Digital Health
Implementation approach to Pandemic Management

November 2020
Digital Health Implementation approