current legislations on antimicrobial prescription and feasibility to strengthen existing legislations and introduce new legislations." [2] There is no evidence of any such regulations on India's National Centre for Disease Control, Ministry of Health & Family Welfare or Central Drugs Standard Control Organization website of a comprehensive law or regulation that requires prescriptions for the sale of all antibiotics. [3,4,5]

[1] Government of India Ministry of Health and Family Welfare. "The Drugs and Cosmetics Act and Rules." 2016.

[https://cdsco.gov.in/opencms/export/sites/CDSCO_WEB/Pdf-documents/acts_rules/2016DrugsandCosmeticsAct1940Rules1945.pdf]. Accessed 02 September 2020

[2] Government of India Ministry of Health and Family Welfare. "National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021." April 2017.

[http://apps.who.int/datacol/answer_upload.asp?survey_id=666&view_id=722&question_id=13163&answer_id=19958&respondent_id=225611]. Accessed 02 September 2020

[3] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 02 September 2020.

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 September 2020.

[5] Government of India. Central Drugs Standard Control Organization. [<https://cdsco.gov.in/>]. Accessed 02 September 2020.

1.1.2b

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

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

Current Year Score: 0

There is no evidence that India has national legislation or regulation in place requiring prescriptions for antibiotic use for animals. Although, India's Ministry of Health and Family Welfare issued "The Drugs and Cosmetics Act and Rules" in December 2016 (which is a combination of The Drugs and Cosmetics Act of 1940 and The Drugs and Cosmetics Rules of 1945), the document only explicitly mentions prescriptions for humans. However, the larger definition of drugs given at the start of the policy includes "all medicines for internal or external use of human beings or animals and all substances intended to be used for or in the diagnosis, treatment, mitigation or prevention of any disease or disorder in human beings or animals," implying that the prescription of antibiotic laws outlined in the document extends to animals as well as humans. Nevertheless, no specific regulations controlling the sale of antibiotics for animals can be found on their Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare or National Institute Clinical Trials Registry - India websites. [2,3,4] Lastly, there is no evidence of any such regulations for animals on India's National Centre for Disease Control website either. [5]

[1] Government of India Ministry of Health and Family Welfare. "The Drugs and Cosmetics Act and Rules." 2016. [<http://www.cdsc.nic.in/writereaddata/2016Drugs%20and%20Cosmetics%20Act%201940%20&%20Rules%201945.pdf>]. Accessed 02 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 September 2020.

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 02 September 2020.

[4] Government of India. National Institute of Medical Statistics. National Institute Clinical Trials Registry - India. [<http://ctri.nic.in/Clinicaltrials/login.php>]. Accessed 02 September 2020

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 02 September 2020

1.2 ZONOTIC 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 evidence of India having a strategy document on zoonotic disease. India's National Centre for Disease Control has a Zoonosis Division which published a document called "Zoonotic Diseases of Public Health Importance" in July 2016. This document almost exhaustively lists the most prevalent zoonotic diseases in India, like rabies, leishmaniasis, plague, leptospirosis and others and their prevention and cures. [1] As the former director of India's NCDC, Dr. S.Venkatesh, states in the acknowledgement section of the document, "this manual will be useful in providing necessary technical information for medical and veterinary officers, public health specialists and laboratory personnel. Besides serving as a reference book, the manual will also form valuable resource material for training programmes and self learning." [1] The manual includes details on laboratory safety during the testing of zoonotic diseases as well as procedures for diagnosis, control, cure and the prevention of zoonotic diseases. [1]

[1] Government of India National Centre for Disease Control. "Zoonotic Diseases of Public Health Importance". July 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File618.pdf>]. Accessed 02 September 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: 1

There is evidence that India has national legislation which includes measures for risk identification and reduction for zoonotic disease spillover events from animals to humans. These regulations are explained in 'The Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009.' 'An act to provide for the prevention, control and eradication of infectious and contagious diseases affecting animals, for prevention of outbreak or spreading of such diseases from one state to another, and to meet the international obligations of India for facilitating import and export of animal and animal products and for matters connected therewith or incidental thereto.' Although the regulations largely focus on spread of disease among animals, there is mention of measures to contain the spread of zoonotic diseases of public health importance in the document. For example, the regulations encourage euthanasia of infected animals to protect public health if the disease is of zoonotic importance and the prohibition of entry of any infected animals into the market or public place. These regulations have defined compulsory vaccinations for all pet animals against any scheduled diseases. Furthermore, in case of any scheduled disease affecting animals in a certain area, that area shall be declared a controlled area to control and eradicate the disease. There are also rules on proper disposal of dead animals that are infected with a disease, any kind of fodder, bedding or material which has come in contact with any infected animal, which could carry the infection. There are prohibitions against sale or exhibition of infected animals in order to curtail the spread of the disease. There are also provisions for quarantine camps and check posts to control movement of infected animals in case of eruption of any scheduled disease and cleaning and disinfection of any vehicle or carrier used to carry infected animals or any place where such animals have been kept.[1]

[1] Ministry of Fisheries, Animal Husbandry and Dairying. Department of Animal Husbandry and Dairying. Acts and Rules. 'The Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009'.

[http://dadf.gov.in/sites/default/files/Gazette_20-03-09.pdf] Accessed 02 October 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: 1

There is evidence that India has guidelines that account for the surveillance and control of multiple zoonotic pathogens of public health concern. India's National Centre for Disease Control has a Zoonosis Division which published a document called "Zoonotic Diseases of Public Health Importance" in July 2016. This document calls for the surveillance of most of the prevalent zoonotic diseases in India. [1] For example under the Plague subheading, the document calls for the surveying activity to not only the pathogen but "should [also] cover surveillance of rodents and vectors as well as laboratory and clinico-epidemiological surveillance. It is emphasized that surveillance is not a onetime activity and has to be carried out on a continuous basis to be effective in prevention and control of plague." [1] The document covers both surveillance, such as lab testing and collection of samples, as well as control measures such as prevention and response for zoonotic diseases. [1] For example for Leptospirosis, control methods outlined include "personal protection, health education, Chemoprophylaxis, rodent control, tapping of water bodies for establishing a proper drainage system, health impact assessment of developmental projects, and vaccination of animals." [1] Similar measures are outlined for the surveillance and control of

zoonotic diseases including rabies, plague, anthrax, zika virus and Ebola virus. [1]

[1] Government of India National Centre for Disease Control. "Zoonotic Diseases of Public Health Importance". July 2016. [https://ncdc.gov.in/WriteReadData/l892s/File618.pdf]. Accessed 02 September 2020

1.2.1d

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence of India having a department, agency or similar unit dedicated to zoonotic disease that functions across ministries. Although there is a zoonotic disease agency, it sits within one ministry (the health ministry). India's Zoonosis Division sits under the National Centre for Disease Control and is the responsible unit for any zoonotic diseases and related issues. It has published a document called "Zoonotic Diseases of Public Health Importance" in July 2016 which outlines the most prevalent zoonotic diseases in India and their prevention and cures. [1,2] The National Centre for Disease Control falls under India's Ministry of Health and Family Welfare in its organizational structure; and although there is evidence that it coordinates with Ministry of Agriculture and Department of Animal Husbandry ,Dairying and Fisheries (DADF) for Control of Zoonoses, there is no evidence that it functions across Ministry of Agriculture or other ministries and agencies. Therefore, the Zoonosis Division does not function across ministries in India. [3,4] Lastly, there is no evidence of any such agencies on their Ministry of Health & Family Welfare or Ministry of Agriculture and Farmers' Welfare website. [5,6]

[1] Government of India. National Centre for Disease Control. "Division of Zoonosis".

[https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=105&lid=56]. Accessed 02 September 2020.

[2] Government of India. National Centre for Disease Control. "Zoonotic Diseases of Public Health Importance". July 2016.

[https://ncdc.gov.in/WriteReadData/l892s/File618.pdf]. Accessed 02 September 2020

[3] Government of India. National Centre for Disease Control.

"Organisation". [https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=159&lid=168]. Accessed 02 September 2020

[4] Government of India. National Centre for Disease Control. National Health Program. 'Inter-Sectoral coordination for Prevention and Control of Zoonotic Diseases'. [https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=144&lid=152].

Accessed 02 September 2020

[5] Government of India. Ministry of Health & Family Welfare. [https://mohfw.gov.in/]. Accessed 02 September 2020

[6] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [http://agricoop.nic.in/]. Accessed 02 September 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

There is evidence that India has a voluntary mechanism for owners of livestock to conduct and report on disease surveillance to a central government agency. In both the 'General Guidelines for Biosecurity at Central Poultry Development Organizations' from August 2015 and "Biosecurity Guidelines for Sheep & Goat Farms" from 2016 it is explicitly stated that

"immediate report of abnormal mortality in poultry stock and disease outbreaks[should be made]" at designated e-mail addresses. [1,2] In addition, the biosecurity guidelines recommend that "all farm workers are aware of the importance of early detection and reporting of unusual animal deaths or animals exhibiting signs of sickness." [2] There is also evidence of a reporting system which is intended for use by official veterinarians, although it does not appear to be accessible by farmers or other livestock owners. India's National Animal Disease Reporting System (NADRS) exists to collect and collate information on animal health. "The NADRS involves a computerized network, linking each Block, District and the State/UT Headquarters in the country to the Central Project Monitoring Unit (CPMU) in the DADF [Department of Animal Husbandry, Dairying & Fisheries] at New Delhi." [3] Lastly, no other method of reporting was found under India's Department of Animal Husbandry, Dairying & Fisheries' exhaustive list of resources for "Livestock Health and Disease Control." [4]

[1] Government of India. Department of Animal Husbandry, Dairying & Fisheries. "General Guidelines for Biosecurity at Central Poultry Development Organizations". August 2015.

[[https://www.farmer.gov.in/dadf/Biosecurity/Revised_Poultry_Biosecurity_Guidelines_Aug_2015_\(English_Version\).pdf](https://www.farmer.gov.in/dadf/Biosecurity/Revised_Poultry_Biosecurity_Guidelines_Aug_2015_(English_Version).pdf)]. Accessed 02 September 2020.

[2] Government of India. Department of Animal Husbandry, Dairying & Fisheries. "General Guidelines for Biosecurity at Central Sheep Breeding Farm, Hissar". 2016.

[https://www.farmer.gov.in/dadf/Biosecurity/Biosecurity_Guidelines_for_Sheep_n_Goat_Farms_2016.pdf]. Accessed 02 September 2020.

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. "National Animal Disease Reporting System (NADRS)". [<http://nadsapps.gov.in/>]. Accessed 02 September 2020

[4] Government of India. Department of Animal Husbandry, Dairying & Fisheries. "Livestock Health and Disease Control". [<http://dahd.nic.in/about-us/divisions/livestock-health>]. Accessed 02 September 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 that India has laws or guidelines that safeguard the confidentiality of information generated through surveillance activities for animals for owners. There is no evidence of an explicit law that addresses the confidentiality of information generated from India's National Animal Disease Reporting System (NADRS) either on the actual NADRS website, Ministry of Health and Family Welfare or Ministry of Agriculture and Farmers' Welfare website. [1,2,3] In addition, India passed "The Personal Data Protection Bill" in 2018, prior to which it did not have a data protection piece of legislation. [4] Although, health data is mentioned in the bill it is broadly defined as "data related to the state of physical or mental health of the data principal and includes records regarding the past, present or future state of the health of such data principal, data collected in the course of registration for, or provision of health services, data associating the data principal to the provision of specific health services." [4] The law makes no specific reference to safeguarding the confidentiality of information generated through surveillance activities for animals. Lastly, no such laws can be found in their animal biosecurity documents nor on their "Livestock Health" section of India's Department of Animal Husbandry, Dairying & Fisheries, Division of Zoonosis or National Centre for Disease Control website. [5,6,7,8,9]

[1] Government of India Ministry of Agriculture and Farmers' Welfare. "National Animal Disease Reporting System (NADRS)". [<http://nadsapps.gov.in/>]. Accessed 04 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers'

Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020

[4] Government of India. "The Personal Data Protection Bill". 2018.

[http://meity.gov.in/writereaddata/files/Personal_Data_Protection_Bill,2018.pdf]. Accessed by 04 September 2020.

[5] Government of India Department of Animal Husbandry, Dairying & Fisheries. "General Guidelines for Biosecurity at Central Poultry Development Organizations". August 2015.

[[https://www.farmer.gov.in/dadf/Biosecurity/Revised_Poultry_Biosecurity_Guidelines_Aug_2015_\(English_Version\).pdf](https://www.farmer.gov.in/dadf/Biosecurity/Revised_Poultry_Biosecurity_Guidelines_Aug_2015_(English_Version).pdf)]. Accessed 04 September 2020

[6] Government of India Department of Animal Husbandry, Dairying & Fisheries. "General Guidelines for Biosecurity at Central Sheep Breeding Farm, Hissar". 2016.

[https://www.farmer.gov.in/dadf/Biosecurity/Biosecurity_Guidelines_for_Sheep_n_Goat_Farms_2016.pdf]. Accessed 04 September 2020

[7] Government of India Department of Animal Husbandry, Dairying & Fisheries. "Livestock Health and Disease Control".

[<http://dahd.nic.in/about-us/divisions/livestock-health>]. Accessed 04 September 2020

[8] Government of India National Centre for Disease Control. "Division of Zoonosis". December 2018.

[<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=105&lid=56>]. Accessed 04 September 2020.

[9] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 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

There is evidence that India conducts surveillance of zoonotic disease in wildlife. The Zoonosis Division of the National Centre for Disease Control has a project that focuses on the "surveillance of plague in states of Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat and Maharashtra." The project provides laboratory support in the states and serves as an early warning system for outbreak. [1] Furthermore, a 2016 report from India's National Health Portal states that the "Plague laboratory at Zoonosis Division of NCDC, Delhi and Plague Surveillance Unit, at its Bengaluru Branch, Karnataka are involved with various activities in control measures and bacteriological and serological surveillance in rodents and rat fleas". [2] There is also evidence of studies on mosquito populations to monitor for mosquito-borne diseases such as dengue and Japanese encephalitis and also there is evidence of studies on chikungunya virus, rabies virus, rickettsiosis infections in animals and humans. [1]

[1] Government of India National Centre for Disease Control. "Research Projects".

[<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=140&lid=107>]. Accessed 04 September 2020.

[2] Government of India National Health Portal. "Plague". April 2016. [<https://www.nhp.gov.in/disease/communicable-disease/plague>]. Accessed 04 September 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: 5.77

2017

OIE WAHIS database

1.2.4b

Number of veterinary para-professionals per 100,000 people

Input number

Current Year Score: 7.46

2017

OIE WAHIS database

1.2.5 Private sector and zoonotic

1.2.5a

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence of India having a national law, plan, or equivalent strategy document, on zoonotic disease that includes mechanisms for working with the private sector in controlling or responding to zoonoses. While India's National Centre for Disease Control has a Zoonosis Division which published a document called "Zoonotic Diseases of Public Health Importance" in July 2016 which exhaustively lists the most prevalent zoonotic diseases in India along with their prevention and cures, there is no mention of any private sector collaborations. [3] Their "National Health Policy 2017," put forth by India's Ministry of Health and Family Welfare, does not cover any clauses on zoonotic diseases. [1] Lastly, no such policies on private sector and zoonotic diseases can be found on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare websites, Department of Animal Husbandry, Dairying & Fisheries, their Farmers' Portal or National Centre for Disease Control website. [4,5,6,7,8]. A publication by the International Livestock Research Institute (ILRI) in collaboration with the Public Health Foundation of India from 2013, explicitly states that private sector collaboration in India needs to be strengthened, with respect to zoonotic disease control. [9]

- [1] Government of India Ministry of Health and Family Welfare. "National Health Policy". 2017. [https://main.mohfw.gov.in/sites/default/files/9147562941489753121.pdf]. Accessed 04 September 2020
- [2] The Hindu. "Emerging infectious diseases, One Health and India". July 2017. [https://www.thehindu.com/sci-tech/health/emerging-infectious-diseases-one-health-and-india/article19285575.ece]. Accessed 04 September 2020.
- [3] Government of India. National Centre for Disease Control. "Zoonotic Diseases of Public Health Importance". July 2016. [https://ncdc.gov.in/WriteReadData/l892s/File618.pdf]. Accessed 04 September 2020.
- [4] Government of India. Ministry of Health & Family Welfare. "Policy". [https://main.mohfw.gov.in/documents/policy]. Accessed by 04 September 2020.
- [5] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [http://agricoop.nic.in/]. Accessed 04 September 2020
- [6] Government of India Ministry of Agriculture and Farmers' Welfare. Department of Animal Husbandry, Dairying & Fisheries. [http://dahd.nic.in/]. Accessed 04 September 2020
- [7] Government of India Ministry of Agriculture and Farmers Welfare. Farmers' Portal. October 2018. [https://www.farmer.gov.in/]. Accessed 04 September 2020.
- [8] Government of India. National Centre for Disease Control. [https://ncdc.gov.in/]. Accessed 04 September 2020
- [9] One Health, EcoHealth and agriculture associated diseases— Report of a regional dialogue. November 2013. [https://cgspage.cgiar.org/bitstream/handle/10568/35234/pr_ecohealth_mar2014.pdf]. Accessed 04 September 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 no evidence of India having in place a record, updated within the past 5 years, of the facilities in which especially dangerous pathogens and toxins are stored or processed, including details on inventories and inventory management systems of those facilities. Although the Department of Biotechnology under the Ministry of Science and Technology has put forth "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment" in 2017, this document only addresses the storage of genetically engineered organisms and related material. [1] The document states that "an inventory of all GE organism in storage should be maintained [and] sub-samples that may be removed from storage when required for experimental or other purposes should be recorded in the inventory list." [1] No mention of the storage of toxins or pathogens is made. Furthermore, there is no evidence of such an inventory or storage in place for pathogens and toxins on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or Ministry of Defence websites.[2,3,4] In the 'National Biosafety Systems' published under the UPMC Center for Health Security, the report on India focuses primarily on genetically modified (GM) agricultural research and ensuring environmental safety. [5] While India does have a document called "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989" put forth by their Ministry of Environment & Forests in December 1989 and it does outline the way pathogens should be stored, no mention is made of recording or updating records and inventories of where these pathogens are stored. [6] Lastly, while their "National Disaster Management Guidelines Management of Biological Disasters" states that "regularly updated inventories with storage locations" are necessary to ensure the accountability of valuable biological materials, no details of this storage system is outlined and there is no evidence of such

storage places on their National Centre for Disease Control website either. [7,8] Although India submits 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. [9] No evidence of a record was found on the Verification Research, Training and Information Centre (VERTIC) database. [10]

[1] Government of India. Ministry of Science and Technology. "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment". 2017.

[http://dbtindia.gov.in/sites/default/files/uploadfiles/Regulations_%26_Guidelines_for_Reocminant_DNA_Research_and_Biocontainment%2C2017.pdf]. Accessed 04 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020.

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020.

[5] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 04 September 2020

[6] Government of India. Ministry of Environment & Forests. "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989". December 1989.

[<http://nbaindia.org/uploaded/Biodiversityindia/Legal/28.%20Rules%20for%20the%20manufacture,%20use%20import%20export%20and%20storage%20of%20hazardous%20microorganism%20genetically%20engineered%20organisms%20or%20cells,%201989.pdf>]. Accessed 04 September 2020.

[7] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020

[8] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 2020

[9] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 2020

[10] VERTIC. 'India'. [<https://www.vertic.org/programmes/biological-weapons-and-materials/bwc-legislation-database/i/>] Accessed 02 October 2020

1.3.1b

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence that India has in place legislation or regulations related to biosecurity which address requirements such as physical containment, operation practices, failure reporting systems or cybersecurity of facilities in which especially dangerous pathogens and toxins are stored or processed. Although the Department of Biotechnology under the Ministry of Science and Technology has put forth "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment" in 2017, this document only addresses the storage of genetically engineered organisms and related material. [1] The document states that "an inventory of all GE organism in storage should be maintained [and] sub-samples that may be removed from storage when required for experimental or other purposes should be recorded in the inventory list." [1] No mention of the storage of toxins or pathogens is made. Furthermore, there is no evidence of such an inventory or storage in place for pathogens and toxins on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or Ministry of Defence websites.[2,3,4] In the 'National Biosafety Systems' published under the UPMC Center for

Health Security, the report on India focuses primarily on genetically modified (GM) agricultural research and ensuring environmental safety. [5] Moreover, India does have a document called "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989" put forth by their Ministry of Environment & Forests in December of 1989 and it does outline the way pathogens should be stored but no mention is made of recording or updating records and inventories of where these pathogens are stored. [6] While their "National Disaster Management Guidelines Management of Biological Disasters" states that "regularly updated inventories with storage locations" are necessary to ensure the accountability of valuable biological materials, no details of this storage system is outlined and there is no evidence of such storage places on their National Centre for Disease Control website either. [7,8] Furthermore, the purpose of the "document is to define the scope and applicability of 'laboratory biosafety' recommendations, narrowing them strictly to human, veterinary and agricultural laboratory environments" which it does but there is no evidence of follow up to this in the form of policy or regulations. [7] For example it recommends that a "laboratory biosecurity risk assessment should further help establish whether this biological material is valuable and warrants tighter security provisions for its protection, that presently may be insufficient through recommended biosafety practices." [7] Although India submits 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. [9] VERTIC Database lists certain guidelines including: 1) Recombinant DNA Safety Guidelines and Regulations, which focuses more on storage of genetically engineered organisms and related material and 2) Rules for Hazardous Microorganisms, 1989, which focuses on the manufacture, use export, import and storage of hazardous microorganisms but there is no mention of recording or updating records and inventories of where these pathogens are stored.[10,11]

[1] Government of India. Ministry of Science and Technology. "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment". 2017.

[http://dbtindia.gov.in/sites/default/files/uploadfiles/Regulations_%26_Guidelines_for_Reocminant_DNA_Research_and_Biocontainment%2C2017.pdf]. Accessed 04 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020

[5] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 04 September 2020.

[6] Government of India. Ministry of Environment & Forests. "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989". December 1989.

[<http://nbaindia.org/uploaded/Biodiversityindia/Legal/28.%20Rules%20for%20the%20manufacture,%20use%20import%20export%20and%20storage%20of%20hazardous%20microorganism%20genetically%20engineered%20organisms%20or%20cells,%201989.pdf>]. Accessed 04 September 2020.

[7] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020

[8] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 2020

[9] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 20216.

[10] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[11] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989. [

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed

02 October 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: 0

There is no evidence that India has an established agency responsible for the enforcement of biosecurity legislation and regulations. Though their Department of Biotechnology handles regulations for biosafety and has a Biosafety Research programme under its wing, this research is mainly concerned about the "safety from the use of Genetically Modified Organisms (GMOs) and products thereof in research and application to the users as well as to the environment." [1] Although, their "National Disaster Management Guidelines. Management of Biological Disasters" says that "a safety department will formulate the biosafety rules and regulations, which will be followed strictly," without mention of a biosecurity agency, there has been no follow up on this evident on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence websites, All India Institute of Medical Sciences or National Centre for Disease Control websites. [2,3,4,5,6,7] Although India submits 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. [8] No further evidence is found under the VERTIC Database [9,10]

[1] Government of India Department of Biotechnology Ministry of Science and Technology. "Rules and Regulations-Biosafety Programme" [<http://dbtindia.gov.in/regulations-guidelines/regulations/biosafety-programme>]. Accessed 04 September 2020

[2] Government of India.National Disaster Management Authority. "National Disaster Management Guidelines.Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020

[4] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[5] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020.

[6] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 04September 2020

[7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 2020.

[8] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 2020

[9] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[10] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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

There is no public evidence that shows that India has taken action to consolidate its inventories of especially dangerous pathogens and toxins into a minimum number of facilities. Although the Department of Biotechnology under the Ministry of Science and Technology has put forth "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment" in 2017, this document only addresses the storage of genetically engineered organisms and related material. [1] The document states that "an inventory of all GE organism in storage should be maintained [and] sub-samples that may be removed from storage when required for experimental or other purposes should be recorded in the inventory list." [1] No mention of consolidation of toxins or pathogens into a minimum number of facilities is made. In the 'National Biosafety Systems' published under the UPMC Center for Health Security, the report on India also focuses primarily on genetically modified (GM) agricultural research and ensuring environmental safety. [2] Furthermore, while India does have a document called "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989" put forth by their Ministry of Environment & Forests in December of 1989 and it does outline the way pathogens should be stored; no mention is made of minimizing these storage or inventory facilities. [3] Lastly, there is no evidence of such an inventory or storage in place for pathogens and toxins on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control website [4,5,6,7] The "National Disaster Management Guidelines, Management of Biological Disasters" document from 2008 does outline certain actions to be taken, for example, developing protocols that "include how to handle discrepancies in inventory results" and that contain "effective control procedures to track and document the inventory, use, manipulation, development, production, transfer and destruction of these materials" but there has been no follow up on this. [8] Although India submits 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. [9] No further evidence is found under the VERTIC Database. [10,11]

[1] Government of India. Ministry of Science and Technology. "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment". 2017.

[http://dbtindia.gov.in/sites/default/files/uploadfiles/Regulations_%26_Guidelines_for_Reocminant_DNA_Research_and_Biocontainment%2C2017.pdf]. Accessed 04 September 2020.

[2] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 04 September 2020.

[3] Government of India Ministry of Environment & Forests. "The Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989". December 1989.

[<http://nbaindia.org/uploaded/Biodiversityindia/Legal/28.%20Rules%20for%20the%20manufacture,%20use%20import%20export%20and%20storage%20of%20hazardous%20microorganism%20genetically%20engineered%20organisms%20or%20cells,%201989.pdf>]. Accessed 04 September 2020

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020.

[5] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[6] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020

[7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 2020.

[8] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020.

[9] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 2020

[10] VERTIC. 'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[11] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[
https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed
02 October 2020

1.3.1e

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

Yes = 1 , No = 0

Current Year Score: 1

There is public evidence that India has in-country capacity to conduct Polymerase Chain Reaction (PCR)-based diagnostic testing for Ebola and Anthrax. According to India's National Centre for Disease Control's (NCDC) Annual report 2014-2015, "diagnostic facilities were established for serological and molecular diagnosis of Ebola. BSL III facilities were used for this purpose" and the tests carried out included real time PCR tests for various Ebola genes. [1] No further evidence is found on Ebola testing in NCDC's annual reports from 2015-2016 and 2016-2017. Although testing for Anthrax is mentioned in their annual reports, the testing modalities have not been mentioned. However, there is evidence that PCR based testing for Anthrax is available in India. 'Molecular confirmation of the circulating Bacillus anthracis during outbreak of anthrax in different villages of Simdega District, Jharkhand' an Anthrax outbreak investigation carried out between October 2014 to June 2016 expounds on the use of PCR for testing for Anthrax using Anthrax specific primers.'This outbreak investigation established the use of polymerase chain reaction (PCR) for detection of B. anthracis directly from clinical specimens, a process established in identifying confirmed cases of cutaneous anthrax'. [2] No further evidence is found under the Ministry of Health, Ministry of Defence, Ministry of Agriculture or National Center for Disease Control Websites [3,4,5,6].

[1] Government of India National Centre for Disease Control. "Annual Report 2014-15".

[<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2014-15.pdf>]. Accessed 04 September 2020.

[2] Kumar, Kumari Seema, Prasad, Sharma. 2019. "Molecular confirmation of the circulating Bacillus anthracis during outbreak of anthrax in different villages of Simdega District, Jharkhand". Indian Journal Of Medical Microbiology, Volume 37, Issue 1: 116-119 [<https://www.ijmm.org/article.asp?issn=0255-0857;year=2019;volume=37;issue=1;spage=116;epage=119;aulast=Kumar>] Accessed 21 October 2020

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020.

[5] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[6] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 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: 0

There is insufficient evidence that India requires biosecurity 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. India's "National Disaster Management Guidelines Management of Biological Disasters" put forth by their National Disaster Management Authority in July of 2008 suggests in chapter 5 that: "laboratory biosecurity training, complementary to laboratory biosafety training and commensurate with the roles, responsibilities and authorities of staff, should be provided to all those working at a facility, including maintenance and cleaning personnel, staff involved in ensuring the security of the laboratory facility and to external first responders." [1] Furthermore, "such training should help understand the need for protection of VBM and equipment and rationale for the laboratory biosecurity measures adopted, and should include a review of relevant national policies and institution-specific procedures." [1] However, there is no evidence that training is required or standardized via the Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence, National Centre for Disease Control or Ministry of Science and Technology website. [2,3,4,5,6] Although India submits 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. [7] No further evidence is found under the VERTIC Database. [8,9]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 04 September 2020

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 04 September 2020

[6] Government of India. Ministry of Science and Technology. [<http://www.dst.gov.in/>]. Accessed 04 September 2020.

[7] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 2020

[8] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[9] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989. [

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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 evidence that India has regulations or licensing conditions which specify that security and other personnel with access to especially dangerous pathogens, toxins, or biological materials with pandemic potential are subject to the checks. India has three documents that cover the handling of toxins with of different natures, they are "The Environment (Protection) Act, 1986," "The Hazardous Wastes (Management and Handling) Rules, 1989 (as amended, May, 2003)" and "The Bio-

Medical Waste (Management and Handling) Rules, 1998." However, none of these documents are able to specify the vetting required to authorize personnel to handle such material and the first is very general while the last two are focused on hazardous waste rather than pathogen management. For example in "The Environment (Protection) Act, 1986" the only statement about appointing government analysts, which are basically the handlers of samples, is that the Central Government may "recognise such persons as it thinks fit and having the prescribed qualifications." [1] Similarly in, "The Hazardous Wastes (Management and Handling) Rules, 1989 (as amended, May, 2003)" the definition of an authorised person is given as "a person or an organisation authorised by the competent authority." [2] Furthermore, in "The Bio-Medical Waste (Management and Handling) Rules, 1998" the definition is updated to "an occupier or operator authorised by the prescribed authority to generate, collect, receive, store, transport, treat, dispose and / or handle bio-medical waste in accordance with these rules and any guidelines issued by the Central Government." [3] However, no such rules or guidelines are specified within the documents or can be found on India's Department of Biotechnology, Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or Ministry of Defence websites. [4,5,6,7] Lastly, no such checks for personnel are specified in their "National Disaster Management Guidelines Management of Biological Disasters." [8] Although India submits 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.[9] No further evidence is found under the VERTIC Database. [10,11]

[1] Government of India Ministry of Environment & Forests. "The Environment (Protection) Act, 1986". May 1986. [http://moef.gov.in/wp-content/uploads/2017/06/eprotect_act_1986.pdf]. Accessed 04 September 2020.

[2] Government of India Ministry of Environment & Forests. "The Hazardous Wastes (Management and Handling) Rules, 1989 (as amended, May, 2003)". May 2003. [<http://globalrec.org/wp-content/uploads/2014/03/Hazardous-Wastes-Management-and-Handling-Rules-1989.pdf>]. Accessed 04 September 2020

[3] Government of India Ministry of Environment & Forests. "The Bio-Medical Waste (Management and Handling) Rules, 1998". July 1998. [<http://moef.gov.in/wp-content/uploads/2018/03/630.pdf>]. Accessed 04 September 2020

[4] Government of India Ministry of Science and Technology. Department of Biotechnology. [<http://www.dbtindia.nic.in/>]. Accessed 04 September 2020

[5] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 04 September 2020

[6] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 04 September 2020.

[7] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed by 04 September 2020

[8] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020.

[9] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 04 September 2020

[10] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990. [https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[11] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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

India does not have publicly available information on national regulations on the safe and secure transport of infectious substances (Categories A and B). According to the "National Disaster Management Guidelines Management of Biological Disasters" issued by their National Disaster Management Authority in July 2008, "the recommendations of the UN Model Regulations for the Transport of Dangerous Goods provides countries with a framework for the development of national and international transport regulations and include provisions addressing the security of dangerous goods, including infectious substances, during transport by all modes. Based on these recommendations, each country has to evolve its own regulations appropriate to its national situation." [1] However, no public evidence of such regulations can be found on their Ministry of Road Transport & Highways, Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control website. [2,3,4,5,6] Further, according to an article on Pharmabiz.com, a comprehensive portal on the Indian pharmaceuticals industry, "it has been 13 years since World Health Organization (WHO) has come out with guidelines on the safe transport of infectious substances and diagnostic specimens, but the government of India is yet to adopt it." [7] Although India submits 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. [8] No further evidence is found under the VERTIC Database. [9,10]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 04 September 2020.

[2] Government of India. Ministry of Road Transport & Highways. [<http://morth.nic.in/>]. Accessed by 05 September 2020.

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020

[4] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 05 September 2020.

[5] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 05 September 2020.

[6] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 05 September 2020.

[7] Pharmabiz. "13 years after WHO guidelines, India yet to adopt guidelines on safe transport of diagnostic specimen". October 2018. [<http://pharmabiz.com/ArticleDetails.aspx?aid=111936&sid=1>]. Accessed 04 September 2020.

[8] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020

[9] VERTIC. 'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[10] VERTIC. 'India'. Rules for Hazardous Microorganisms, 1989. [

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 2020

1.3.5 Cross-border transfer and end-user screening

1.3.5a

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

Yes = 1 , No = 0

Current Year Score: 1

There is evidence that India has regulations in place to oversee the cross-border transfer and end-user screening of especially dangerous pathogens, toxins and pathogens with pandemic potential. According to the website of the U.S. Department of Commerce, "India does maintain a list of items controlled for export: the Special Chemicals, Organism, Material, Equipment and Technologies (SCOMET) list under Appendix 3 of Schedule 2 of the India Trade Classification (ITC-HS) of the Export Policy." [1] The "Appendix 3 List of SCOMET Items" includes guidance for biological agents which the document defines as "pathogens or toxins, selected or modified (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) to produce casualties in humans or animals, degrade equipment or damage crops or the environment." [2] Category 2 is dedicated to "Micro-organisms, toxins" under Schedule 2 Appendix 3, which include "Bacteria, Fungi, Parasites, Viruses, Toxins, Plant pathogens, Genetic Elements and Genetically-modified Organisms." [2] It is written that 'the export policy of a specific item will be determined mainly by the description and Policy Conditions in the schedule. The code number is illustrative of classification but does not limit the description by virtue of the standard description of the item against the code in the import part of the ITC(HS) classification'. [3] The export of any such material requires the approval of the Inter Ministerial Working Group (IMWG) "which includes members from the Ministry of External Affairs (MEA), Department of Defence Production (DDP), Department of Space (through ISRO), Defence Research and Development Organization (DRDO), Department of Chemicals and Petrochemicals, National Authority of Chemical Weapon Convention (NACWC) and Cabinet Secretariat." [4] The IMWG looks for the following when analysing applications for export: "End-user credentials, credibility of declaration of end-use of the item or technology, integrity of chain of transmission of item from supplier to end-user, and on potential of the item or technology, to contribute to end-uses that are not in conformity with India's national security or foreign policy goals and objectives etc., assessed risk that exported items will not fall into hands of terrorists and non- state actors, and export control measures instituted by the recipient State." [4]

[1] United States of America Department of Commerce. "India Export Control Information".

[<https://www.bis.doc.gov/index.php/all-articles/220-eco-country-pages/1058-india-export-control-information>]. Accessed 05 September 2020

[2] Government of India. Directorate General of Foreign Trade. "Appendix 3 List of SCOMET Items".

2018[https://content.dgft.gov.in/Website/append3_0.pdf]. Accessed 05 September 2020

[3] Government of India Directorate General of Foreign Trade. "ITC (HS), 2018 Schedule 2 - Export Policy". 2018.

[https://content.dgft.gov.in/Website/gennote_0.pdf]. Accessed 05 September 2020

[4] Government of India. Directorate General of Foreign Trade. "India's Export Control System". 2018.

[https://ibkp.dbtindia.gov.in/DBT_Content_Test/CMS/Guidelines/20181115135754468_Export%20of%20SCOMET%20guidelines.pdf]. Accessed 05 September 2020

1.4 BIOSAFETY

1.4.1 Whole-of-government biosafety systems

1.4.1a

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

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that India has in place national biosafety regulations. Although the Ministry of Health and Family Welfare has issued a Biosafety Manual, there is no evidence via the manual that these have regulatory or legal force behind them and are more than a guiding document. India's Integrated Disease Surveillance Project has issued the "Biosafety Manual For Public Health Laboratories." [1] This Biosafety manual covers topics including safe laboratory techniques, management of accidents and personal safety while working in a laboratory. [1] The preface of the manual states that "this

manual acknowledges the role of effective laboratory bio-safety controls and guidelines for laboratory practice at State & District level in order to manage the risks to laboratory workers and the community from microbiological agents and toxins" but does not state any legal requirements for following the guidance in the manual. [1] Outside of the manual, there is no evidence that biosafety legislation is in place. India's latest biosafety legislation put forth by the Department of Biotechnology under their Ministry of Science and Technology called "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment" in 2017 only addresses the genetically engineered organisms and related material such as crops but not harmful biological substances. [2] As the 2016 "National Biosafety Systems" report by the Johns Hopkins University Center for Health Security (formerly at UPMC) states, "Biosafety in India is primarily focused on genetically modified (GM) agricultural research and ensuring environmental safety. This is evidenced by the Indian definition of biosafety as "the need to protect the environment including human and animal health from the possible adverse effects of the Genetically Modified Organisms (GMOs) and products thereof derived from the use of modern biotechnology."" The report does highlight that India does have a manual entitled "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)," but the document is primarily focused on laboratory practices for working with GMOs. [3,4] India's "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells" is their national biosafety legislation from December 1989 and also only primarily addresses GMOs. [5] India's "National Disaster Management Guidelines Management of Biological Disasters" specifically states that "a national code of practice for biosecurity and biosafety needs to be prepared and promulgated." [6] However, no such regulations can be found on their Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare, or National Centre for Disease Control website. [7,8,9] Although India submits 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. [10] No further evidence is found under the VERTIC Database.[11,12]

[1] Government of India Integrated Disease Surveillance Project. "Biosafety Manual For Public Health Laboratories". [https://ncdc.gov.in/WriteReadData/l892s/File572.pdf]. Accessed 05 September 2020.

[2] Government of India. Department of Biotechnology. Ministry of Science and Technology. ' Guidelines - Biosafety'. 2017. [http://dbtindia.gov.in/guidelines-biosafety]. Accessed by 05 September 2020

[3] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 05 September 2020.

[4] Indian Council of Agricultural Research. Biosafety Portal. "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)." [https://biosafety.icar.gov.in/guidelines-and-handbook-for-institutional-biosafety-committees-ibscs/]. Accessed 05 September 2020

[5] Government of India Ministry of Environment & Forests. "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells". December 1989. [http://moef.gov.in/wp-content/uploads/2018/03/616E.pdf]. Accessed 05 September 2020.

[6] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 05 September 2020

[7] Government of India. Ministry of Health & Family Welfare. [https://mohfw.gov.in/]. Accessed 05 September 2020.

[8] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [http://agricoop.nic.in/]. Accessed 05 September 2020.

[9] Government of India. National Centre for Disease Control. [https://ncdc.gov.in/]. Accessed 05 September 2020.

[10] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [https://bwc-ecbm.unog.ch/state/India]. Accessed 05 September 2020

[11] VERTIC. 'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[12] VERTIC. 'India'. Rules for Hazardous Microorganisms, 1989. [

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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: 0

There is insufficient evidence that India has an established agency responsible for the enforcement of biosafety regulations. Although India does have a publicly available guidance on biosafety in laboratories, the "Biosafety Manual For Public Health Laboratories," there is no evidence that the recommendations in the manual carry the force of law. The manual points to the National Centre for Disease Control (NCDC), formerly known as National Institute of Communicable Diseases (NICD), as the main driving force behind the biosafety regulations, but makes no explicit reference to it enforcing the recommendations. [1] Outside of the manual, there is no public evidence of either biosafety legislation or an oversight agency. The Department of Biotechnology handles regulations for biosafety and has a Biosafety Research programme under its wing; however, this department and research is mainly concerned about the "safety from the use of Genetically Modified Organisms (GMOs) and products thereof in research and application to the users as well as to the environment" rather than harmful biological substances. [2] "The Biotechnology Regulatory Authority of India Act (BRAI Act) (2013) mandates the establishment of the Biotechnology Regulatory Authority of India to "regulate the research, transport, import, manufacture and use of organisms and products of modern biotechnology and for matters connected therewith or incidental thereto." However, it does not oversee issues related to laboratory safety [3,4] In addition, the competent authorities laid out in India's "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells" such as "Recombinant DNA Advisory Committee, Review Committee on Genetic Manipulation, Institutional Biosafety Committee, Genetic Engineering Approval Committee" all pertain to GMOs. [5] Although, their "National Disaster Management Guidelines Management of Biological Disasters" says that "a safety department will formulate the biosafety rules and regulations, which will be followed strictly," there has been no follow up on this evident anywhere on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or National Centre for Disease Control website. [6,7,8] However, none of these acts or agencies operate in a biosafety sphere pertaining to outside of GMO related activity. Although India submits 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. [9] No further evidence is found under the VERTIC Database. [10,11]

[1] Government of India. Integrated Disease Surveillance Project. "Biosafety Manual For Public Health Laboratories".

[<https://ncdc.gov.in/WriteReadData/l892s/File572.pdf>]. Accessed 05 September 2020.

[2] Government of India. Department of Biotechnology. Ministry of Science and Technology. "Guidelines- Biosafety". 2017.

[<http://dbtindia.gov.in/guidelines-biosafety>]. Accessed 05 September 2020.

[3] Government of India. "The Biotechnology Regulatory Authority of India Bill, 2013". March 2013.

[<https://www.prsindia.org/uploads/media/Biotech%20Regulatory/Biotechnology%20Regulatory%20Authority%20of%20India%20Bill.pdf>]. Accessed 05 September 2020

[4] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 05 September 2020.

[5] Government of India Ministry of Environment & Forests. "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells". December 1989. [<http://moef.gov.in/wp-content/uploads/2018/03/616E.pdf>]. Accessed 05 September 2020

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020.

[7] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 05 September 2020.

[8] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 05 September 2020.

[9] UN Biological Weapons Convention. 2020 "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020

[10] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[11] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 2020

1.4.2 Biosafety training and practices

1.4.2a

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

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that India requires 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. Although their "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)," mandates that "all members of the IBSC should receive initial mandatory and refresher training on biosafety" and a "refresher training on any changes to national guidelines," the guidance only pertains to researchers working with Genetically Modified Organisms (GMOs). [1] According to their "National Disaster Management Guidelines Management of Biological Disasters," "a safety department will formulate the biosafety rules and regulations, which will be followed strictly." [2] However, there is no public evidence of any such training which does not specifically apply to GMOs via their Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare, or National Centre for Disease Control website. [3,4,5] Additionally, the 2016 "National Biosafety Systems" report by UPMC Center for Health Security mentions that "lab staff working in BSL 3 and BSL 4 facilities must have more detailed training, but the specifics of the training or who is to provide the training is not provided." [6] Lastly, their "Biosafety Manual For Public Health Laboratories" put forward by India's Integrated Disease Surveillance Project suggests that training should take place in the laboratory. "An effective safety program begins with the laboratory in charge, which should ensure that safe laboratory practices and procedures are being followed. Employees should be introduced to the code of GMT (Good Medical Technique) and to the Bio-safety manual. Staff training should include safe methods adopted for commonly used laboratory procedures." [7] However, no requirements for standardized training are put forth. Although India submits 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. [8] No further evidence is found under the VERTIC Database.[9,10]

[1] Indian Council of Agricultural Research. Biosafety Portal. "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)." [<https://biosafety.icar.gov.in/guidelines-and-handbook-for-institutional-biosafety-committees-ibscs/>]. Accessed 05 September 2020.

[2] Government of India National Disaster Management Authority. "National Disaster Management Guidelines. Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 05 September 2020

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020.

- [4] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [http://agricoop.nic.in/]. Accessed 05 September 2020.
- [5] Government of India. National Centre for Disease Control. [https://ncdc.gov.in/]. Accessed 05 September 2020.
- [6] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 05 September 2020.
- [7] Government of India. Integrated Disease Surveillance Project. "Biosafety Manual For Public Health Laboratories". [https://ncdc.gov.in/WriteReadData/l892s/File572.pdf]. Accessed 05 September 2020.
- [8] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [https://bwc-ecbm.unog.ch/state/India]. Accessed 05 September 2020
- [9] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990. [https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020
- [10] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989. [https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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 no publicly available evidence that India 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. According to an article from January 2011 in the Indian Journal of Medical Research, India does "not have such policies on publication of DURC (dual use research of concern). However, in India, DURC is receiving attention; the Indian Society for Medical Microbiology devoted a full session to this issue in its 2010 Annual meeting. The Indian Journal of Medical Research will soon call for a meeting of Indian medical journal editors to formulate policy guidelines for publication of DURC." [1] There do not seem to be any updates on the matter and furthermore, no evidence of any such assessment conducted can be found on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control websites. [2,3,4,5] Furthermore, according to a Center for Health Security report, "to date, there are a limited number of institutions and research centers, and a handful of industrial or commercial companies engaged in research or work with synthetic biology" in India and as the demand for research into synthetic biology grows, "the need for guidelines to accommodate these new endeavours has been expressed by many academics." [6] Although India submits 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. [7] No further evidence is found under the VERTIC Database.[8,9]

[1] Indian Journal of Medical Research. "Dual dual-use research of concern: Publish and perish?*" . January 2011.

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3100136/]. Accessed 05 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [https://mohfw.gov.in/]. Accessed 05 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [http://agricoop.nic.in/]. Accessed 05 September 2020.

Welfare.[<http://agricoop.nic.in/>]. Accessed 05 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 05 September 2020.

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 05 September 2020

[6] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 05 September 2020.

[7] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020

[8] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.

[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020

[9] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989. [

https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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 no available evidence that India has a national policy requiring oversight of dual use research, such as research with especially dangerous pathogens, toxins, and/or pathogens with pandemic potential. According to an article in the Indian Journal of Medical Research, India does "not have such policies on publication of DURC (dual use research of concern). However, in India, DURC is receiving attention; the Indian Society for Medical Microbiology devoted a full session to this issue in its 2010 Annual meeting. The Indian Journal of Medical Research will soon call for a meeting of Indian medical journal editors to formulate policy guidelines for publication of DURC." [1] There do not seem to be any updates on the matter and furthermore, no evidence of any such assessment conducted can be found on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control websites. [2,3,4,5] In addition, according to a Center for Health Security report, "to date, there are a limited number of institutions and research centers, and a handful of industrial or commercial companies engaged in research or work with synthetic biology" in India and as the demand for research into synthetic biology grows, "the need for guidelines to accommodate these new endeavours has been expressed by many academics." [6] Although India submits 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. [7] No further evidence is found under VERTIC Database[8,9]

[1] Indian Journal of Medical Research. "Dual dual-use research of concern: Publish and perish?*" . January 2011.

[<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3100136/>]. Accessed 05 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>]. Accessed 05 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 05 September 2020

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>] Accessed 05 September 2020

[6] UPMC Center for Health Security. "National Biosafety Systems". July 2016. [http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2016/National%20Biosafety%20Systems.pdf]. Accessed 05 September 2020.

[7] UN Biological Weapons Convention. 2020. "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020.

- [8] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.
[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020
- [9] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[
https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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 evidence that India has an agency responsible for oversight of research with especially dangerous pathogens, pathogens with pandemic potential, and/or other dual use research. There is no evidence of any such agencies on their Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control websites. [1,2,3,4] Lastly, the "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)" which establishes India's official IBSCs does not make any specific mention of regulating dual research should the need arise. [5] Although India submits 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. [6] No further evidence is found under the VERTIC Database.[7,8]

- [1] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020
- [2] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>]. Accessed 05 September 2020.
- [3] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 05 September 2020.
- [4] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>].Accessed 05 September 2020
- [5]] Indian Council of Agricultural Research. Biosafety Portal. "Guidelines and Handbook for Institutional Biosafety Committees (IBSCs)." [<https://biosafety.icar.gov.in/guidelines-and-handbook-for-institutional-biosafety-committees-ibscs/>]. Accessed 05 September 2020.
- [6] UN Biological Weapons Convention. 2020 "Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020
- [7] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990.
[https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020
- [8] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[
https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 2020

1.5.2 Screening guidance for providers of genetic material

1.5.2a

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence that India has a national legislation, regulation, policy, or other guidance, requiring the screening of synthesized DNA before it is sold. Although the Department of Biotechnology under the Ministry of Science and Technology has put forth "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment" in 2017, this document only addresses the container and disposal requirements of genetically engineered organisms and related material such as synthetic DNA and RNA. [1] No guidance as to how to screen synthesized DNA before selling it is made within the policy document. Moreover, there is a single line mandate in India's "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells" from 1989 which reads "no person shall import, export, transport, manufacture, process, use or sell any hazardous microorganisms of genetically engineered organisms/substances or cells except with the approval of the Genetic Engineering Approval Committee." [2] However, the approval process is not detailed therein or on their Ministry of Road Transport & Highways, Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Defence or National Centre for Disease Control websites [3,4,5,6,7] Although India submits 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. [8] No further evidence is found under the VERTIC Database.[9,10]

- [1] Government of India Ministry of Science and Technology. "Regulations and Guidelines on Biosafety of Recombinant DNA Research and Biocontainment". 2017. [http://dbtindia.gov.in/sites/default/files/uploadfiles/Regulations_%26_Guidelines_for_Reocminant_DNA_Research_and_Biocontainment%2C2017.pdf]. Accessed 05 September 2020.
- [2] Government of India.Ministry of Environment & Forests. "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells". December 1989. [<http://moef.gov.in/wp-content/uploads/2018/03/616E.pdf>]. Accessed 05 September 2020.
- [3] Government of India. Ministry of Road Transport & Highways. [<http://morth.nic.in/>]. Accessed 05 September 2020.
- [4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 05 September 2020.
- [5] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>]. Accessed 05 September 2020.
- [6] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 05 September 2020.
- [7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 05 September 2020
- [8] UN Biological Weapons Convention. 2020."Confidence Building Measures". [<https://bwc-ecbm.unog.ch/state/India>]. Accessed 05 September 2020
- [9] VERTIC.'India'. Recombinant DNA Safety Guidelines and Regulations 1990. [https://www.vertic.org/media/National%20Legislation/India/IN_Recombinant_DNA_Safety_Guidelines_1990.pdf] Accessed 02 October 2020
- [10] VERTIC.'India'. Rules for Hazardous Microorganisms, 1989.[https://www.vertic.org/media/National%20Legislation/India/IN_Rules_for_Hazardous_Microorganisms_1989.pdf] Accessed 02 October 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 evidence that India's national laboratory system has the capacity to conduct diagnostic tests for six of the ten WHO-defined core tests. These tests are: polymerase chain reaction (PCR) testing for Influenza virus (flu); virus culture for poliovirus (polio); serology for HIV; microscopy and CBNAAT for mycobacterium tuberculosis (tuberculosis/TB); rapid diagnostic testing for plasmodium spp. (malaria); and serotyping for salmonella. India's National Centre for Disease Control includes evidence for influenza, polio and HIV testing in their most recent published annual report 2016-17. For influenza, RNA is extracted from samples "followed by amplification of the RNA by using RT-PCR technique." For polio, "The enterovirus laboratory is a WHO accredited laboratory for Polio Virus isolation, typing and intratypic differentiation." For HIV, the National Reference Laboratory conducts "serological confirmation" of HIV testing from other laboratories. [1] For TB, India has six national reference laboratories for tuberculosis and states that diagnosis is primarily done through "smear microscopy and by rapid molecular test." [2] Diagnostic testing for Malaria is conducted in India's National Centre for Disease Control (NCDC) as per NCDC Booklet. [3] The National Vector Borne Disease Control Programme's 'National Strategic Plan for Malaria 2017-2022' confirms that rapid testing is in use in India. [4,5] The National Salmonella and Escherichia Centre (NSEC) can

conduct serotyping for salmonella. [6] There is no public evidence that India has publicly shared its four country-defined tests. No evidence of these is available via the Ministry of Health & Family Welfare or National Centre for Disease Control websites. [7,8]

- [1] Government of India National Centre for Disease Control. "Annual Report 2016-17". [https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf]. Accessed 05 September 2020
- [2] Government of India Central TB Division. "India TB Report 2020". 2020. [https://www.tbcindia.gov.in/showfile.php?lid=3538]. Accessed 05 September 2020.
- [3] Government of India Directorate General of Health Services. "National Centre for Disease Control (NCDC)". [https://ncdc.gov.in/linkimages/NCDC%20Booklet.pdf]. Accessed 05 September 2020.
- [4] Government of India. Ministry of Health & Family Welfare. National Vector Borne Disease Control Programme. "Diseases-Malaria" [https://nvbdcp.gov.in/index1.php?lang=1&level=1&sublinkid=5784&lid=3689]. Accessed 05 September 2020.
- [5] Government of India. Ministry of Health & Family Welfare. National Vector Borne Disease Control Programme. 'National Strategic Plan for Malaria 2017-2022'. [https://nvbdcp.gov.in/WriteReadData/l892s/nsp_2017-2022.pdf]. Accessed 05 September 2020
- [6] Ministry of Health and Family Welfare. Central Research Institute Kasauli. 'National Salmonella and Escherichia Centre'. [https://crikasauli.nic.in/National%20Salmonella%20And%20Escherichia%20Centre]. Accessed 05 September 2020.
- [7] Government of India. Ministry of Health & Family Welfare. [https://mohfw.gov.in/]. Accessed 05 September 2020.
- [8] Government of India. National Centre for Disease Control. [https://ncdc.gov.in/]. Accessed 05 September 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

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. In the COVID-19 pandemic, the government came up with a plan for scaling capacity with goals for testing. 'As the epidemic evolved, India's testing strategy underwent iterative calibration to keep pace with the changing epidemiology and extent of infection. This ensured that access to tests was assured for risk groups that needed it the most; wasteful, unnecessary testing was avoided; and testing infrastructure was optimally scaled up without taking away resources from other key public health interventions. Empowered groups set up by the Government of India, cutting across ministries, were tasked with the objective of increasing procurement and ensuring regular supplies. Indian missions and embassies abroad helped identify global suppliers in a highly competitive seller's market. At the same time, the government partnered with domestic industry to work towards self sufficiency in testing. 'The scale up of testing laboratories started with a network of 106 Indian Council of Medical Research (ICMR) funded Viral Research and Diagnostic Laboratories, (VRDLs), which already had the capacity to conduct testing for viruses similar to SARS-CoV-2. Subsequently, the testing was initiated in partnership with other laboratories, private and public, as well as medical college based laboratories. Private laboratories that had approval from the National Accreditation Board for Testing and Calibration Laboratories (NABL) were accepted. With its testing capabilities now matching the most advanced countries in the world, Indian institutions have risen to the occasion in an emergency situation. In the days ahead their contributions will be required even more as India continues to grapple with the clear and present danger still posed by COVID-19'. [1] There is also evidence that India in the past scaled up testing during the H1N1 pandemic in 2009 [2] There is no evidence India could use this capacity for novel pathogens in the future under the Ministry of Health and Family Welfare, Indian Council of Medical Research, National

Center for Disease Control, Ministry of Agriculture or All India Institute of Medical Sciences websites.[3,4,5,6,7]

[1] Indian Council of Medical Research. Enhancing India's Testing Capacity.[
https://www.icmr.gov.in/pdf/press_realease_files/Testing%20Capacity_22%20May%202020_v3.pdf] Accessed 28 March 2021

[2] Ministry of Health and Family Welfare. National Center for Disease Control. Integrated Disease Surveillance Programme. Influenza Surveillance Network.[<https://idsp.nic.in/index1.php?lang=1&level=1&sublinkid=5789&lid=3722>] Accessed 28 March 2021

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 October 2020

[4] Government of India. National Centre for Disease Control.[<https://ncdc.gov.in/>] Accessed 02 October 2020

[5] Indian Council of Medical Research.[<https://main.icmr.nic.in/>] Accessed 02 October 2020

[6] Government of India. Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>] Accessed 02 October 2020

[7] All India Institute of Medical Sciences.[<https://www.aiims.edu/en.html>] Accessed 02 October 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

There is evidence that at least some of India's reference laboratories that serve as reference facilities are accredited. For example "the Virology laboratory of National Centre for Disease Control (NCDC) has been accredited as a World Health Organisation (WHO) National Polio Lab to assist NPSP on lab based surveillance." Additionally, "the enterovirus laboratory is a WHO accredited laboratory for Polio Virus isolation, typing and intratypic differentiation as well as Measles and Rubella IgM antibody detection." Lastly, the Centre for AIDS & Related Diseases has "achieved National Accreditation Board for Testing and Calibration Laboratories (NABL) accreditation as per ISO 15189:2007 in the year 2011." [1] The National Institute for Research in Tuberculosis in India is also accredited as a WHO supra-national reference laboratory. [2,3]

[1] Government of India National Centre for Disease Control. "Annual Report 2016-17".

[<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf>]. Accessed 14 September 2020.

[2] Central Tuberculosis Division. "RNTCP laboratory network: Overview". [<https://tbcindia.gov.in/showfile.php?lid=2890>]. Accessed 14 September 2020.

[3] World Health Organisation. "WHO TB Supranational Reference Laboratory Network." [<https://www.who.int/tb/areas-of-work/laboratory/srl-network/en/>]. Accessed 14 September 2020-09-14

2.1.2b

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

Yes = 1 , No = 0

Current Year Score: 1

There is evidence that India's regional laboratories that serve as reference facilities are subject to external quality assurance review. India's National Centre for Disease Control (NCDC) is ISO 15189 certified which mean it requires external quality

assurance reviews and their Centre for AIDS & Related Diseases has "achieved National Accreditation Board for Testing and Calibration Laboratories (NABL) accreditation as per ISO 15189:2007 in the year 2011." [1, 2] The six national tuberculosis reference laboratories are also subject to external quality assurance. The National Institute for Research in Tuberculosis (NIRT) conducts EQAs of the other five reference laboratories. The EQA for the NIRT is conducted by an un-named laboratory in Antwerp, Belgium. [3]

[1] Government of India National Centre for Disease Control. "Annual Report 2016-17".

[<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf>]. Accessed 14 September 2020.

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

[http://www.who.int/ihr/training/laboratory_quality/10_b_eqa_contents.pdf]. Accessed 14 September 2020.

[3] Central Tuberculosis Division. "RNTCP laboratory network: Overview". [<https://tbcindia.gov.in/showfile.php?lid=2890>]. Accessed 14 September 2020

2.2 LABORATORY SUPPLY CHAINS

2.2.1 Specimen referral and transport system

2.2.1a

Is there a nationwide specimen transport system?

Yes = 1, No = 0

Current Year Score: 0

There is no evidence of India having a nationwide specimen transport system. There is no public evidence that a specimen transport network is in place via the websites of their Ministry of Road Transport & Highways, Ministry of Health and Family Welfare or Ministry of Agriculture and Farmers' Welfare. [1,2,3] Although there is evidence that a guide on how to transport specimens exists via the National Centre for Disease Control, the links for the various sections of the manual seem to be broken at the time of research. [4] Also, according to an article on Pharmabiz.com, a comprehensive portal on the Indian pharmaceuticals industry, as of October 2018, "it has been 13 years since World Health Organization (WHO) has come out with guidelines on the safe transport of infectious substances and diagnostic specimens, but the government of India is yet to adopt it." [5] It is noteworthy, however, that in light of the present pandemic COVID-19 a specimen collection, packaging and transport guideline has been developed. It is unclear if these guidelines intend to cover at least 80% of the country.[6]

[1] Government of India. Ministry of Road Transport & Highways. [<http://morth.nic.in/>]. Accessed 14 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 14 September 2020

[3] Government of India. Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>] Accessed 14 September 2020

[4] Government of India. National Centre for Disease Control. "Laboratory Manuals".

[<https://ncdc.gov.in/index4.php?lang=1&level=0&linkid=91&lid=84>]. Accessed 14 September 2020.

[5] Pharmabiz. "13 years after WHO guidelines, India yet to adopt guidelines on safe transport of diagnostic specimen".

October 2018. [<http://pharmabiz.com/ArticleDetails.aspx?aid=111936&sid=1>]. Accessed 14 September 2020.

[6] Government of India. Ministry of Health & Family Welfare. 'Media-Disease Alerts'. 'Specimen Collection, Packaging and Transport Guidelines for 2019 novel Coronavirus (2019-nCoV)'. [

https://main.mohfw.gov.in/sites/default/files/5Sample%20collection_packaging%20%202019-nCoV.pdf] Accessed 14 September 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 no evidence of 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. Although the present COVID-19 pandemic has seen a rapid authorization of laboratories across India to scale up testing, and there is evidence that testing was scaled up in the existing laboratories during the H1N1 pandemic in 2009 there is no evidence of a plan that could be used for the same during outbreaks in the future. [1,2,3] No evidence is found under the Ministry of Health, National Center for Disease Control, Indian Council for Medical Research, Ministry of Agriculture, All India Institute of Medical Sciences or Integrated Disease Surveillance Programme websites .[4,5,6,7,8,9].

[1] Indian Council of Medical Research. Enhancing India's Testing Capacity.[
https://www.icmr.gov.in/pdf/press_release_files/Testing%20Capacity_22%20May%202020_v3.pdf] Accessed 02 October 2020

[2] Indian Council of Medical Research. MAPPING OF COVID-19 RT-PCR TESTING LABORATORIES WITH QUALITY CONTROL LABS for ILQC ACTIVITY.[https://www.icmr.gov.in/pdf/covid/labs/QCLab_List_10072020.pdf] Accessed 03 October 2020

[3] Ministry of Health and Family Welfare. National Center for Disease Control. Integrated Disease Surveillance Programme. Influenza Surveillance Network.[<https://idsp.nic.in/index1.php?lang=1&level=1&sublinkid=5789&lid=3722>] Accessed 02 October 2020.

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 02 October 2020

[5] Government of India. National Centre for Disease Control.[<https://ncdc.gov.in/>] Accessed 02 October 2020

[6] Indian Council of Medical Research.[<https://main.icmr.nic.in/>] Accessed 02 October 2020

[7] Government of India. Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare.[<http://agricoop.nic.in/>] Accessed 02 October 2020

[8] All India Institute of Medical Sciences.[<https://www.aiims.edu/en.html>] Accessed 02 October 2020

[9] Ministry of Health and Family Welfare. National Center for Disease Control. Integrated Disease Surveillance Programme. Outbreaks.[<https://idsp.nic.in/index4.php?lang=1&level=0&linkid=403&lid=3685>]Accessed 03 October 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: 0

There is no evidence that India conducts ongoing event based surveillance and analysis for infectious diseases, rather indicator based surveillance is conducted and the IBS data is analysed on a weekly basis. This ongoing event based

surveillance is conducted through the Central Surveillance Unit in Delhi, State surveillance units in all States, and District Surveillance Units in all Districts across the country, through a program called the Integrated Disease Surveillance Project (IDSP). The objective of the program is to "strengthen/maintain decentralized laboratory based IT enabled disease surveillance system for epidemic prone diseases to monitor disease trends and to detect and respond to outbreaks in early rising phase through trained Rapid Response Team (RRTs)". Under the IDSP, data is collected on epidemic prone diseases on a weekly basis. "The information is collected on three specified reporting formats, namely "S" (suspected cases), "P" (presumptive cases) and "L" (laboratory confirmed cases) filled by Health Workers, Clinicians and Laboratory staff respectively. The weekly data gives information on the disease trends and seasonality of diseases. Whenever there is a rising trend of illnesses in any area, it is investigated by the Rapid Response Teams (RRT) to diagnose and control the outbreak. Data analysis and actions are being undertaken by respective State/District Surveillance Units". [1] At present, in light of the COVID-19 pandemic, the surveillance and reporting is done on a daily basis according to the Ministry of Health and Family Welfare Website. [2,3] There is no evidence that event-based surveillance is conducted by the country. [1, 2, 3]

[1] Government of India. National Center for Disease Control. Directorate General of Health Services. "Integrated Disease Surveillance Program". [<https://idsp.nic.in/>] Accessed 14 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 14 September 2020

[3] Government of India. Ministry of Health & Family Welfare. 'Manual for Surveillance Teams for Containment Zones'. [<https://www.mohfw.gov.in/pdf/ManualforSurveillanceTeamsforcontainmentzones.pdf>] Accessed 14 September 2020

2.3.1b

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

Yes = 1, No = 0

Current Year Score: 1

There is publicly available evidence that India reported a potential public health emergency of international concern (PHEIC) to the World Health Organization (WHO) within the last two years.

In 2018, two separate cases of the Nipah virus were reported to the World Health Organization, once in May of 2018 and then again in August of 2018. [1,2] It is to be noted that COVID-19 has been reported to the WHO by India before 30 January 2020, when it was declared as PHEIC by the WHO, and at present daily updates on the number of new cases, total number of active cases and the total number of deaths can be noted on the WHO website.[3,4,5,6]

[1] World Health Organization. "Nipah virus - India". May 2018. (<http://www.who.int/csr/don/31-may-2018-nipah-virus-india/en/>). Accessed 14 September 2020

[2] World Health Organization. "Nipah virus - India". August 2018. (<http://www.who.int/csr/don/07-august-2018-nipah-virus-india/en/>). Accessed 14 September 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]

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 14 September 2020

[5] Government of India. National Center for Disease Control. [<https://ncdc.gov.in/>] Accessed 14 September 2020

[6] World Health Organization. India. [<https://www.who.int/countries/ind/>] Accessed 14 September 2020.

2.3.2 Interoperable, interconnected, electronic real-time reporting systems

2.3.2a

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

Yes = 1 , No = 0

Current Year Score: 1

There is evidence that the government of India operates an electronic reporting surveillance system at both the national and sub-national level. According to the Integrated Disease Surveillance Programme (IDSP) website, "ICT plays an integral and most powerful role in implementing IDSP across the country. One of the important components of the programme is data management, analysis and rapid communication in case of outbreaks." [1] Furthermore, their "National Informatics Centre (NIC) has installed Data Centre Equipment at 776 out of 800 sites. The objective of Data Centre is online data entry for speedy data transmission from Districts." [1] In addition, the national system is fed in by the various state IDSP sites. [2] Some of the diseases surveyed include Measles, Chickenpox, Chikungunya, and Dengue. [3] Lastly, the Integrated Disease Surveillance Programme is reviewed every year, including its budget allocation, by India's National Centre for Disease Control; however, its objective remains "to strengthen/maintain decentralized laboratory-based IT enabled disease surveillance system for epidemic-prone diseases to monitor disease trends and to detect and respond to outbreaks in early rising phase through trained Rapid Response Team (RRTs)." [3]

[1] Government of India Integrated Disease Surveillance Programme. "About IDSP". December 2018.

[<https://idsp.nic.in/index4.php?lang=1&level=0&linkid=313&lid=1592>]. Accessed 14 September 2020

[2] Government of India Integrated Disease Surveillance Programme. "State IDSP Sites".

[<https://idsp.nic.in/index1.php?lang=1&level=1&sublinkid=6044&lid=3680>]. Accessed 14 September 2020.

[3] Government of India National Centre for Disease Control. "Integrated Disease Surveillance Programme (IDSP)".

[<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=143&lid=54>]. Accessed 14 September 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

There is sufficient evidence that India's electronic reporting surveillance system collects ongoing laboratory data. The National Centre for Disease Control (NCDC) website's overview of the Integrated Disease Surveillance Programme (IDSP) notes that "data is collected on epidemic-prone diseases on weekly basis (Monday-Sunday). The information is collected on three specified reporting formats, namely "S" (suspected cases), "P" (presumptive cases) and "L" (laboratory confirmed cases) filled by Health Workers, Clinicians and Laboratory staff respectively. The weekly data gives information on the disease trends and seasonality of diseases." The description also notes that the Central Surveillance Unit (CSU) for the IDSP, which sits within the NCDC, receives disease outbreak reports from states and union territories. [1] Furthermore, there is no evidence of such a capability on their Integrated Disease Surveillance Programme, National Disaster Response Force, Institute of Disaster Management, National Disaster Management Authority, Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare or elsewhere on the National Centre for Disease Control website. [2,3,4,5,6,7,8]

[1] Government of India. National Centre for Disease Control. "Integrated Disease Surveillance Programme (IDSP)".

[<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=143&lid=54>]. Accessed 14 September 2020

[2] Government of India. National Centre for Disease Control. Directorate General of Health Services. Integrated Disease Surveillance Programme. [<https://idsp.nic.in/>]. Accessed 14 September 2020.

[3] Government of India National Disaster Response Force. "About Us" [<http://www.ndrf.gov.in/about-us>]. Accessed 14 September 2020.

[4] Government of India National Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 14 September 2020.

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 14 September 2020.

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 14 September 2020

[7] Government of India. Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 14 September 2020.

[8] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in>]. Accessed 14 September 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

In India, electronic health records are not commonly in use but there is evidence that they are used. Electronic health records (EHR) have been implemented in India but they have not been implemented in all states of the country. A 2016 paper in the Indian Journal of Science and Technology states that one of major objectives of the new government "is to encourage health Information technology, for improvement of a digital infrastructure for providers as well as patients so that care can be delivered more effectively and adequately." [1] India's Ministry of Health and Family Welfare published the "Electronic Health Record (EHR) Standard for India" in December of 2016. The objective of this policy is "to introduce a uniform standard-based system for creation and maintenance of Electronic Health Records (EHRs) by the healthcare providers." [2] However a uniform implementation of these standards throughout the country is lacking. More recently, an article on the Economic Times-Health world.com stated that 'While the governments continue to give hope, Kerala is the only state in India which has successfully collected and stored electronic health records of 2.58 crore people through its 'eHealth project'. The state government initiative allows patients to walk into any government hospital without carrying any papers.' [3] Lastly, although the Ministry of Health has a section on 'E-Health and Telemedicine' which states that Ministry of Health & Family Welfare has undertaken various initiatives using Information & Communication Technologies (ICT) for improving efficiency & effectiveness of the public healthcare system, no public evidence of the use of EHRs being common is available on their Ministry of Health & Family Welfare or National Centre for Disease Control website. [4,5]

[1] Indian Journal of Science and Technology, Vol 9(34). "EHR Adoption in India: Potential and the Challenges". September 2016. [<http://www.indjst.org/index.php/indjst/article/download/100211/73180>]. Accessed 14 September 2020.

[2] Government of India. Ministry of Health and Family Welfare. "Electronic Health Record (EHR) Standard for India". December 2016. [<https://main.mohfw.gov.in/sites/default/files/17739294021483341357.pdf>]. Accessed 14 September 2020.

[3] Rashmi Mabiyan. 06 January 2020. 'India Bullish on AI in Healthcare without electronic health records'. EHealthWorld. [<https://health.economictimes.indiatimes.com/news/health-it/india-bullish-on-ai-in-healthcare-without-ehr/73118990>] Accessed 21 October 2020

[4] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/Organisation/departments-health-and-family-welfare/e-Health-Telemedicine>]. Accessed 14 September 2020

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 14 September 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: 0

There is insufficient evidence that India's national public health system has access to electronic health records of individuals in their country. Electronic health records (EHR) have been implemented in India but they have not been implemented in all states of the country. Although the Ministry of Health has a section on 'E-Health and Telemedicine' which states that Ministry of Health & Family Welfare has undertaken various initiatives using Information & Communication Technologies (ICT) for improving efficiency & effectiveness of the public healthcare system no public evidence of the use of EHRs being common is available on their Ministry of Health & Family Welfare or National Centre for Disease Control website. [1,2]According to their "Data Ownership of EHR" section on their National Health Portal, this data is strictly protected and "all recorded data will be available to care providers on an 'as required on demand' basis." [3] Furthermore, the document outlines that "patients will have the privileges to restrict access to and disclosure of individually identifiable health information and need to provide explicit consent, which will be audited, to allow access and/or disclosures." [3] However, EHR use is still in its infant stages in India. More recently, an article on the Economic Times-Health world.com stated that 'While the governments continue to give hope, Kerala is the only state in India which has successfully collected and stored electronic health records of 2.58 crore people through its 'eHealth project'. The state government initiative allows patients to walk into any government hospital without carrying any papers.' [4] No further evidence is found on their Ministry of Health & Family Welfare or National Centre for Disease Control website. [1,2]

[1] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/Organisation/departments-health-and-family-welfare/e-Health-Telemedicine>]. Accessed 14 September 2020.

[2] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 14 September 2020.

[3] Government of India.National Health Portal. "Data Ownership of EHR". June 2015. [https://www.nhp.gov.in/data-ownership-of-ehr_mtl]. Accessed 14 September 2020.

[4] Rashmi Mabiyan. 06 January 2020.'India Bullish on AI in Healthcare without electronic health records'. ETHealthWorld.[<https://health.economictimes.indiatimes.com/news/health-it/india-bullish-on-ai-in-healthcare-without-ehr/73118990>] Accessed 21 October 2020

2.4.1c

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

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that India has data standards to ensure data is comparable. The "Electronic Health Record (EHR) Standards for India," is intended to be a living document to set standards for EHRs in India to ensure interoperability. However, these standards are considered recommendations, not legal restrictions. The document states "It is understood that with adoption of these standards properly, the data capture, storage, view, presentation, and transmission will be standardized to levels that will achieve interoperability of both meaning and data contained in the records. This document does not cater to wider implementation scenarios such as of administrative, legal or regulatory nature. This document also does not cater to aspects of creation and operation of local, regional or national infrastructures, indexes, or repositories as they are dealt with by appropriate regulative/administrative bodies." In the standards document, there is a section entitled

"Standards at a Glance" in which they list the type of data, its intended purpose and the standard name it is to follow. [1] For example the identification and demographics data for basic identity details of a patient is to follow the "ISO/TS 22220:2011 Health Informatics - Identification of Subjects of Health Care" standard. [1] Over 30 different types of electronic data are listed in the document each with its own standard. [1] No further evidence is found via the Ministry of Health website or the National Health Portal website. [2,3]

[1] Government of India Ministry of Health and Family Welfare. "Electronic Health Record (EHR) Standard for India". December 2016. [<https://main.mohfw.gov.in/sites/default/files/17739294021483341357.pdf>]. Accessed 14 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/Organisation/departments-health-and-family-welfare/e-Health-Telemedicine>]. Accessed 14 September 2020

[3] Government of India. National Health Portal. [<https://www.nhp.gov.in/>] Accessed 14 September 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: 0

There is insufficient evidence of India having established mechanisms at the relevant ministries responsible for animal, human and wildlife surveillance to share data. Although India collects data through its National Vector Borne Disease Control Programme under the Directorate General of Health Services in the Ministry of Health & Family Welfare, it is not clear whether they have a mechanism to share this data with other ministries. [1] There is no evidence of data sharing taking place on their Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Environment & Forests or National Centre for Disease Control website. [2,3,4,5] Lastly, India's Zoonosis Division, under their National Centre for Disease Control, which is the responsible unit for any zoonotic diseases and related issues such as national surveillance on diseases such as the plague and rabies does not indicate any sharing mechanisms either. [6]

[1] Government of India. National Vector Borne Disease Control Programme. "About Us".

[<http://www.nvbdc.gov.in/index1.php?lang=1&level=0&linkid=405&lid=3681>]. Accessed 14 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>] Accessed 14 September 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 14 September 2020

[4] Government of India. Ministry of Environment & Forests. [<http://envfor.nic.in/>]. Accessed 14 September 2020.

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 14 September 2020

[6] Government of India National Centre for Disease Control. "Division of Zoonosis".

[<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=105&lid=56>]. Accessed 14 September 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

There is evidence that India makes de-identified health surveillance data on disease outbreaks publicly available via reports on government websites. There is de-identified health surveillance data on disease outbreaks on their Integrated Disease Surveillance Programme (IDSP) website (Ministry of Health). Per the IDSP website, the reporting is done weekly and as the website states "all disease outbreaks reported from the States/UTs are compiled in the form of a Weekly Outbreak Report and is available on the Website. Compilation of these outbreaks in the form of weekly outbreak report (Monday-Sunday) and is available on the website. On an average around 40-50 outbreaks are reported to CSU on weekly basis." [1] A comprehensive list of all weekly reports from the year 2009 to 2020 current week is indeed available on their website. [2] The most recently available report from Week 27 of 2020, includes reports of disease such as Japanese Encephalitis, Acute Diarrheal Disease and Food Poisoning. [3] In light of the present COVID-19 pandemic, daily de-identified health surveillance data are made available on the Ministry of Health website. [4]

[1] Government of India Integrated Disease Surveillance Programme. "Outbreaks".

[<https://idsp.nic.in/index4.php?lang=1&level=0&linkid=403&lid=3685>]. Accessed 14 September 2020

[2] Government of India Integrated Disease Surveillance Programme. "Weekly Outbreaks".

[<https://idsp.nic.in/index4.php?lang=1&level=0&linkid=406&lid=3689>]. Accessed 14 September 2020.

[3] Government of India Integrated Disease Surveillance Programme. "Weekly Outbreak Report (29th June to 5th July 2020)."

[<https://idsp.nic.in/WriteReadData/l892s/76245669481599205071.pdf>]. Accessed 14 September 2020.

[4] Government of India. Ministry of Health and Family Welfare. [<https://www.mohfw.gov.in/>] Accessed 14 September 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

There is evidence that India makes de-identified COVID-19 surveillance data available via daily reports on the Ministry of Health website. This data includes number of active cases, number of discharged/cured cases and number of deaths, national and state wise data. [1]

[1] Government of India. Ministry of Health and Family Welfare. [<https://www.mohfw.gov.in/>] Accessed 14 September 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 no evidence that India has laws, regulations, or guidelines that safeguard the confidentiality of identifiable health information for individuals, such as that generated through health surveillance activities. No such laws or regulations are readily available on their Ministry of Health & Family Welfare, All India Institute of Medical Sciences website nor their National Centre for Disease Control websites. [1,2,3] Furthermore, under their Integrated Disease Surveillance Project, forms

exist to report surveillance data such as Form S which asks for "ID No./Unique Identifier" which are to be filled in by DSU (District Surveillance Unit). [4] However, in neither their "Training Manual on Data Management" nor in their "Training Manual for State & District Surveillance Officers" is it specified whether the confidentiality of this information is protected or not. [5,6] Although, there is a law entitled "The Information Technology Act, 2000" developed by India's Ministry of Law, Justice and Company Affairs, it too does not incorporate health or medical records of any kind under its legislation. [7] Lastly, India has "The Personal Data Protection Bill, 2019" which would address this if passed but it has not yet been adopted into law. [8]

[1] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 14 September 2020.

[2] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 14 September 2020

[3] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 14 September 2020.

[4] Government of India Integrated Disease Surveillance Programme. "Form S". [https://idsp.nic.in/WriteReadData/OldSite/Form_S.pdf]. Accessed 14 September 2020

[5] Government of India Integrated Disease Surveillance Programme. "Training Manual on Data Management". [https://idsp.nic.in/WriteReadData/OldSite/usermanual/Portal_Training.pdf]. Accessed 14 September 2020

[6] Government of India Integrated Disease Surveillance Programme. "Training Manual for State & District Surveillance Officers". [https://idsp.nic.in/WriteReadData/OldSite/2WkDSOSept08/Resources_files/DistrictSurvMan/Module2.pdf]. Accessed 14 September 2020

[7] Government of India Ministry of Law, Justice and Company Affairs. "The Information Technology Act, 2000". June 2000. [<https://www.wipo.int/edocs/lexdocs/laws/en/in/in024en.pdf>]. Accessed 14 September 2020.

[8] Government of India. Ministry of Law and Justice. "The Personal Data Protection Bill, 2019". 2018. [<https://www.prsindia.org/billtrack/personal-data-protection-bill-2019>]. Accessed 14 September 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 no evidence that India has laws, regulations, or guidelines that safeguard the confidentiality of identifiable health information for individuals, such as that generated through health surveillance activities, or that include mention of protections from cyber attacks. No such laws or regulations are readily available on their Ministry of Health & Family Welfare, All India Institute of Medical Sciences website nor their National Centre for Disease Control websites. [1,2,3] Furthermore, under their Integrated Disease Surveillance Project, forms exist to report surveillance data such as Form S which asks for "ID No./Unique Identifier" which are to be filled in by DSU (District Surveillance Unit). [4] However, in neither their "Training Manual on Data Management" nor in their "Training Manual for State & District Surveillance Officers" is it specified whether this the confidentiality of this information is protected or not. [5,6] Although, "The Information Technology Act, 2000" developed by India's Ministry of Law, Justice and Company Affairs is in place, it too does not incorporate health or medical records of any kind under its legislation. [7] Lastly, India has "The Personal Data Protection Bill, 2019" which would address this if passed but it has not yet been adopted into law. [8]

[1] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 14 September 2020.

[2] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 14 September 2020

- [3] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 14 September 2020.
- [4] Government of India Integrated Disease Surveillance Programme. "Form S". [https://idsp.nic.in/WriteReadData/OldSite/Form_S.pdf]. Accessed 14 September 2020
- [5] Government of India Integrated Disease Surveillance Programme. "Training Manual on Data Management". [https://idsp.nic.in/WriteReadData/OldSite/usermanual/Portal_Training.pdf]. Accessed 14 September 2020
- [6] Government of India Integrated Disease Surveillance Programme. "Training Manual for State & District Surveillance Officers". [https://idsp.nic.in/WriteReadData/OldSite/2WkDSOSept08/Resources_files/DistrictSurvMan/Module2.pdf]. Accessed 14 September 2020
- [7] Government of India Ministry of Law, Justice and Company Affairs. "The Information Technology Act, 2000". June 2000. [<https://www.wipo.int/edocs/lexdocs/laws/en/in/in024en.pdf>]. Accessed 14 September 2020.
- [8] Government of India. Ministry of Law and Justice. "The Personal Data Protection Bill, 2019". 2018. [<https://www.prsindia.org/billtrack/personal-data-protection-bill-2019>]. Accessed 14 September 2020

2.4.5 International data sharing

2.4.5a

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

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

Current Year Score: 0

There is no evidence that the government has 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 for one or more diseases. However, under the Fostering Partnerships heading in their 2016 "National Disaster Management Plan (NDMP)" they state the following: "India is keen to share expertise and work with other countries in the areas of disaster management. India can play a major role for capacity building in the Asia Pacific region and is look forward to build sustained regional and international partnerships under the Sendai Framework. India is committed to work with countries in the region and beyond in building resilient nations and communities, against disasters. India is looking forward to engage with international community in providing humanitarian assistance to other countries in need." [1] However, this sharing seems limited to natural disaster data such as "warnings about rivers flowing from neighbouring countries" and sharing of "seismic activity data with national and international scientific, academic and R&D institutions." [1] India has a ' National Risk Communication Plan 2016' in place. This plan states that 'the International Health Regulations (2005) is an international agreement that is legally binding on 194 countries (States Parties). India is also a signatory to the IHR 2005. IHR came into force on 15 June 2007. The IHRs aim at protecting the global community from public health risks and emergencies that cross international borders. In May 2015, India submitted the new national Action plan on International Health Regulations(IHR) (2005), identifying risk communication as one of the areas where more needs to be done. While complying by IHR(2005) requirements, India needs to have a national risk communication plan for all public health emergencies, as well as fundamentals of risk communication well understood by all concerned stakeholders of IHR (2005)'. However, there is no mention of a cooperative agreement/legislation to share surveillance data during a public health emergency with other countries in the region in the risk communication plan.[2] Lastly, the sharing of surveillance data is not specifically addressed on their Integrated Disease Surveillance Programme, National Disaster Response Force, Institute of Disaster Management, National Disaster Management Authority, Ministry of Health & Family Welfare or Ministry of Agriculture and Farmers' Welfare website. [3,4,5,6,7,8]

- [1] Government of India National Disaster Management Authority. "National Disaster Management Plan (NDMP)". May 2016. [<https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf>]. Accessed 14 September 2020.
- [2] Government of India. National Center for Disease Control. 'National Risk Communication Plan'. 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File593.pdf>] Accessed 14 September 2020.
- [3] Government of India. Integrated Disease Surveillance Programme. [<https://idsp.nic.in/>]. Accessed 14 September 2020
- [4] Government of India National Disaster Response Force. "About Us". [<http://www.ndrf.gov.in/about-us>]. Accessed 14 September 2020.
- [5] Government of India. National Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 14 September 2020.
- [6] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 14 September 2020.
- [7] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 14 September 2020.
- [8] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 14 September 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: 0

There is no evidence of 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 in India. Although contact tracing has been given importance to control the spread of the disease in light of the present COVID-19 pandemic, there is no mention of a national system in the form of a support structure in place to provide support to conduct contract tracing at the sub national level. No evidence is found under the Ministry of Health, National Center for Disease Control, Integrated Disease Surveillance Program, the National Disaster Management Authority or the All India Institute of Medical Sciences websites. [1,2,3,4,5]

- [1] Government of India. Ministry of Health and Family Welfare. [<https://www.mohfw.gov.in/index.html>]. Accessed 14 September 2020
- [2] Government of India. National Center for Disease Control. [<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=690&lid=541>] Accessed 14 September 2020
- [3] Government of India. National Center for Disease Control. Integrated Disease Surveillance Programme. [<https://idsp.nic.in/>]. Accessed 14 September 2020
- [4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 14 September 2020.
- [5] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 14 September 2020

2.5.1b

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

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

Current Year Score: 0

There is no evidence that India provides wraparound services to enable cases and suspected cases to self-isolate as recommended, particularly economic support (paycheck, job security) and medical attention. In the present Covid-19 pandemic, although self isolation and quarantining of cases and suspected cases has been stressed and medical attention to these cases has been given importance (although not formally guaranteed), the other services--particularly around economic support--have not been mentioned. [1] No evidence for such wraparound services has been mentioned under the Ministry of Health, although an insurance scheme for health workers fighting COVID-19 has been granted under the Ministry of Health. [2] No further evidence for aforementioned wraparound services is found under the National Center for Disease Control, Integrated Disease Surveillance Program, the National Disaster Management Authority or the All India Institute of Medical Sciences websites. [3,4,5,6]

[1] Government of India. Ministry of Health and Family Welfare.Resources-Citizens.[<https://www.mohfw.gov.in/index.html>] Accessed 14 September 2020

[2] Government of India. Ministry of Health and Family Welfare.Resources-Hospitals. 'Insurance Coverage for our Health workers. Caring for those who are taking care of the nation'[<https://www.mohfw.gov.in/pdf/videogif.gif>] Accessed 14 September 2020

[3] Government of India. National Center for Disease Control.[<https://ncdc.gov.in/>] Accessed 14 September 2020

[4] Government of India. National Center for Disease Control. Integrated Disease Surveillance Programme. [<https://idsp.nic.in/>]. Accessed 14 September 2020

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 14 September 2020.

[6] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 14 September 2020

2.5.1c

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence that India makes de-identified data on contact tracing efforts for COVID-19 (including the percentage of new cases from identified contacts) available via daily reports (or other format) on government websites. Although contact tracing and quarantining of the contacts is given utmost importance in the 'Containment Plan for the Novel Corona Virus Disease 2019', published by the Ministry of Health, there is no evidence that de-identified data on contact tracing is made available which includes percentage of new cases from identified cases specifically [1] However, there is de-identified data on the number of cases, active cases, discharged cases, number of deaths updated daily on the Ministry of Health Website. This data also includes a state wise tally.[2] Further, the National Center for Disease Control gives reports on the urban and rural distribution, gender wise distribution, age wise distribution, distribution by signs and symptoms at the time of presentation of COVID-19.[3]There is no further evidence on the All India Institute of Medical Sciences and Indian Council of Medical

Research Websites.[4,5]

[1] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 17 September 2020.

[2] Government of India. Ministry Of Health and Family Welfare. [<https://www.mohfw.gov.in/>] Accessed 17 September 2020.

[3] Government of India. National Center for Disease Control.[<https://ncdc.gov.in/dashboard.php>] Accessed 17 September 2020

[4] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 17 September 2020

[5] Government of India. Indian Council of Medical Research.[<https://www.icmr.gov.in/index.html>] Accessed 17 September 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 of a cooperative agreement between the public health system and border control authorities to identify suspected and potential cases in international travellers and trace and quarantine their contacts in the event of a public health emergency but the agreement is in place only in response to active public health emergencies. In light of the Covid-19 pandemic, there is evidence of a system to identify suspected and potential cases in international travellers and trace and quarantine their contacts at the 30 designated airports, 12 major ports, 65 minor ports and 8 land crossings. Screening at ports of entry, both airport and ground has been emphasized in the 'Containment Plan for the Novel Corona Virus Disease 2019', published by the Ministry of Health.[1] India has a 'National Risk Communication Plan 2016' in place, which emphasizes the importance of screening at ports of entry in the event of a public health emergency, but there is no evidence of a joint plan or cooperative agreement between the public health system and the border control authorities on the matter.[2] No further evidence is found under the Ministry of Health, National Center for Disease Control, Integrated Disease Surveillance Program, the National Disaster Management Authority or the All India Institute of Medical Sciences websites.[3,4,5,6,7]

[1] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 17 September 2020.

[2] Government of India. National Center for Disease Control. 'National Risk Communication Plan'. 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File593.pdf>] Accessed 14 September 2020.

[3] Government of India. Ministry Of Health and Family Welfare. [<https://www.mohfw.gov.in/>] Accessed 17 September 2020.

[4] Government of India. National Center for Disease Control.[<https://ncdc.gov.in/dashboard.php>] Accessed 17 September 2020

[5] Government of India. National Center for Disease Control. Integrated Disease Surveillance Programme. [<https://idsp.nic.in/>]. Accessed 17 September 2020

[6] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 17 September 2020.

[7] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 17 September

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

There is evidence of an applied epidemiology training program (such as FETP) being available in India. According to TEPHINET, "the India Epidemic Intelligence Service (EIS) program is a two-year training in applied epidemiology in which trainee officers develop skills while working in Indian public health agencies and programs." [1] However, there is no explicit evidence of resources being provided by the government of India to send citizens to another country to participate in applied epidemiology training programs (such as FETP). No indication of such resources being provided for the explicit reason of sending trainees to another country in order to participate in applied epidemiology training programs can be found on their Ministry of Health & Family Welfare. [2] However, India's National Centre for Disease Control (NCDC) does conduct FETP training inside India for health personnel. According to their most recent published annual report, "a need based special two-week disease surveillance and Field Epidemiology Training Programme (FETP) have been initiated for the District Surveillance Officers [and] 729 District Surveillance Officers have already been trained in this special 2- week FETP." [3] Further evidence on EIS, FETP, Regional Training Programme on Prevention and Control of Communicable Diseases for Paramedics is available on the NCDC website.[4]

[1] TEPHINET. "India Epidemic Intelligence Service". [<https://www.tephinet.org/training-programs/india-epidemic-intelligence-service>]. Accessed 17 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 17 September 2020

[3] Government of India. National Centre for Disease Control. "Annual Report 2016-17". [<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2016-17.pdf>]. Accessed 17 September 2020.

[4] Government of India. National Centre for Disease Control.'Training Programmes'. [<https://ncdc.gov.in/index4.php?lang=1&level=0&linkid=129&lid=434>] Accessed 17 September 2020

2.6.1b

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

Yes = 1 , No = 0

Current Year Score: 1

There is no evidence that there are general field epidemiology training programs explicitly inclusive of animal health professionals but there is a specific animal health field epidemiology training program offered (such as FETPV) in India. India is a part of the South Asian Association for Regional Cooperation (SAARC) which conducts Field Epidemiology Training Programmes for veterinarians such as the one conducted in India in May of 2017. [1] There is no evidence that India's general field epidemiology trainings are open to animal health professionals. TEPHINET notes that the India Epidemic Intelligence Service (EIS) program is open to medical doctors. [2] The trainings listed on India's National Centre for Disease Control portal do not mention animal health field epidemiology or indeed any training for animal health professionals. [3,4]

[1] Indian Council of Agricultural Research. "Field Epidemiology Training Programme for Veterinarian for SAARC nations". May 2017. [<https://icar.org.in/content/field-epidemiology-training-programme-veterinarian-saarc-nations>]. Accessed 17 September 2020.

[2] TEPHINET. "India Epidemic Intelligence Service". [<https://www.tephinet.org/training-programs/india-epidemic-intelligence-service>]. Accessed 17 September 2020.

[3] Government of India National Centre for Disease Control. "Training Programme". [<https://ncdc.gov.in/index4.php?lang=1&level=0&linkid=96&lid=99>]. Accessed 17 September 2020.

[4] Government of India National Centre for Disease Control. "Regional Field Epidemiology Training Programme (FETP)". [<https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=186&lid=100>]. Accessed 17 September 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 evidence that India has a national public health emergency response plan in place which addresses planning for multiple communicable diseases with pandemic potential and this plan is publicly available. India's National Disaster Management Authority published the "National Disaster Management Plan (NDMP)" in May 2016 which covers most natural disasters common in India as well as recognizes epidemics of several kinds under its Biological category of natural hazards. [1] More importantly, their "National Disaster Management Guidelines Management of Biological Disasters" from 2008 lays out the both the legal framework and actual guidelines of developing a response plan for communicable diseases. [2] It plans to respond to multiple communicable diseases mainly through minimising exposure of patients with these diseases thereby controlling its spread, including through social distancing measures, isolation and quarantine and restrictions of movement of populations. [2] These measures have indeed been included in India's proposed legislation, "The Public Health (Prevention, Control and Management of Epidemics, Bio-Terrorism and Disasters) Bill, 2017" put in front of the parliament by their Ministry of Health & Family Welfare to replace the Epidemic Diseases Act of 1897. [3] This bill was first envisioned in National Disaster Management Guidelines Management of Biological Disasters" document from 2008. [2]

[1] Government of India National Disaster Management Authority. "National Disaster Management Plan (NDMP)". May 2016. [<https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf>]. Accessed 17 September 2020.

[2] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020.

[3] Government of India. Ministry of Health & Family Welfare. "The Public Health (Prevention, Control and Management of Epidemics, Bio-Terrorism and Disasters) Bill, 2017". February 2017. [<http://www.prsindia.org/uploads/media//draft/Draft%20PHPCM%20of%20Epidemics,%20Bio-Terrorism%20and%20Disasters%20Bill,%202017.pdf>]. Accessed 17 September 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

Although India has an overarching national public health emergency response plan in place, it has not been updated in the last 3 years. The "National Disaster Management Guidelines Management of Biological Disasters," which lays out both the legal framework and actual guidelines of developing a response plan for communicable diseases with plans to respond to multiple communicable diseases, was developed in 2008 but it has not been updated since.[1]There is no evidence of any such updated plans on their Ministry of Health & Family Welfare, National Center for Disease Control or National Disaster Management Authority website. [2,3,4]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 17 September 2020.

[3] Government of India. National Center for Disease Control.[<https://ncdc.gov.in/>] Accessed 17 September 2020

[4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 17 September 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

Although India's overarching national public health emergency response plan "National Disaster Management Guidelines Management of Biological Disasters" does mention vulnerable groups like the pediatric and elderly population, it does not have extensive guidance on how these populations are to be addressed during an emergency. The document states that "vulnerable groups such as children, pregnant women, the aged and patients suffering from diseases like HIV/AIDS will be given special attention." There is some attention given to varying communication needs due to literacy rates, but it does not specifically mention response and treatment for vulnerable or paediatric populations during an emergency. [1] Lastly, there is no further evidence of plans including considerations for these populations on their Ministry of Health & Family Welfare, National Center for Disease Control or National Disaster Management Authority websites. [2,3,4]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 17 September 2020.

[3] Government of India. National Center for Disease Control.[<https://ncdc.gov.in/>] Accessed 17 September 2020

[4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 17 September 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: 0

2020

WHO Strategic Partnership for IHR and Health Security (SPH)

3.1.2 Private sector involvement in response planning

3.1.2a

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

Yes = 1 , No = 0

Current Year Score: 0

There is insufficient evidence that India has a specific mechanism for engaging with the private sector to assist with outbreak emergency preparedness and response. Although they state in their "National Disaster Management Guidelines Management of Biological Disasters" from July 2008, that "it would be mutually beneficial for both the private sector and government if this infrastructure can be used for biological disaster management in a Public-Private Partnership (PPP) module", there is no evidence of a mechanism in place. The guidelines do state that "necessary quarantine measures will be legally instituted using private sector health facilities also for comprehensive patient care," but no further detail on a

partnership is provided. Lastly, the guidelines suggest that the government should have ties with major private vaccine manufacturers within the country in order to scale "up for manufacture of pandemic influenza vaccine" should the need arise, but there is no specific mention of an existing partnership. [1] No evidence of a private sector cooperation mechanism can be found on their Ministry of Health or National Disaster Management Authority websites. [2,3]

[1] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 17 September 2020.

[3] Government of India. National Disaster Management Authority. "Projects". [<https://ndma.gov.in/en/capacity-building/projects.html>]. Accessed 17 September 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

India has guidelines in place to implement non-pharmaceutical interventions (NPIs) during an epidemic or pandemic. These guidelines are applicable to all communicable diseases in general. These guidelines have been outlined in their "National Disaster Management Guidelines Management of Biological Disasters" from July 2008, under Chapter 4: Guidelines for Biological Disaster Management, 4.2.6: Non-Pharmaceutical Interventions. Examples provided are '(A) Social Distancing Measures: Spread of communicable diseases in many conditions can be controlled or prevented by reducing direct contact with patients. Social distancing measures such as closure of schools, offices and cinemas is recommended to prevent the gathering of large numbers of people at one place. Further, there could be a ban on cultural events. Entry to railway stations and airports could be restricted. There is evidence to suggest that social distancing measures, if properly applied, can delay the onset of an epidemic, compress the epidemic curve and spread it over a longer time, thus reducing the overall health impact. Social distancing measures, if required to be implemented in the context of an epidemic, may be voluntary or legally mandated. In either case, the public will be made aware of the action taken and its purpose. (B) Disease Containment by Isolation and Quarantine Methodologies. The spread of communicable diseases in many conditions can be controlled or prevented by isolation and quarantine, thereby reducing direct contact with patients. Other preventive measures are vector control, rodent and mosquito control, and food and environmental control. It includes: (i) Isolation refers to isolating suspected cases in hospital settings. In the case of biological disasters such as pandemic influenza which affects millions, home isolation may have to be recommended to those who can be treated at home. (ii) Quarantine refers to not only restricting the movements of exposed persons but also the healthy population beyond a defined geographical area or unit/institution (airport and maritime quarantine) for a period in excess of the incubation period of the disease. Restrictions in the movement of the affected population is an important method to contain communicable diseases.'(1) In light of the present COVID-19 pandemic 'Containment Plan for the Novel Corona Virus Disease 2019', was published by the Ministry of Health which also gives importance to NPIs in order to contain the spread of the disease. Some examples mentioned are isolation of cases, contact tracing, strict enforcement of social distancing, closure of school, colleges and work places, cancellation of mass gatherings, cancellation of public transport. [2]

[1] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020.

[2] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 17 September 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 India has activated their national emergency response plan for an infectious disease outbreak in the past year but there is no evidence that the country has completed a national-level biological threat-focused exercise (either with WHO or separately) in the past year. In light of the ongoing pandemic Covid-19, India has activated its national emergency response plan. While India has a pre-existing response plan in place, the 'National Disaster Management Guidelines Management of Biological Disasters' since 2008, [1] a specific response plan was developed and implemented for COVID-19, namely the 'Containment Plan for the Novel Corona Virus Disease 2019' published in May 2020 under the Ministry of Health, to control the spread of the disease in the country.[2] There is no evidence that the country has completed a national-level biological threat-focused exercise (either with WHO or separately) in the past year. No evidence for such an exercise is found under the World Health Organization websites, Ministry of Health, National Disaster Management Authority, Ministry of Agriculture or the National Center for Disease Control.[3,4,5,6,7,8]

[1] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 17 September 2020.

[2] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 17 September 2020.

[3] World Health Organization (WHO). Strategic Partnership For International Health Regulations (2005) and Health Security (SPH). [<https://extranet.who.int/sph/simulation-exercise>] Accessed 17 September 2020

[4] World Health Organization. 'India'. [<https://www.who.int/countries/ind/>] Accessed 17 September 2020

[5] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 17 September 2020.

[6] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 17 September 2020

[7] Government of India. Ministry of Agriculture and Farmers' Welfare. Department of Agriculture, Cooperation and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 17 September 2020.

[8] Government of India. National Center for Disease Control. [<https://ncdc.gov.in/>] Accessed 17 September 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 evidence that India 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. There is an After Action Review planned under the WHO but further details could not be elucidated. [1] There is also no evidence of an exercise to identify a list of gaps and best practices through either an after action review (post emergency response) with the WHO. No evidence of such an exercise is seen on the World Health Organization's After Action Review database or India page. [1,2] There is no further information from National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or National Centre for Disease Control. [3,4,5,6,7]

[1] World Health Organization (WHO) Strategic Partnership for International Health Regulations (2005) and Health Security (SPH). "After Action Review". 2020, (<https://extranet.who.int/sph/after-action-review>). Accessed 19 September 2020.

[2] World Health Organization. 'India'. [<https://www.who.int/countries/ind/>] Accessed 19 September 2020

[3] Government of India. National Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 19 September 2020.

[4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 19 September 2020.

[5] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>] Accessed 19 September 2020.

[6] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 19 September 2020.

[7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 19 September 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 no evidence that India in the past year has undergone a national-level biological threat-focused exercise that has included private sector representatives. No evidence of such an exercise is seen on the World Health Organization's (WHO) websites or the India page.[1,2,3] An After Action Review has been planned under the WHO but further details are not available.[2] Furthermore, no evidence of such exercises are found under the Ministry of Health and Family Welfare and Department of Disaster Management websites.[4,5]

[1] World Health Organization (WHO). Strategic Partnership For International Health Regulations (2005) and Health Security (SPH). 'India'. [https://extranet.who.int/sph/simulation-exercise-list?field_region_tid=All&tid=324&field_simulation_status_tid=1790&field_simulation_type_tid=All&title=] Accessed 17 September 2020

[2] World Health Organization (WHO) Strategic Partnership for International Health Regulations (2005) and Health Security

(SPH). "After Action Review". 2020 [<https://extranet.who.int/sph/after-action-review>] Accessed 19 September 2020

[3] World Health Organization. 'India'. [<https://www.who.int/countries/ind/>] Accessed 19 September 2020

[4] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 19 September 2020.

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed by 19 September 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

There is evidence that India has in place a national-level Emergency Operations Centre, but the available detail on its role and functions is minimal. India's national emergency response agency is the National Disaster Management Authority (NDMA). In addition to a national-level authority, there are also State Disaster Management Authorities (SDMAs). [1] Although the 2009 "National Policy on Disaster Management" document developed by the NDMA does confirm the existence of a national level EOC - the National Executive Committee (NEC) which coordinates response during threats and disasters, most of the publicly available information is focused on state-level EOCs. [2] These SDMAs have their own Emergency Operations Centers. For example the Himachal Pradesh State Disaster Management Authority has a website for its Emergency Operations Centre which describes its main objective being coordinating "the flow of information with respect to activities associated with relief operations." In addition, "as per the Government of India national framework for disaster management, the States are being assisted to set up control rooms/emergency operations centres at State and district level." [3] As evidenced by the 2008 National Disaster Management Guidelines on Biological Disasters, the NDMA explicitly covers pandemic emergencies within its mandate. [4] In light of the present COVID-19 pandemic, the 'Containment Plan for the Novel Corona Virus Disease 2019' published in May 2020 under the Ministry of Health states that 'At the National Level, the National Crisis Management Committee (NCMC)/ Committee of Secretaries (CoS) will be activated. The coordination with health and non-health sectors will be managed by NCMC/ Cos, on issues, flagged by the Ministry of Health and Family Welfare. The Ministry will activate its Crisis Management Plan. The Concerned State will activate State Crisis Management Committee or the State Disaster Management Authority, as the case may be to manage the clusters of COVID-19.' [5]

[1] Government of India. National Disaster Management Authority. "SDMA". [<https://ndma.gov.in/en/sdmas.html>]. Accessed 19 September 2020

[2] Government of India National Disaster Management Authority. "National Policy on Disaster Management". 2009. [<https://ndma.gov.in/images/policyplan/dmpolicy/national-dm-policy2009.pdf>]. Accessed 19 September 2020.

[3] Himachal Pradesh State Disaster Management Authority. "Resource List - Emergency Operations Centre". [<https://hpsdma.nic.in/index1.aspx?lsid=92&lev=2&lid=90&langid=1>]. Accessed 19 September 2020.

[4] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September 2020

[5] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 19 September 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 no evidence that India's Emergency Operations Centers are required to conduct health focused drills or that there are annual drills. The "National Policy on Disaster Management" put forth by their National Disaster Management Authority under the Ministry of Home Affairs in 2009, notes that EOCs exist at the national and sub-national levels, there is minimal information available about the national EOC's functionings. [1] Most of the publicly available information is focused on state-level EOCs. While, both the national level "National Disaster Management Guidelines Management of Biological Disasters" and the state level legislations mention the importance of "training, seminars and mock drills," in emergency situations at the hospital level, there is no mention of drills conducted by the EOC. [2] The "Himachal Pradesh State Policy on Disaster Management" from 2011 mentions that "disaster management drills are carried out periodically," but there is no specific mention of health drills. [3] Lastly, no evidence of such drills can be found on their National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare or Ministry of Agriculture and Farmers' Welfare websites. [4,5,6,7]

[1] Government of India National Disaster Management Authority. "National Policy on Disaster Management". 2009. [<https://ndma.gov.in/images/policyplan/dmpolicy/national-dm-policy2009.pdf>]. Accessed 19 September 2020

[2] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [<https://www.slideshare.net/SunilKohli/medical-preparedness-aspects-of-disasters>]. Accessed 19 September 2020

[3] Government of Himachal Pradesh. Department of Revenue. "Himachal Pradesh State Policy on Disaster Management". 2011. [<https://hpsdma.nic.in/WriteReadData/LINKS/08e072f1-e0b5-4e73-84fa-c980077c7e24.pdf>]. Accessed 19 September 2020

[4] Government of India. Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 19 September 2020.

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 19 September 2020.

[6] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 19 September 2020.

[7] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 19 September 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 no public evidence to show that India's EOC can conduct, or 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. Although, the "National Policy on Disaster Management" put forth by their National Disaster Management Authority under the Ministry of Home Affairs confirms the existence of an EOC - the National Executive Committee (NEC) which coordinates response during threats and disasters - there is scant detail available about the functioning of the national EOC. [1] Outside of the document, most of the publicly available information is focused on state-

level EOCs. Therefore, there is no evidence of the capability of the national EOC's ability to respond to initiate response to an identified public health emergency within 120 minutes available via the National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare or Ministry of Agriculture and Farmers' Welfare websites. [2,3,4,5]. No other evidence of drills conducted in India pertaining to the present Covid-19 pandemic can be found in 'Containment Plan for the Novel Corona Virus Disease 2019' published in May 2020 under the Ministry of Health. [6]

[1] Government of India National Disaster Management Authority. "National Policy on Disaster Management". 2009.

[<https://ndma.gov.in/images/policyplan/dmpolicy/national-dm-policy2009.pdf>]. Accessed 19 September 2020

[2] Government of India. Ministry of Home Affairs. National Institute of Disaster Management.

[<http://nidm.gov.in/default.asp>]. Accessed 19 September 2020.

[3] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 19 September 2020.

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 19 September 2020.

[5] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 19 September 2020

[6] Government of India. Ministry Of Health and Family Welfare. 'Containment Plan for the Novel Corona Virus Disease 2019'. May 2020. [<https://www.mohfw.gov.in/pdf/Containmentplan16052020.pdf>] Accessed 19 September 2020

3.4 LINKING PUBLIC HEALTH AND SECURITY AUTHORITIES

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

3.4.1a

Does the country meet one of the following criteria?

- Is there public evidence that public health and national security authorities have carried out an exercise to respond to a potential deliberate biological event (i.e., bioterrorism attack)?

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

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

Current Year Score: 0

There is insufficient evidence of India's public health or national security authorities having carried out an exercise to respond to a potential deliberate biological event and no publicly available standard operating procedures, guidelines, MOUs or other agreements between the public health and security authorities to respond to a potential deliberate biological event can be found. Although India's "National Disaster Management Guidelines Management of Biological Disasters" provides details on deliberate biological attacks, there is no information provided about SOPs or guidelines on coordinating response between public health and security authorities beyond stating that the Ministry of Health and Family Welfare (MoH&FW) and the Ministry of Agriculture serve as the leads for response. [1] Additionally, in a review article titled "India's preparedness against bioterrorism: bio-defence strategies and policy measures" in the journal Current Science volume 113 from 2017 the authors recommend that "laws and policies for protection against bio-warfare agents and bioterrorists need to be strictly implemented" and more generally talk about the need and lack of such guidelines in India. [2] Lastly, there is no evidence of any such exercises or standard procedures against deliberate biological events on their National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare, Ministry of Agriculture and Farmers' Welfare or National Centre for Disease Control websites. [3,4,5,6,7]

- [1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September 2020
- [2] Current Science. Volume 113. "India's preparedness against bioterrorism: biodefence strategies and policy measures". 2017. [<https://pdfs.semanticscholar.org/64b6/5c641d06d065b4d6df51a26c881a6a441d1f.pdf>]. Accessed 19 September 2020
- [3] Government of India. Ministry of Home Affairs. National Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 19 September 2020.
- [4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 19 September 2020.
- [5] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 19 September 2020.
- [6] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 19 September 2020
- [7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 19 September 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 evidence that India's strategy document used to guide national public health response outlines how messages will reach populations and sectors with different communications needs. Their "National Disaster Management Guidelines Management of Biological Disasters" says that "given the level of literacy in some states, communication strategies, to be successful, need planning, trained manpower, an understanding of communications protocols, messaging and the media, as also the ability to manage the flow of information. The reach of visual and print media to a substantial section of the population ensures that messages in the context of biological disasters can be delivered to them instantaneously and further sustained through the audio/print media. Activities at the local level could include street plays, dramas, folk theatres, poster competitions, distribution of reading material, school exhibitions, etc." [1] The document also states that "biological disaster related education shall be given in various vernacular languages". [1] The policy recognizes the importance of community participation in times of emergency and call upon "community level social workers who can help in rebuilding efforts, create counselling groups, define more vulnerable groups, take care of cultural and religious sensitivities, and also act as informers to local medical authorities during a biological disaster phase [which] will be created after proper training and education." [1] Further, the 'National Risk Communication Plan, 2016' published under the National Center for Disease Control reinforces to 'ensure an efficient flow of accurate and consistent information during a public health emergency about the cause, magnitude, uncertainties, and consequences of specific public health emergencies, deliver messages through the appropriate channels to provide timely education to the public so that they can understand and implement the preventive measures, increase awareness of Health care workers/providers of the use of control measures, facilitate communication among key internal and external partners, provide a system of information to the general public through the media and other information channels so as to promote informed decision making'. [2]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September

2020

[2] Government of India. National Center for Disease Control. 'National Risk Communication Plan'. 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File593.pdf>] Accessed 19 September 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 evidence that India's public health emergency plan includes a section on risk communication plan during a public health emergency. India's "National Disaster Management Guidelines Management of Biological Disasters" contains guidelines on risk communications in multiple sections throughout the document. The document outlines that "risk will be conveyed to the community through simple and precise messages. It might be done using all available communication channels including word of mouth communication. To disseminate information to a wider audience in a short span of time, print/visual media may be used. Effort will be made to prevent/reduce panic among the public and create awareness about adopting risk reduction/health seeking behaviour." The document also outlines advised steps for preparedness and communication, including setting up "communication and networking system with appropriate intra-hospital and inter-linkages with state ambulance/transport services, state police departments and other emergency services," and establishing "toll-free numbers and a reward system for providing vital information about any oncoming biological disaster by an early responder or the public." [1]. Further, there is a specific 'National Risk Communication Plan, 2016' published under the National Center for Disease Control specifically for use during a public health emergency.[2]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September 2020

[2] Government of India. National Center for Disease Control. 'National Risk Communication Plan'. 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File593.pdf>] Accessed 19 September 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

The risk communication plan for India does not designate a specific position within the government to serve as the primary spokesperson to the public during a public health emergency. While there is a risk communication plan for public health emergency in place stated under both the "National Disaster Management Guidelines Management of Biological Disasters, 2008" and the 'National Risk Communication Plan 2016', these do not specifically designate a specific position within the government to serve as the primary spokesperson.[1,2] According to the National Risk Communication Plan 'Ministry of Health and Family Welfare is the nodal agency for management of any public health event amounting to a national

emergency or PHEIC. Development of risk communication plan at all levels is important to address local issues with best responses and with locally available means of risk communication. Inputs from various existing task forces/inter ministerial groups for management of crisis may be sought for preparation of health messages on respective topics'. [2] The Risk Communication Committee would be set up in the national, state and district level in the event of a public health emergency, and the communication plan specifically lists the members and their positions in the committees at each level, but no specific position for a primary spokesperson has been mentioned.[2] No further evidence is found in under the Ministry of Health or the Disaster Management Authority websites. [3,4]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September 2020

[2] Government of India. National Center for Disease Control. 'National Risk Communication Plan'. 2016. [<https://ncdc.gov.in/WriteReadData/l892s/File593.pdf>] Accessed 19 September 2020

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 23 October 2020

[4] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 22 October 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: 1

There is evidence that the Government of India utilizes media platforms to inform the public about active public health emergencies but it does not regularly utilize online media platforms . Their "National Disaster Management Guidelines Management of Biological Disasters 2016" states that "available print and visual media need to be put to use for effective communication [and that] appropriate communication materials and media plans are to be worked out in advance.'[1] In light of the COVID 19 pandemic India's Ministry of Health, National Center for Disease Control and Department of Disaster Management have been effective in regular updates and situational analysis and advisories.[2,3,4] Lastly, the Ministry of Health also has a Twitter account and Facebook account on which it is quite active and has regular updates and advisories on the COVID-19 pandemic.[5,6]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 19 September 2020

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 19 September 2020.

[3] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 19 September 2020

[4] Government of India. National Disaster Management Authority.[<https://ndma.gov.in/en/media-public-awareness/covid-19-case-studies.html>] Accessed 19 September 2020.

[5] Twitter.Ministry of Health and Family Welfare. India. September 2020 [https://twitter.com/MoHFW_INDIA/] Accessed 19 September 2020

[6] Facebook. Ministry of Health and Family Welfare. Government of India. [<https://www.facebook.com/MoHFWIndia>]

Accessed 19 September 2020

3.5.2b

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

No = 1, Yes = 0

Current Year Score: 1

There is no evidence that senior leaders (president or ministers) in India have shared misinformation or disinformation on infectious diseases in the past two years. In light of the present pandemic, COVID-19, the senior leaders have been regularly addressing the public and sharing information about the situation in the country and also safety measures, protocols in order to fight the pandemic. The leaders leading the fight against the pandemic are the Prime Minister and the Health Minister of India besides the state chief ministers and health ministers.[1] Updates from the Health Minister are also seen on the Health Ministry Twitter and Facebook accounts.[2,3] There has been no misinformation or disinformation from these leaders. [1,2,3]

[1]] Government of India. Ministry of Health & Family Welfare.[<https://main.mohfw.gov.in/>] Accessed 22 September 2020

[2] Twitter.Ministry of Health and Family Welfare. India. September 2020.

(https://twitter.com/MoHFW_INDIA/status/999289118180818945). Accessed 22 September 2020

[3] Facebook. Ministry of Health and Family Welfare. Government of India. [<https://www.facebook.com/MoHFWIndia>]

Accessed 22 September 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: 34.45

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: 84.27

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: 16.0

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: 17.0

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: 0

There is sufficient evidence that in the past year India has issued a restriction, without international/bilateral support, on the export of medical goods e.g Hydroxychloroquine, Personal Protective Equipment including clothing and masks, N-95 masks, ventilators and sanitizers during the COVID-19 pandemic. Evidence for this is found under the Directorate General of Foreign Trade and the International Trade Center Websites.[1,2]

[1] Government of India. Ministry of Commerce and Industry. Department of Commerce. Directorate General of Foreign Trade.'Notifications'. [<https://dgft.gov.in/CP/>] Accessed 22 September 2020

[2] International Trade Center. Market Access Map.'Covid-19 Temporary Trade Measures'. 'India'. [<https://www.macmap.org/covid19>]. Accessed on 22 September 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: 0

There is evidence that in the past year, India has issued a restriction, without international/bilateral support, on the export/import of non-medical goods due to an infectious disease outbreak. For example India prohibited the export of all varieties of onion except those cut, sliced or in powder form from September 14, 2020 and there was a plan to ban imports on over 100 items of military equipment from August 9 2020 as given in the Market Access Map.'Covid-19 Temporary Trade Measures' under the International Trade Center and the Directorate General of Foreign Trade websites. [1,2]

[1] International Trade Center. Market Access Map.'Covid-19 Temporary Trade Measures'. 'India'. [<https://www.macmap.org/covid19>]. Accessed on 22 September 2020.

[2] Government of India. Ministry of Commerce and Industry. Department of Commerce. Directorate General of Foreign Trade.'Notifications'. [<https://dgft.gov.in/CP/>] Accessed 22 September 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

In the past year, India has implemented a ban, without international/bilateral support, on travelers arriving from a specific country or countries due to an infectious disease outbreak. This measure has been taken in light of the present Covid-19 pandemic by the Government of India.[1,2]According to the Ministry of Home Affairs, Bureau of Immigrations, as of March 03, 2020 ' All regular (sticker) Visas/e-Visa (including Visa on Arrival for Japan and South Korea) granted to nationals of Italy, Iran, South Korea, Japan and issued on or before 03.03.2020 and who had not yet entered India, was suspended with immediate effect. Such foreign nationals were banned from entering India from any Air, Land or Seaport ICPs. Those who had to travel to India due to compelling reasons, were advised to seek fresh visa from nearest Indian Embassy/Consulate' . 'Regular (sticker) visa / e-Visa granted to nationals of Peoples Republic of China, issued on or before 05.02.2020 also remained suspended. Such Chinese nationals were not allowed to enter India from any Air, Land or Seaport ICPs. Those needing to travel to India under compelling circumstances were advised to seek fresh visa to nearest Indian Embassy/Consulate.'[1]

[1] Government of India. Ministry of Home Affairs. Bureau of Immigration.[<https://boi.gov.in/content/advisory-travel-and-visa-restrictions-related-covid-19>]. Accessed 22 September 2020

[2] Government of India. Ministry of Health and Family Welfare.Resources. 'Travel Advisories'. [<https://www.mohfw.gov.in/>] Accessed 22 September 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: 85.71

2018

WHO; national sources

4.1.1b

Nurses and midwives per 100,000 people

Input number

Current Year Score: 172.71

2018

WHO; national sources

4.1.1c

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence that India has a public 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. India currently has no national employment strategy in place. According to news articles, 'Prime Minister Narendra Modi has asked a Group of Ministers (GoM) constituted for skill development and employment generation amid the Covid crisis to come up with a National Employment Policy (NEP) within four months, which will serve as a long-term vision document for improving the job scenario in the country'. [1] In addition, there were talks early in 2018 of such a "policy [that] will outline a comprehensive road map for creation of quality jobs across sectors through economic, social and labour policy interventions and is likely to be announced in Budget 2018." [2] However, there seem to be no more updates since then and a workforce strategy is still missing from India's Ministry of Labour & Employment. [3] Furthermore, there is no evidence of such a strategy on their Ministry of Health & Family Welfare or Ministry of Human Resource Development. [4,5] The National Health Mission website

states "under NRHM, financial support is provided to States under National Rural Health Mission (NRHM) to strengthen the health system including engagement of Nurses, doctors and specialist on contractual basis based on the appraisal of requirements proposed by the States in their annual Programme Implementation Plans. Support under NRHM is also provided by way of additional incentives to serve in remote underserved areas, so that health professionals find it attractive to join public health facilities in such areas. Performance based incentives are also being provided to motivate service providers to give better service delivery. State governments are also regularly requested to fill up the vacancies on priority." However, there is no evidence that this also extends to urban areas and covers all public health workforce in the country. [6]

[1] The Print. 'Present a National Employment Policy for long-term in 4 months: PM Modi tells GoM'. 23 June 2020[<https://theprint.in/india/governance/present-a-national-employment-policy-for-long-term-in-4-months-pm-modi-tells-gom/447201/>] Accessed 22 September 2020

[2] Business Today. "Govt may announce India's first National Employment Policy in budget 2018". January 2018. [<https://www.businesstoday.in/union-budget-2018-19/expectations/jobs-national-employment-policy-nep-budget-2018-un-labour-report-niti-aayog-pm-modi/story/266077.html>]. Accessed 22 September 2020.

[3] Government of India Ministry of Labour & Employment. "Policies". [<https://labour.gov.in/policies/national-policy-skill-development/>]. Accessed 22 September 2020.

[4] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 22 September 2020.

[5] Government of India. Ministry of Human Resource Development. [<http://mhrd.gov.in/>]. Accessed 22 September 2020.

[6] National Health Mission. Ministry of Health. "Health Management Workforce for India in 2030" [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6110161/>] Accessed 22 September 2020

4.1.2 Facilities capacity

4.1.2a

Hospital beds per 100,000 people

Input number

Current Year Score: 53

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

India has 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. Articles on the 2018 Nipah outbreak highlight India's isolation capacity. An interview with the Chief of Critical Care at Baby Memorial Hospital indicates that that Nipah patients were kept in negative pressure isolation units and staff used appropriate PPE following protocols similar to Ebola and CDC and instituted a "strict contact isolation" and "cleaning and dietary policies were adopted". [1] India has been expanding its isolation capacity in recent years. According to a press release from their Ministry of Health and Family Welfare, a man with suspected Ebola flying into India from Liberia was successfully isolated in a "special health facility of Delhi Airport Health Organization"

in November of 2014. [2] Since this incident occurred, "the government has been training thousands of health-care workers and has set up Ebola isolation wards at hospitals in each state." [3] Furthermore, according to India's National Centre for Disease Control's annual report from 2014-2015, NCDC "visited Jaipur, Rajasthan from 19-23 February 2015 to conduct an epidemiological assessment of mortality due to H1N1 in Rajasthan" in which one of the exercises consisted of visiting the "Swine flu isolation ward and by reviewing available death audit report of 50 confirmed H1N1 cases." [4] These isolation wards are usually rooms with 4-8 beds in a hospital. [5,6] However, in some places plans to make "necessary arrangements [in] ICU facility in the ward [for] two ventilators" had not yet been taken. [5] Additionally, a 2015 article found that not all hospitals followed procedures for isolation capacity, such as negative pressure rooms, separated bed, etc. [7] In the present COVID-19 pandemic there is evidence that facilities have been set up across the countries to contain suspected cases and also to treat positive patients. Facilities have been dedicated for COVID management. 'All the selected facilities must be dedicated for COVID management. Three types of COVID dedicated facilities are proposed in this document. All 3 types of COVID Dedicated facilities will have separate ear marked areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances. All suspect cases (irrespective of severity of their disease) will be tested for COVID-19. Further management of these cases will depend on their (i) clinical status and (ii) result of COVID-19 testing. All three types of facilities will be linked to the Surveillance team (IDSP) All these facilities will follow strict infection prevention and control practices'.[8]

[1] BMJ. "Nipah in Kerala: An interview with Dr Anoop Kapoor." [<https://www.bmj.com/company/nipah-in-kerala-interview>]. Accessed 23 September 2020.

[2] Government of India Ministry of Health and Family Welfare. "Ebola Treated and Cured Person from Liberia Quarantined at Airport Health Organisation Quarantine Centre, Delhi". November 2014. [<http://pib.nic.in/newsite/PrintRelease.aspx?relid=111541>]. Accessed 23 September 2020.

[3] The Washington Post. "India quarantines Ebola patient from Liberia who has traces of virus". November 2014. [https://www.washingtonpost.com/world/india-quarantines-ebola-patient-from-liberia-who-has-traces-of-virus/2014/11/19/fba2c188-c5bf-4b24-be0d-aa9a61e67ecb_story.html?noredirect=on&utm_term=.e965b4830040]. Accessed 23 September 2020.

[4] Government of India.National Centre for Disease Control. "Annual Report 2014-15". [<https://ncdc.gov.in/WriteReadData/linkimages/Annual%20report2014-15.pdf>]. Accessed 23 September 2020.

[5] The Times of India. "Madurai's Rajaji hospital sets up isolation ward for Ebola". August 2014. [<https://timesofindia.indiatimes.com/india/Madurais-Rajaji-hospital-sets-up-isolation-ward-for-Ebola/articleshow/40039336.cms>]. Accessed 23 September 2020.

[6] The Telegraph. "Isolation ward for patients at SCB". October 2014.[<https://www.telegraphindia.com/states/odisha/isolation-ward-for-patients-at-scb/cid/1592688>]. Accessed 23 September 2020.

[7] Indian Express. "St George's isolation ward remains idle as patients wait at pvt hospitals". February 2015. [<https://indianexpress.com/article/cities/mumbai/st-georges-isolation-ward-remains-idle-as-patients-wait-at-pvt-hospitals/>]. Accessed 23 September 2020.

[8] Government of India. Ministry of Health and Family Welfare.'Guidance Document on Appropriate Management of suspect/confirmed cases of COVID-19'. [<https://www.mohfw.gov.in/pdf/FinalGuidanceonMangaementofCovidcasesversion2.pdf>] Accessed 23 September 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 the country has developed a plan to expand isolation capacity and demonstrated the capacity to expand isolation capacity in response to an infectious disease outbreak in the past two years. In the present COVID-19 pandemic there is evidence that facilities have been set up across the countries to contain suspected cases and also to treat positive patients. Facilities have been dedicated for COVID management. 'All the selected facilities must be dedicated for COVID management. Three types of COVID dedicated facilities are proposed in this document. All 3 types of COVID Dedicated facilities will have separate ear marked areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances. All suspect cases (irrespective of severity of their disease) will be tested for COVID-19. Further management of these cases will depend on their (i) clinical status and (ii) result of COVID-19 testing. All three types of facilities will be linked to the Surveillance team (IDSP) All these facilities will follow strict infection prevention and control practices'.[1]

[1] Government of India. Ministry of Health and Family Welfare. 'Guidance Document on Appropriate Management of suspect/confirmed cases of COVID-19'. [<https://www.mohfw.gov.in/pdf/FinalGuidanceonMangaementofCovidcasesversion2.pdf>] Accessed 23 September 2020

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: 1

There is evidence that India has a national procurement protocol in place which can be utilized by the Ministries of Health and Ministry of Agriculture for the acquisition of medical and laboratory supplies. India's Department of Expenditure published the "Manual for Procurement of Goods" in 2017 which outlines the procedures for procurement. The protocol applies to all government entities including the Ministries of Health and Agriculture for purchase of goods and services. [1] There is evidence that the protocol is used for the acquisition of laboratory needs (such as equipment, diagnostic kits) for routine use by the Ministry of Health. National Centre for Disease Control under the Ministry of Health, has tenders available on their website for acquiring new laboratory equipment such as, machines, equipments, diagnostic kits but no tenders on medical supplies.[2] No further evidence is found under the Ministry of Health, Ministry of Agriculture or the All India Institute of Medical Sciences websites.[3,4,5]

[1] Government of India Ministry of Finance Department of Expenditure. "Manual for Procurement of Goods" 2017. [https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20Goods%202017_0_0.pdf]. Accessed 23 September 2020

[2] Government of India. National Centre for Disease Control. "Tenders".

[<https://ncdc.gov.in/index1.php?page=1&ipp=All&lang=1&level=1&sublinkid=556&lid=436>]. Accessed 23 September 2020.

[3] Government of India. Ministry of Health & Family Welfare. [<https://main.mohfw.gov.in/>]. Accessed 23 September 2020.

[4] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>]. Accessed 23 September 2020

[5] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 23 September 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: 0

There is no evidence that the country has a stockpile of medical supplies (e.g. Medical Countermeasures (MCMs), medicines, vaccines, medical equipment, PPE) for national use during a public health emergency. India's "National Disaster Management Guidelines Management of Biological Disasters," states that 'State-run hospitals have limited medical supplies. There is no stockpile of drugs, important vaccines like anthrax vaccine, PPE or diagnostics for surge capacity. In a crisis situation there is further incapacitation due to tedious procurement procedures. Inventory management/ supply chain management concepts are not followed. Protection, detection, decontamination equipment are not available with most first responders.

Decontamination, decorporation and CBRN treatment modalities are also grossly inadequate'. [1] Additionally, the "National Disaster Management Guidelines Management of Biological Disasters," highlights the importance of stockpiles, stating that "identifying, stockpiling, supply chain and inventory management of drugs, equipment and consumables including vaccines and other agents for protection, detection, and medical management" is of vital importance. [1] However, there is evidence that India has agreements with vaccine manufacturers in place that could be used for manufacture of MCMs during a public health emergency. India's "National Disaster Management Guidelines Management of Biological Disasters," suggests that the government create ties with major private vaccine manufacturers within the country in order to scale up "for manufacture of pandemic influenza vaccine." Although there is no evidence of such an agreement yet in place, there is evidence that there are vaccine manufacturers which are part of the public sector. [1,2] However, there is no public evidence via these laboratories that they are focused on developing vaccines beyond preventative vaccines for diseases such as measles versus vaccines for pandemic diseases such as influenza. [2] A sample list of stock inventory for disaster stores is available in Annexure J, "Sample stock inventory for disaster stores," in their National Disaster Management Division's "Guidelines for Hospital Emergency Preparedness Planning." This list includes medical equipments, I.V. Fluids, Resuscitation Drugs, Antibiotics, Bronchodilators," etc. but is only for hospitals and not a national stockpile. [3] There is no evidence of any such national stockpiles of medical supplies or agreements with medical countermeasure manufacturers on their Ministry of Health & Family Welfare, Ministry of Defence websites, National Disaster Management Authority websites or Central Drugs Standard Control Organization websites. [4,5,6,7,8] In light of the present COVID-19 pandemic, guidelines state that 'the State Government has to ensure adequate stock of Personal Protective Equipment (PPE). The quantity required for a containment operation will depend upon the size and extent of the cluster and the time required for containing it. States will also ensure that the PPE are being used in accordance with the guidelines on rational use of PPE', however there is no evidence of a stockpile of these equipments. There is no evidence of a stockpile of MCMs mentioned [9]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 23 September 2020.

- [2] Government of India Central Drugs Standard Control Organization. "List of Licensed Vaccine Manufacturers in India". 2017. [<http://www.cdsc.org.in/writereaddata/List%20of%20Licensed%20Vaccine%20Manufacturers%20in%20India17.pdf>]. Accessed 23 September 2020
- [3] Government of India National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 23 September 2020.
- [4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 23 September 2020
- [5] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 23 September 2020
- [6] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 23 September 2020
- [7] Government of India Central Drugs Standard Control Organization. "Clinical Trial" [<https://cdsc.org.in/opencms/opencms/en/Clinical-Trial/clinical-trials/>]. Accessed 23 September 2020
- [8] Government of India Pasteur Institute of India Coonoor. "Annual Report 2016-2017". March 2017. [<http://pasteurinstituteindia.com/Annual%20Report/AR%202016-17.pdf>]. Accessed 23 September 2020.
- [9] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)'. [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 23 September 2020

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 no evidence that India has a stockpile of laboratory supplies (e.g. reagents, media) for national use during a public health emergency. There is no mention of a stockpile of laboratory supplies in the "National Disaster Management Guidelines Management of Biological Disasters". Although recommendations for upgrading facilities at diagnostic laboratories have been elaborated in these guidelines, there is no mention of a stockpile. [1] No evidence of a stockpile of laboratory supplies is found in their National Disaster Management Division's "Guidelines for Hospital Emergency Preparedness Planning." [2] No further evidence is found under the Ministry of Health & Family Welfare, Ministry of Defence websites or National Disaster Management Authority websites.[3,4,5] In light of the present pandemic, no evidence of a stockpile of laboratory supplies is seen in the 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)'. [6]

- [1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 23 September 2020.
- [2] Government of India National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 23 September 2020.
- [3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 23 September 2020
- [4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 23 September 2020
- [5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 23 September 2020
- [6] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)'. [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 23 September 2020

4.2.2c

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

Yes = 1, No = 0

Current Year Score: 0

There is no evidence that the country conducts or requires an annual review of the national stockpile of medical or laboratory supplies to ensure the supply is sufficient for a public health emergency. There is no evidence that India has a stockpile of medical supplies or laboratory supplies (e.g. reagents, media) for national use during a public health emergency. No evidence of a stockpile of these supplies or an annual review of the same is found under "National Disaster Management Guidelines Management of Biological Disasters" or the National Disaster Management Division's "Guidelines for Hospital Emergency Preparedness Planning." [1,2] No further evidence is found under the Ministry of Health & Family Welfare, Ministry of Defence websites, National Disaster Management Authority websites or the Central Drugs Standard Control Organization websites. [3,4,5,6,7]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 March 2021.

[2] Government of India National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 28 March 2021.

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 March 2021

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 28 March 2021

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 28 March 2021

[6] Government of India Central Drugs Standard Control Organization. "Clinical Trial" [<https://cdsco.gov.in/opencms/opencms/en/Clinical-Trial/clinical-trials/>]. Accessed 28 March 2021

[7] Government of India Pasteur Institute of India Coonoor. "Annual Report 2016-2017". March 2017. [<http://pasteurinstituteindia.com/Annual%20Report/AR%202016-17.pdf>]. Accessed 28 March 2021

4.2.3 Manufacturing and procurement for emergencies

4.2.3a

Does the country meet one of the following criteria?

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

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

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

Current Year Score: 0

There is no evidence 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. There is also no evidence of a plan/mechanism to procure medical supplies (e.g. MCMs, medicines, vaccines, equipment, PPE) for national use during a public health emergency. There is evidence that India has a national procurement protocol in place which can be utilized by the Ministries of Health and Agriculture for the acquisition of goods, however there is no evidence that the protocol can also be used for acquisition of medical supplies (medicines, MCMs, PPE, equipment, vaccines) during a public health emergency. [1] The National Centre for Disease Control has tenders available on their website for acquiring new laboratory

equipment such as, machines, equipments, diagnostic kits but no tenders on medical supplies.[2] India's "National Disaster Management Guidelines Management of Biological Disasters," states that 'State-run hospitals have limited medical supplies. There is no stockpile of drugs, important vaccines like anthrax vaccine, PPE or diagnostics for surge capacity. In a crisis situation there is further incapacitation due to tedious procurement procedures. Inventory management/ supply chain management concepts are not followed.' There is no evidence of a plan to leverage domestic manufacturing or a mechanism to procure medical supplies during a public health emergency in these guidelines.[3] There is however, evidence that India has agreements with vaccine manufacturers in place that could be used for manufacture of MCMs during a public health emergency. India's "National Disaster Management Guidelines Management of Biological Disasters," suggests that the government create ties with major private vaccine manufacturers within the country in order to scale "up for manufacture of pandemic influenza vaccine." Although there is no evidence of such an agreement yet in place, there is evidence that there are vaccine manufacturers which are part of the public sector.[3,4] No such plan is found under the "Guidelines for Hospital Emergency Preparedness Planning" although the importance of use of PPE is highlighted[5]The importance of PPE is highlighted in the guidelines for the COVID-19 pandemic 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' but no evidence of a plan to leverage domestic manufacturing of or procurement of medical supplies is mentioned.[6] However, there is evidence that the indigenous manufacturers have come together and ramped up medical supplies such as ventilators, PPE, therapeutics and diagnostics to meet the country's demands in light of the present COVID-19 pandemic. According to reports, "Earlier, there was no domestic manufacturing of PPE in the country and almost all of them were imported. Now, we have 111 indigenous manufacturers. PPE production capacity has increased so much that it has become a Rs 7,000-crore industry in India, the biggest after China" [7,8] No further evidence is found under the Ministry of Health, Ministry of Defence, the National Disaster Management or Directorate General Of Foreign Trade websites[9,10,11,12]

[1] Government of India Ministry of Finance Department of Expenditure. "Manual for Procurement of Goods" 2017.

[https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20Goods%202017_0_0.pdf]. Accessed 25 September 2020

[2] Government of India. National Centre for Disease Control. "Tenders".

[<https://ncdc.gov.in/index1.php?page=1&ipp=All&lang=1&level=1&sublinkid=556&lid=436>]. Accessed 25 September 2020

[3] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 25 September 2020

[4] Government of India. Central Drugs Standard Control Organization. "List of Licensed Vaccine Manufacturers in India". 2017. [<http://www.cdsc.nic.in/writereaddata/List%20of%20Licensed%20Vaccine%20Manufacturers%20in%20India17.pdf>]. Accessed 25 September 2020

[5] Government of India. National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 23 September 2020

[6] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)'. [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 25 September 2020

[7] ET Healthworld.com. 03 May 2020. 'India ramps up production of Covid-19 protective gears, medical equipment'

[[https://health.economictimes.indiatimes.com/news/medical-devices/india-ramps-up-production-of-covid-19-protective-gears-medical-](https://health.economictimes.indiatimes.com/news/medical-devices/india-ramps-up-production-of-covid-19-protective-gears-medical-equipment/75514109#:~:text=According%20to%20the%20government%2C%20the,be%20produced%20indigenously%2C%20he%20said.)

[equipment/75514109#:~:text=According%20to%20the%20government%2C%20the,be%20produced%20indigenously%2C%20he%20said.](https://health.economictimes.indiatimes.com/news/medical-devices/india-ramps-up-production-of-covid-19-protective-gears-medical-equipment/75514109#:~:text=According%20to%20the%20government%2C%20the,be%20produced%20indigenously%2C%20he%20said.)] Accessed 25 September 2020.

[8] ET Healthworld.com. 07May 2020. 'Mylab increases production capacity of Covid-19 testing kits to 2 lakh per

day.' [<https://health.economictimes.indiatimes.com/news/pharma/mylab-increases-production-capacity-of-covid-19-testing-kits-to-2-lakh-per-day/75598366>] Accessed 25 September 2020

[9] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 25 September 2020.

[10] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 25 September 2020

[11] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 25 September 2020.

[12] Government of India. Ministry of Commerce and Trade. Directorate General of Foreign Trade [<https://dgft.gov.in/CP/>] Accessed 25 September 2020

4.2.3b

Does the country meet one of the following criteria?

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

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

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

Current Year Score: 0

There is no evidence 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 nor is there evidence of a plan/mechanism to procure laboratory supplies (e.g. reagents, media) for national use during a public health emergency. There is evidence that India has a national procurement protocol in place which can be utilized by the Ministries of Health and Agriculture for the acquisition of laboratory needs (such as equipment, reagents and media) however there is no evidence that the protocol can also be used for acquisition of laboratory supplies during a public health emergency[1] The National Centre for Disease Control (NCDC) has tenders available on their website for acquiring new laboratory equipment such as, machines, equipments, diagnostic kits but no tenders on reagents and media.[2] India's "National Disaster Management Guidelines Management of Biological Disasters," states that "State-run hospitals have limited medical supplies. There is no stockpile of drugs, important vaccines like anthrax vaccine, PPE or diagnostics for surge capacity. In a crisis situation there is further incapacitation due to tedious procurement procedures. Inventory management/ supply chain management concepts are not followed." There is no evidence of a plan to leverage domestic manufacturing or a mechanism to procure laboratory supplies during a public health emergency in these guidelines.[3] No such plan is found under the "Guidelines for Hospital Emergency Preparedness Planning" or in the 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' released in light of the present COVID-19 pandemic[4,5] No further evidence is found under the Ministry of Health, Ministry of Defence, the National Disaster Management or Directorate General Of Foreign Trade websites websites.[6,7,8,9]

[1] Government of India Ministry of Finance Department of Expenditure. "Manual for Procurement of Goods" 2017.

[https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20Goods%202017_0_0.pdf]. Accessed 25 September 2020

[2] Government of India. National Centre for Disease Control. "Tenders".

[<https://ncdc.gov.in/index1.php?page=1&ipp=All&lang=1&level=1&sublinkid=556&lid=436>]. Accessed 25 September 2020

[3] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 25 September 2020

[4] Government of India. National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 23 September 2020

[5] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)'. [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 25 September 2020

- [6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 25 September 2020.
- [7] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 25 September 2020
- [8] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/>]. Accessed 25 September 2020.
- [9] Government of India. Ministry of Commerce and Trade. Directorate General of Foreign Trade [<https://dgft.gov.in/CP/>] Accessed 25 September 2020

4.3 MEDICAL COUNTERMEASURES AND PERSONNEL DEPLOYMENT

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

4.3.1a

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

Yes = 1 , No = 0

Current Year Score: 0

There is no evidence that India has guidelines in place for dispensing medical countermeasures for national use during a public health emergency (i.e. antibiotics, vaccines, therapeutics and diagnostics). Although, according to India's "National Disaster Management Guidelines Management of Biological Disasters," "identifying, stockpiling, supply chain and inventory management of drugs, equipment and consumables including vaccines and other agents for protection, detection, and medical management" is of vital importance. No specifics are given about how these countermeasures are to be dispensed during a public health emergency.[1] No evidence is found under the "Guidelines for Hospital Emergency Preparedness Planning".[2] Lastly, there is no information on the dispensing tactics of these stockpiles on their Ministry of Health & Family Welfare, Ministry of Defence, All India Institute of Medical Sciences, National Centre for Disease Control or National Disaster Management Authority websites. [3,4,5,6,7]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 25 September 2020.

[2] Government of India. National Disaster Management Division. "Guidelines for Hospital Emergency Preparedness Planning". 2008. [http://asdma.gov.in/pdf/publication/undp/guidelines_hospital_emergency.pdf]. Accessed 25 September 2020

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 25 September 2020.

[4] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 25 September 2020.

[5] Government of India. All India Institute of Medical Sciences. [<https://www.aiims.edu/en.html>]. Accessed 25 September 2020.

[6] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 25 September 2020.

[7] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 25 September 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 no evidence that India has a public plan in place to receive health personnel from other countries to respond to a public health emergency. Neither their "National Disaster Management Guidelines Management of Biological Disasters" nor their "National Disaster Management Plan (NDMP)" makes any mention of receiving health personnel from other countries to respond to a public health emergency. [1,2] Similarly, no evidence of such a public plan exists on their National Disaster Response Force, National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare, Ministry of Defence or National Centre for Disease Control websites. [3,4,5,6,7,8]. No evidence is found under 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' released in light of the present COVID-19 pandemic.[9]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 25 September 2020

[2] Government of India National Disaster Management Authority. "National Disaster Management Plan (NDMP)". May 2016. [<https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf>]. Accessed 25 September 2020.

[3] Government of India. National Disaster Response Force. [<http://www.ndrf.gov.in>]. Accessed 25 September 2020.

[4] Government of India National Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 25 September 2020

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 25 September 2020.

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 25 September 2020.

[7] Government of India. Ministry of Defence. [<https://mod.gov.in/>]. Accessed 25 September 2020.

[8] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 25 September 2020.

[9] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 25 September 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: 81.4

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: 158.08

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: 0

2020

World Policy Analysis Center

4.4.3 Healthcare worker access to healthcare

4.4.3a

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

Yes = 1, No = 0

Current Year Score: 0

There is no evidence that the government of India has issued legislation, a policy or a public statement committing to provide prioritized health care services to healthcare workers who become sick as a result of responding to a public health emergency. There is no evidence of such a clause anywhere in neither their "National Disaster Management Guidelines Management of Biological Disasters" nor their "National Disaster Management Plan (NDMP)." [1,2] Similarly, no evidence of such a public plan exists on their National Disaster Response Force, National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare or National Centre for Disease Control websites. [3,4,5,6,7]. Further, although insurance schemes are provided by the government, for frontline health workers in light of the present COVID-19 pandemic, there is no evidence of an issued plan to provide prioritized health care services to the health care workers who become sick as a result of responding to the pandemic.[8] No such plan is seen under the 'Containment

Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' issued in light of the present COVID-19 pandemic.[9]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 26 September 2020.

[2] Government of India National Disaster Management Authority. "National Disaster Management Plan (NDMP)". May 2016. [<https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf>]. Accessed 26 September 2020.

[3] Government of India. National Disaster Response Force. [<http://www.ndrf.gov.in>]. Accessed 26 September 2020

[4] Government of India National Ministry of Home Affairs. Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 26 September 2020

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 26 September 2020

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 26 September 2020

[7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 26 September 2020

[8] Government of India. Ministry of Health and Family Welfare. Resources. Hospitals. 'Pradhan Mantri Garib Kalyan Package: Insurance Scheme for Health Workers Fighting COVID-

19.' [<https://www.mohfw.gov.in/pdf/FAQPradhanMantriGaribKalyanPackageInsuranceSchemeForHealthWorkersFightingCOVID19.pdf>] Accessed 26 September 2020

[9] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 26 September 2020

4.5 COMMUNICATIONS WITH HEALTHCARE WORKERS DURING A PUBLIC HEALTH EMERGENCY

4.5.1 Communication with healthcare workers

4.5.1a

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

Yes = 1, No = 0

Current Year Score: 1

There is sufficient evidence to confirm that India has a system in place for public health officials and healthcare workers to communicate during a public health emergency. India's "National Disaster Management Guidelines Management of Biological Disasters" declares that communication is a vital component of disaster management and thus they aim to improve and upgrade their systems accordingly. [1] They plan to do this through the "establishment of control rooms at the district, state and central levels and inclusion of private practitioners in the network through the IDSP (Integrated Disease Surveillance Programme). There will be terrestrial and satellite based hubs for failsafe communication both vertically and horizontally." [1] In addition, "all hospitals will be connected with IAN (Integrated Ambulance Network) and QRMTs (Quick Reaction Medical Teams). They will have an intra-hospital horizontal network. Dedicated telephone numbers shall be made available to hospitals. The network shall also be integrated with police, fire and other helpline services." [1] Such a control room is in place "at the NDMA (National Disaster Management Authority) Bhawan which is a repository for disaster specific information and data input facility. The Control Room is manned 24X7 and has a National Helpline (No. 1078). The Control Room shares critical disaster related inputs with the concerned states through video conferencing and other means and coordinates response activities." [2] In addition, each SDMA (State Disaster Management Authority) also has its own control

room. [3] There is evidence that these communication systems are in place. India's Common Alerting Protocol (CAP) facilitates this communication and the NDMA have tested this system in July 2018. [2,4]. Further evidence for such a system is also found in the the 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' issued in light of the present COVID-19 pandemic. It states that the 'District Collector would be the nodal person for all preparedness and response activities within his jurisdiction. District Collector will hold regular meetings with health functionaries, District Disaster Management Authority (DDMA), Revenue, Public Works Department (PWD), Forest, Education and Panchayati Raj/ Local Self Governance Departments where the containment plan will be finalized and operationalized. These officials will issue directions to their ground level staff in all aspects of preparedness, control and containment in accordance with the Containment Plan and Guidelines. Emergency Medical Relief (EMR) division, Ministry of Health and Family Welfare will deploy the Central Rapid Response Team (RRT) to support and advice the State. The State will deploy its own State RRT and District RRT.' The District RRT forms the contact point for the health care workers in each district.[5]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 26 September 2020.

[2] Government of India National Disaster Management Authority. "Introduction". [<https://ndma.gov.in/en/about-ndma/divisions/ops-comn-and-it>]. Accessed 26 September 2020

[3] Government of India National Disaster Management Authority. "Search Keyword: control room". [<https://ndma.gov.in/en/component/search/?searchword=control%20room&searchphrase=all&Itemid=186>]. Accessed 26 September 2020.

[4] The Indian Express. "Five months after alarm, DoT acts: disaster alert SMS will go to all". November 2018. [<https://indianexpress.com/article/india/five-months-after-alarm-dot-acts-disaster-alert-sms-will-go-to-all-5454681/>]. Accessed 26 September 2020.

[5] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 26 September 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: 1

There is evidence that the system in India for public health officials and healthcare workers to communicate during an emergency encompasses healthcare workers in both the public and private sector. India's "National Disaster Management Guidelines Management of Biological Disasters" declares that communication is a vital component of disaster management and thus they aim to improve and upgrade their systems accordingly. [1] They plan to do this through the "establishment of control rooms at the district, state and central levels and inclusion of private practitioners in the network through the IDSP (Integrated Disease Surveillance Programme). There will be terrestrial and satellite based hubs for failsafe communication both vertically and horizontally." [1] There is evidence that this system is in place. India's Common Alerting Protocol (CAP) facilitates this communication and the National Disaster Management Authority (NDMA) has tested this system in July 2018. [2,3] According to India's "National Disaster Management Guidelines Management of Biological Disasters," "private sector facilities are required to be included in district-level disaster management (DM) plans and collaborative strategies shall be evolved at the district level for the utilisation of their manpower and infrastructure." [1] India's Emergency Medical Relief division is in charge of overseeing communications as it "coordinates all such actions that require interface between MoH&FW [Ministry of Health & Family Welfare], other central ministries, the state(s) and other institutions both in the public

and private sectors." [1] The NDMA recognizes that "patterns of critical information exchange during crisis situations are different than in normal business. Identifying and deploying appropriate public, private, and volunteer resources in a coordinated, timely manner depends on a commitment to addressing—in advance of a disaster— such concerns as interoperability and the use of common standards." [2]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 26 September 2020

[2] Government of India National Disaster Management Authority. "New initiatives". [<https://ndma.gov.in/en/operation-dm-policy.html>]. Accessed 26 September 2020.

[3] The Indian Express. "Five months after alarm, DoT acts: disaster alert SMS will go to all". November 2018. [<https://indianexpress.com/article/india/five-months-after-alarm-dot-acts-disaster-alert-sms-will-go-to-all-5454681/>]. Accessed 26 September 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

There is evidence that India's national public health system monitors for and tracks the number of health care associated infections that take place in healthcare facilities. The HAI Surveillance India project is a cooperative agreement in which "the All India Institute of Medical Sciences (AIIMS), New Delhi is collaborating with the Centers for Disease Control and Prevention (CDC) and Indian Council of Medical Research (ICMR) [to] strengthen the national capacity for surveillance of HAIs, using the modules developed at AIIMS, based on CDC's guidelines." [1] More specifically the project aims to "serve the need for reliable AMR data to support successful patient care, and public health need to measure, track and report the magnitude and types of AMR and HAI threats affecting India." [1] Reports from the HAI Surveillance India project show that the system has been in place since 2015, is operating in 25+ hospitals and 102+ surveillance units and collects data for a number of AMR pathogens include *K.pneumoniae*, *E.coli*, *S.aureus* and others. [2,3]

[1] HAI Surveillance India. "About". [<https://www.haisindia.com/about>]. Accessed 26 September 2020.

[2] All India Institute of Medical Services. 2017-2018. "Capacity Building and Strengthening of Hospital Infection Control to detect and prevent Antimicrobial resistance in India."

[https://www.haisindia.com/upload/fileuploads/1535613297_TOT%20Jan%202018.pdf] Accessed 26 September 2020.

[3] HAI Surveillance India. [<https://www.haisindia.com>]. Accessed 26 September 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

There is evidence that India has a national requirement for ethical review before beginning a clinical trial. The Clinical Trials Registry - India (CTRI) under their National Institute of Medical Statistics registers all clinical trials in India. [1] Part of the information they record is the "name of Ethics Committee and approval status." [1] However, India does not have a national ethics committee and so independent ethics committees fill this need. According to India's "Drugs and Cosmetics Act and Rules" last amended in December 2016, "approval of the Ethics Committee shall be obtained before initiation of any clinical study." [2] Furthermore, "no Ethics Committee shall review and accord its approval to a clinical trial protocol without prior registration with the Licensing Authority." Only when an Ethics Committee already registered with their Drug Controller General India (DCGI) approves the study, it can go ahead. [2]

[1] Government of India. Indian Council of Medical Research. National Institute of Medical Statistics. National Institute Clinical Trials Registry - India. [<http://ctri.nic.in/Clinicaltrials/login.php>]. Accessed 26 September 2020.

[2] Government of India Ministry of Health and Family Welfare. "The Drugs and Cosmetics Act and Rules". December 2016. [https://indiacode.nic.in/ViewFileUploaded?path=AC_CEN_12_13_00023_194023_1523353460112/rulesindividualfile/&file=Drugs+and+Cosmetics+Act%2C+1940+and+Rules%2C+1945.pdf]. Accessed 26 September 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 that India has an expedited process for approving clinical trials for unregistered medical countermeasures to treat ongoing pandemics. There is no evidence of an expedited process for approving clinical trials anywhere on their Clinical Trials Registry, or in their "The Drugs and Cosmetics Act and Rules," Ministry of Health & Family Welfare or Ministry of Science and Technology websites. [1,2,3,4]

[1] Government of India. Indian Council of Medical Research. National Institute of Medical Statistics. National Institute Clinical Trials Registry - India. [<http://ctri.nic.in/Clinicaltrials/login.php>]. Accessed 28 September 2020

[2] Government of India. Ministry of Health and Family Welfare. "The Drugs and Cosmetics Act and Rules". December 2016. [https://indiacode.nic.in/ViewFileUploaded?path=AC_CEN_12_13_00023_194023_1523353460112/rulesindividualfile/&file=Drugs+and+Cosmetics+Act%2C+1940+and+Rules%2C+1945.pdf]. Accessed 28 September 2020.

[3] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 September 2020

[4] Government of India. Ministry of Science and Technology. [<http://www.dst.gov.in/>]. Accessed 28 September 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

There is evidence that India has a government agency responsible for approving new medical countermeasures for humans. "Under the Drugs and Cosmetics Act, their Central Drugs Standard Control Organization (CDSCO) is responsible for approval of Drugs, Conduct of Clinical Trials, laying down the standards for Drugs, control over the quality of imported Drugs in the country and coordination of the activities of State Drug Control Organizations by providing expert advice with a view of bring about the uniformity in the enforcement of the Drugs and Cosmetics Act. [1] Further CDSCO along with state regulators, is jointly responsible for grant of licenses of certain specialized categories of critical Drugs such as blood and blood products, I. V. Fluids, Vaccine and Sera." [1]

[1] Government of India. Ministry of Health and Family Welfare. Directorate General of Health Services. Central Drugs Standard Control Organization. 'About Us.'[\[https://cdsco.gov.in/opencms/opencms/en/\]](https://cdsco.gov.in/opencms/opencms/en/) Accessed 28 September 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: 0

There is no evidence that India has an expedited process for approving medical countermeasures for human use during public health emergencies. Their Central Drugs Standard Control Organization is responsible for the "approval of licenses of specified categories of drugs such as blood and blood products, IV fluids, vaccines and sera in India" and there is no evidence it oversees approval of medical countermeasures for human use during public health emergencies. [1] There is no evidence of an expedited process for approving medical countermeasures for human use during public health emergencies anywhere on their Clinical trials Registry - India, in their "The Drugs and Cosmetics Act and Rules," Ministry of Health & Family Welfare, Ministry of Science and Technology or Central Drugs Standard Control Organization website. [1,2,3,4,5] A Pharmaceutical journal describes certain changes to India's Drug and Cosmetics Acts and Rules as written in a new draft in February 2018. It states "Some of the above processes/mechanisms may be followed to expedite the development and approval of new drugs intended to be used in life-threatening/serious diseases of special relevance to India as well." However, this draft is supposed to be approved by the Ministry of Health, and there is no evidence that this has occurred, based on a review of the health ministry's website. [6,4]

[1] Government of India Central Drugs Standard Control Organization. "Clinical Trial"

[\[https://cdsco.gov.in/opencms/opencms/en/Clinical-Trial/clinical-trials/\]](https://cdsco.gov.in/opencms/opencms/en/Clinical-Trial/clinical-trials/). Accessed 28 September 2020

[2] Government of India. Indian Council of Medical Research. National Institute of Medical Statistics. National Institute Clinical Trials Registry - India. [<http://ctri.nic.in/Clinicaltrials/login.php>]. Accessed 28 September 2020.

[3] Government of India. Ministry of Health and Family Welfare. "The Drugs and Cosmetics Act and Rules". December 2016. [https://indiacode.nic.in/ViewFileUploaded?path=AC_CEN_12_13_00023_194023_1523353460112/rulesindividualfile/&file=

Drugs+and+Cosmetics+Act%2C+1940+and+Rules%2C+1945.pdf]. Accessed 28 September 2020

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 September 2020.

[5] Government of India. Ministry of Science and Technology. [<http://www.dst.gov.in/>]. Accessed 28 September 2020

[6] Bobby George. 2018. "India Making Way for Separate Clinical Trial Rules". Clinical Leader.

[<https://www.clinicalleader.com/doc/india-making-way-for-separate-clinical-trials-rules-0001>]. Accessed 28 September 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 evidence that India has integrated pandemics into the national risk reduction strategy or that India has a standalone national disaster risk reduction strategy for pandemics. Although, their "National Disaster Management Plan (NDMP)" does cover risk reduction; it does not do so for epidemics and pandemics. [1] Furthermore, their "National Disaster Management Guidelines Management of Biological Disasters" mentions the need to develop a rigorous risk reduction framework in order "to reduce the number of deaths during biological disasters, both intentional and accidental." [2] However, no evidence of such a strategy is yet available on their National Disaster Response Force, National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare or National Centre for Disease Control websites. [3,4,5,6,7]

- [1] Government of India National Disaster Management Authority. "National Disaster Management Plan (NDMP)". May 2016. [<https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf>]. Accessed 28 September 2020
- [2] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 September 2020
- [3] Government of India. National Disaster Response Force. [<http://www.ndrf.gov.in>]. Accessed 28 September 2020.
- [4] Government of India. Ministry of Home Affairs. National Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 28 September 2020
- [5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 28 September 2020
- [6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 September 2020
- [7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 28 September 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 evidence that India has cross-border agreements, protocols or MOUs with neighbouring countries, or as part of a regional group, with regards to public health emergencies. It is clearly stated in their "National Disaster Management Guidelines Management of Biological Disasters" that they need to develop a mechanism for enhancing international cooperation. [1] They claim that "during the preparedness phase, various interactive forums will be developed to evaluate the common problems and identify viable solutions for prompt and effective management of biological emergencies. The mechanism for international cooperation will include both resource sharing, stockpiling of medical logistics at the regional level, joint international mock exercises and knowledge management systems." [1] Although India is a part of the South Asian Association for Regional Cooperation (SAARC), there is no publicly available written agreement of any agreements or protocols with regards to public health emergencies; rather the aim of the collaboration is geared towards knowledge and skill sharing such as through shared reference labs. [2] Lastly, there is no evidence of such cross-border agreements on their National Disaster Response Force, National Institute of Disaster Management, National Disaster Management Authority or Ministry of Health and Family Welfare websites. [3,4,5,6]

- [1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 September 2020.
- [2] South Asian Association for Regional Cooperation (SAARC) Tuberculosis and HIV/AIDS Centre (STAC). "SAARC Ref. Lab". 2016. (<https://www.saarctb.org/new/saarc-ref-lab/>). Accessed 28 September 2020
- [3] Government of India. National Disaster Response Force. [<http://www.ndrf.gov.in>]. Accessed 28 September 2020.
- [4] Government of India. Ministry of Home Affairs. National Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 28 September 2020.
- [5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed by 28 September

2020.

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 September 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

There is no evidence that India has cross-border agreements, protocols or MOUs with neighbouring countries, or as part of a regional group, with regards to animal health emergencies. It is clearly stated in their "National Disaster Management Guidelines Management of Biological Disasters" that they need to develop a mechanism for enhancing international cooperation. [1] They claim that "during the preparedness phase, various interactive forums will be developed to evaluate the common problems and identify viable solutions for prompt and effective management of biological emergencies. The mechanism for international cooperation will include both resource sharing, stockpiling of medical logistics at the regional level, joint international mock exercises and knowledge management systems." [1] Although India is a part of the SAARC, there is no publicly available written agreement of any agreements or protocols with regards to public health emergencies/animal health emergencies; rather the aim of the collaboration is geared towards knowledge and skill sharing such as through shared reference labs. [2] Lastly, there is no evidence of such cross-border agreements on their National Disaster Response Force, National Institute of Disaster Management, National Disaster Management Authority, Ministry of Health and Family Welfare or National Centre for Disease Control websites. [3,4,5,6,7]

[1] Government of India National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 September 2020

[2] South Asian Association for Regional Cooperation(SAARC) Tuberculosis and HIV/AIDS Centre (STAC). "SAARC Ref. Lab". 2016. (<https://www.saarctb.org/new/saarc-ref-lab/>). Accessed 28 September 2020.

[3] Government of India. National Disaster Response Force. [<http://www.ndrf.gov.in>]. Accessed 28 September 2020

[4] Government of India.Ministry of Home Affairs. National Institute of Disaster Management. [<http://nidm.gov.in/default.asp>]. Accessed 28 September 2020

[5] Government of India. National Disaster Management Authority. [<https://ndma.gov.in/en/>]. Accessed 28 December 2020.

[6] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 28 September 2020

[7] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 28 September 2020

5.3 INTERNATIONAL COMMITMENTS

5.3.1 Participation in international agreements

5.3.1a

Does the county have signatory and ratification (or same legal effect) status to the Biological Weapons Convention?

Signed and ratified (or action having the same legal effect) = 2, Signed = 1, Non-compliant or not a member = 0

Current Year Score: 2

2021

Biological Weapons Convention

5.3.1b

Has the country submitted confidence building measures for the Biological Weapons Convention in the past three years?

Yes = 1 , No = 0

Current Year Score: 1

2021

Biological Weapons Convention

5.3.1c

Has the state provided the required United Nations Security Council Resolution (UNSCR) 1540 report to the Security Council Committee established pursuant to resolution 1540 (1540 Committee)?

Yes = 1 , No = 0

Current Year Score: 1

2021

Biological Weapons Convention

5.3.1d

Extent of United Nations Security Council Resolution (UNSCR) 1540 implementation related to legal frameworks and enforcement for countering biological weapons:

Very good (60+ points) = 4, Good (45–59 points) = 3, Moderate (30–44 points) = 2, Weak (15–29 points) = 1, Very weak (0–14 points) or no matrix exists/country is not party to the BWC = 0

Current Year Score: 4

2021

Biological Weapons Convention

5.3.2 Voluntary memberships

5.3.2a

Does the country meet at least 2 of the following criteria?

- Membership in Global Health Security Agenda (GHSA)
- Membership in the Alliance for Country Assessments for Global Health Security and IHR Implementation (JEE Alliance)
- Membership in the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (GP)
- Membership in the Australia Group (AG)
- Membership in the Proliferation Security Initiative (PSI)

Needs to meet at least two of the criteria to be scored a 1 on this measure. , Yes for five = 1 , Yes for four = 1 , Yes for three = 1 , Yes for two = 1 , Yes for one = 0 , No for all = 0

Current Year Score: 1

2021

Global Health Security Agenda; JE Alliance; Global Partnership; Australia Group; PSI

5.4 JOINT EXTERNAL EVALUATION (JEE) AND PERFORMANCE OF VETERINARY SERVICES PATHWAY (PVS)

5.4.1 Completion and publication of a Joint External Evaluation (JEE) assessment and gap analysis

5.4.1a

Has the country completed a Joint External Evaluation (JEE) or precursor external evaluation (e.g., GHSA pilot external assessment) and published a full public report in the last five years?

Yes = 1, No = 0

Current Year Score: 0

2021

WHO Strategic Partnership for IHR and Health Security (SPH); Global Health Security Agenda

5.4.1b

Has the country completed and published, within the last five years, either a National Action Plan for Health Security (NAPHS) to address gaps identified through the Joint External Evaluation (JEE) assessment or a national GHSA roadmap that sets milestones for achieving each of the GHSA targets?

Yes = 1, No = 0

Current Year Score: 0

2021

WHO Strategic Partnership for IHR and Health Security (SPH); Global Health Security Agenda

5.4.2 Completion and publication of a Performance of Veterinary Services (PVS) assessment and gap analysis

5.4.2a

Has the country completed and published a Performance of Veterinary Services (PVS) assessment in the last five years?

Yes = 1, No = 0

Current Year Score: 1

2021

OIE PVS assessments

5.4.2b

Has the country completed and published a Performance of Veterinary Services (PVS) gap analysis in the last five years?

Yes = 1, No = 0

Current Year Score: 0

2021

OIE PVS assessments

5.5 FINANCING

5.5.1 National financing for epidemic preparedness

5.5.1a

Is there evidence that the country has allocated national funds to improve capacity to address epidemic threats within the past three years?

Yes = 1, No = 0

Current Year Score: 0

There is no evidence that India has allocated national funds to improve capacity to address epidemic threats within the past three years. India has disaster response funds which the country can access in the face of a public health emergency. According to their "National Disaster Management Guidelines Management of Biological Disasters" from 2008, "under the provisions of the DM Act, 2005, the National Disaster Response Fund will be created, and adequate funds will also be earmarked for the containment of biological disasters from this fund." [1] Per Point 7.17 of the "Financing Disaster Management in India" study by the National Institute of Disaster Management's Finance Commission, The National Disaster Response Fund has now been implemented and covers "Biological Disasters and Epidemics" as a man-made disaster which can warrant the use of the fund. [2] This fund is presently in effect and has its own section on the India's Disaster Management Division website, under 'State Disaster Response Fund/National Disaster Response Fund (SDRF/NDRF)'. [3] This fund has been used in light of the COVID-19 pandemic as given under the Disaster Management Division website.[3] However, there is no direct evidence that national funds have been allocated specifically to improve capacity to address epidemic threats. No further evidence is found under the Ministry of Health, Ministry of Home Affairs or the National Disaster Management Authority Websites [4,3,1].

[1] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 September 2020

[2] Government of India. National Institute of Disaster Management. "Financing Disaster Management in India". August 2009. [https://fincomindia.nic.in/writereaddata/html_en_files/oldcommission_html/fincom13/discussion/report23.pdf]. Accessed 28 September 2020

[3] Government of India. Ministry of Home Affairs. Disaster Management Division. "SDRF/NDRF". 2020. [<http://www.ndmindia.nic.in/response-fund>]. Accessed 28 September 2020.

[4] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 23 October 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

India has a publicly identified special emergency public financing mechanism and funds which the country can access in the face of a public health emergency. According to their "National Disaster Management Guidelines Management of Biological Disasters" from 2008, "under the provisions of the DM Act, 2005, the National Disaster Response Fund will be created, and adequate funds will also be earmarked for the containment of biological disasters from this fund." [1] Per Point 7.17 of the "Financing Disaster Management in India" study by the National Institute of Disaster Management's Finance Commission, The National Disaster Response Fund has now been implemented and covers "Biological Disasters and Epidemics" as a man-made disaster which can warrant the use of the fund. [2] This fund is presently in effect and has its own section on the India's Disaster Management Division website under 'State Disaster Response Fund/National Disaster Response Fund (SDRF/NDRF).[3] India does not qualify for credits from the World Bank's International Development Association (IDA) and so is not eligible to access Pandemic Emergency Financing Facility (PEF) funds. [4,5] However, in light of the COVID-19 pandemic

the World Bank has supported India financially to support the health sector and the poor households severely impacted by the pandemic. [6]

[1] Government of India. National Disaster Management Authority. "National Disaster Management Guidelines Management of Biological Disasters". July 2008. [https://ndma.gov.in/images/guidelines/biological_disasters.pdf]. Accessed 28 September 2020

[2] Government of India. National Institute of Disaster Management. "Financing Disaster Management in India". August 2009. [https://fincomindia.nic.in/writereaddata/html_en_files/oldcommission_html/fincom13/discussion/report23.pdf]. Accessed 28 September 2020

[3] Government of India. Ministry of Home Affairs. Disaster Management Division. "SDRF/NDRF". 2020. [<http://www.ndmindia.nic.in/response-fund>]. Accessed 28 September 2020.

[4] World Bank Group International Development Association. "Borrowing Countries". 2020. [<http://ida.worldbank.org/about/borrowing-countries>]. Accessed 28 September 2020.

[5] The World Bank. 'Pandemic Emergency Financing Facility (PEF)'. December 2017. [<http://pubdocs.worldbank.org/en/119961516647620597/PEF-Operational-Brief-Dec-2017.pdf>] Accessed 28 September 2020

[6] The World Bank. '\$1 Billion from World Bank to Protect India's Poorest from COVID-19 (Coronavirus)'. 14 May 2020. [<https://www.worldbank.org/en/news/press-release/2020/05/13/world-bank-covid-coronavirus-india-protect-poor>] Accessed 29 September 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: 0

There is no evidence that senior leaders in India have made a public commitment either to support other countries to improve capacity to address epidemic threats by providing financing or support in the past three years or to improve its own domestic capacity to address epidemic threats by expanding financing or requesting support to improve capacity in the past three years. No press releases or policy documents outlining this can be found on their Ministry of Health and Family Welfare or Ministry of External Affairs websites. [1,2] Although, India has received and requested funding in the past 3 years according to the Global Health Security Funding Tracking Dashboard (2017-2020) none of this funding has been specifically for improving capacity to address epidemic threats. [3] As per a press release, in December 2018, India's Prime Minister Narendra Modi announced financial assistance up to US\$ 1.4 billion for Maldives, which would include healthcare support; however, there is no specific reference to whether this assistance would include strengthening epidemic preparedness. [4]

[1] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 22 October 2020

[2] Government of India. Ministry of External Affairs. [<https://www.mea.gov.in/>]. Accessed October 22, 2020.

[3] Center for Global Health Science and Security. "India". 2020. [<https://tracking.ghscosting.org/#analysis/IN/r>]. Accessed 22 October 22, 2020.

[4] Press Information Bureau. Government of India. Prime Minister's Office. 17 December 2018. "Joint Statement on the occasion of State Visit of the President of the Republic of Maldives to India (December 17, 2018)". [https://www.mea.gov.in/bilateral-documents.htm?dtl/30765/Joint_Statement_on_the_occasion_of_State_Visit_of_the_President_of_the_Republic_of_Maldives_to_India_December_17_2018] Accessed 22 October 2020

5.5.4b

Is there evidence that the country has, in the past three years, either:

- Provided other countries with financing or technical support to improve capacity to address epidemic threats?
- Requested financing or technical support from donors to improve the country's domestic capacity to address epidemic threats?

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

Current Year Score: 1

There is no evidence that India has in the past three years provided other countries with financing or technical support to improve capacity to address epidemic threats but there is evidence that India has requested and received financial support from donors in the past three years to improve the country's domestic capacity to address epidemic threats. India has received funding in the past 3 years according to the Global Health Security Funding Tracking Dashboard, for capacity building, this has been used for various purposes like funds from Canada for Micronutrient Programs for the Survival and Health of Mothers and their Children from 2014 to 2020, from International Bank for Reconstruction and Development for Program Towards Elimination of Tuberculosis between 2014 and 2020, from The Global Fund to Fight AIDS, Tuberculosis and Malaria for Intensified Malaria Elimination Project between 2014 to 2020, from Global Alliance for Vaccines and Immunization for Measles and Measles-Rubella between 2014 and 2020, from Asian Development Bank for Supporting National Urban Health Mission between 2014 and 2020, from US Agency for International Development for Meeting Target and Maintaining Epidemic Control from 2014 to 2020 among others. [1] There is no evidence that India has provided other countries with financing or technical support to improve capacity to address epidemic threats in the past three years.] No press releases or policy documents outlining this can be found on the Global Health Security Funding Tracker or on their Ministry of Health and Family Welfare or Ministry of External Affairs websites. [1,2,3]

[1] Global Health Security Funding Tracker. 'India'.2021. [<https://tracking.ghscosting.org/table/965/recipient>]. Accessed 29 March 2021.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 22 October 2020.

[3] Government of India. Ministry of External Affairs. [<https://www.mea.gov.in/>]. Accessed 22 October 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 evidence that India has a publicly available plan or policy for sharing genetic data, epidemiological data, clinical specimens, and/or isolated specimens (biological materials) with international organizations and/or other countries that goes beyond influenza. Their "Guidelines for collection & transport of clinical specimens during outbreak situation" published by National Centre for Disease Control under their Ministry of Health and Family Welfare in June 2016 outlines the methods for transporting but no commitment of sharing is implied. [1] No evidence of any written agreements or plans to share such data is available on their Ministry of Health & Family Welfare, Ministry of Agriculture and Farmers' Welfare, Ministry of Science and Technology or National Centre for Disease Control websites. [2,3,4,5]

[1] Government of India National Centre for Disease Control. "Guidelines for collection & transport of clinical specimens during outbreak situation". June 2016. [<https://idsp.nic.in/showfile.php?lid=3759>]. Accessed 01 October 2020.

[2] Government of India. Ministry of Health & Family Welfare. [<https://mohfw.gov.in/>]. Accessed 01 October 2020

[3] Government of India. Ministry of Agriculture and Farmers' Welfare. [<http://agricoop.nic.in/>] Accessed 01 October 2020.

[4] Government of India. Ministry of Science and Technology. [<http://www.dbtindia.nic.in/>]. Accessed 01 October 2020.

[5] Government of India. National Centre for Disease Control. [<https://ncdc.gov.in/>]. Accessed 01 October 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 India has not shared samples in accordance with the PIP framework in the past two years. Neither the 'Pandemic influenza preparedness in the WHO South-East Asia Region: a model for planning regional preparedness for other priority high-threat' a report journal released by the WHO in 2020 nor 'Pandemic Influenza Preparedness framework: annual progress report: 1 January - 31 December 2018' released by the WHO in 2019 contain any evidence of non compliance on India's part. [1,2] No evidence of any non adherence is present within the media or other WHO sources at large. [3]

[1] World Health Organization. WHO South-East Asia Journal of Public Health | 'Pandemic influenza preparedness in the WHO South-East Asia Region: a model for planning regional preparedness for other priority high-threat pathogens'. April 2020. [http://www.who-seajph.org/temp/WHOSouth-EastAsiaPublicHealth9143-6324291_014524.pdf]. Accessed 01 October

2020.

[2] World Health Organization. "Pandemic Influenza Preparedness Framework Annual Progress Report. 1 January -31 December, 2018. 2019. [<https://apps.who.int/iris/bitstream/handle/10665/311901/WHO-WHE-IHM-PIP-2019.1-eng.pdf?sequence=1&isAllowed=y>]. Accessed 01 October 2020.

[3] World Health Organization. Official website. [<https://www.who.int/India>] Accessed 01 October 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 Bhutan has not shared pandemic pathogen samples during an outbreak in the past two years. No evidence is found via World Health Organization (WHO) resources as well as media reports. [1,2,3] There is no evidence that in light of the ongoing pandemic COVID-19, India has not shared COVID-19 pathogen samples [3, 4,5].

[1] World Health Organization. WHO South-East Asia Journal of Public Health | 'Pandemic influenza preparedness in the WHO South-East Asia Region: a model for planning regional preparedness for other priority high-threat pathogens'. April 2020. (http://www.who-seajph.org/temp/WHOSouth-EastAsiaJPublicHealth9143-6324291_014524.pdf). Accessed 01 October 2020

[2] World Health Organization. "Pandemic Influenza Preparedness Framework Annual Progress Report. 1 January -31 December,2018. 2019. (<https://apps.who.int/iris/bitstream/handle/10665/311901/WHO-WHE-IHM-PIP-2019.1-eng.pdf?sequence=1&isAllowed=y>). Accessed 01 October 2020.

[3] World Health Organization. Official website. [<https://www.who.int/India>] Accessed 01 October 2020

[4] Government of India. Ministry of Health and Family Welfare. 'Containment Plan for Large Outbreaks. Novel Coronavirus Disease 2019 (COVID-19)' [<https://www.mohfw.gov.in/pdf/3ContainmentPlanforLargeOutbreaksofCOVID19Final.pdf>] Accessed 01 October 2020

[5] ASIAN INFRASTRUCTURE INVESTMENT BANK (AIIB). 'India: COVID-19 Emergency Response and Health Systems Preparedness Project'. [<https://www.aiib.org/en/projects/details/2020/approved/India-COVID-19-Emergency-Response-and-Health-Systems-Preparedness-Project.html>] Accessed 01 October 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: 2

2020

Economist Intelligence

6.1.1b

Quality of bureaucracy (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 2

2020

Economist Intelligence

6.1.1c

Excessive bureaucracy/red tape (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 2

2020

Economist Intelligence

6.1.1d

Vested interests/cronyism (Economist Intelligence score; 0-4, where 4=best)

Input number

Current Year Score: 1

2020

Economist Intelligence

6.1.1e

Country score on Corruption Perception Index (0-100, where 100=best)

Input number

Current Year Score: 40

2020

Transparency International

6.1.1f

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

Input number

Current Year Score: 1

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: 4

2021

Economist Intelligence

6.1.3 Risk of social unrest

6.1.3a

What is the risk of disruptive social unrest?

Very low: Social unrest is very unlikely = 4, Low: There is some prospect of social unrest, but disruption would be very limited = 3, Moderate: There is a considerable chance of social unrest, but disruption would be limited = 2, High: Major social unrest is likely, and would cause considerable disruption = 1, Very high: Large-scale social unrest on such a level as to seriously challenge government control of the country is very likely = 0

Current Year Score: 1

2021

Economist Intelligence

6.1.4 Illicit activities by non-state actors

6.1.4a

How likely is it that domestic or foreign terrorists will attack with a frequency or severity that causes substantial disruption?

No threat = 4, Low threat = 3, Moderate threat = 2, High threat = 1, Very high threat = 0

Current Year Score: 3

2021

Economist Intelligence

6.1.4b

What is the level of illicit arms flows within the country?

4 = Very high, 3 = High, 2 = Moderate, 1 = Low, 0 = Very low

Current Year Score: 0

2020

UN Office of Drugs and Crime (UNODC)

6.1.4c

How high is the risk of organized criminal activity to the government or businesses in the country?

Very low = 4, Low = 3, Moderate = 2, High = 1, Very high = 0

Current Year Score: 2

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: 2

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: 74.37

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: 0.5

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: 4.6

2011

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: 2

According to the International Labor Organization (ILO) statistics, the share of employment in the informal sector stands at more than 90 % of the total workforce, in a report published on 'India's Informal Employment Trends' in 2019. 'Inclusive growth of India will not be achieved unless the share of informal employment in total employment does not fall. However, with over 90 per cent of the entire workforce being informal (defined as those without any social insurance), and 85 per cent of the nonagricultural workforce being informal, India is an outlier among low-middle income countries in this regard. Although India is one of the fastest growing large economy in the world, the informality incidence has remained stuck at this level for decades'. [1]

[1] International Labor Organization. Employment Policy Department. 'Informal Employment Trends in the Indian Economy: Persistent informality, but growing positive development.' 2019. [https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_734503.pdf] Accessed 01 October 2020

6.2.3c

Coverage of social insurance programs (% of population)

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

Current Year Score: 2

2016, or latest available

World Bank; Economist Impact calculations

6.2.4 Public confidence in government

6.2.4a

Level of confidence in public institutions

Input number

Current Year Score: 2

2021

Economist Intelligence Democracy Index

6.2.5 Local media and reporting

6.2.5a

Is media coverage robust? Is there open and free discussion of public issues, with a reasonable diversity of opinions?

Input number

Current Year Score: 2

2021

Economist Intelligence Democracy Index

6.2.6 Inequality

6.2.6a

Gini coefficient

Scored 0-1, where 0=best

Current Year Score: 0.36

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: 2

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: 2

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: 2

2021

Economist Intelligence

6.4 ENVIRONMENTAL RISKS

6.4.1 Urbanization

6.4.1a

Urban population (% of total population)

Input number

Current Year Score: 34.47

2019

World Bank

6.4.2 Land use

6.4.2a

Percentage point change in forest area between 2006–2016

Input number

Current Year Score: 0.84

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: 1

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: 69.42

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: 558.5

2019

WHO

6.5.1c

Population ages 65 and above (% of total population)

Input number

Current Year Score: 6.38

2019

World Bank

6.5.1d

Prevalence of current tobacco use (% of adults)

Input number

Current Year Score: 27

2018

World Bank

6.5.1e

Prevalence of obesity among adults

Input number

Current Year Score: 3.9

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: 92.67

2017

UNICEF; Economist Impact

6.5.2b

Percentage of homes with access to at least basic sanitation facilities

Input number

Current Year Score: 59.54

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: 74.16

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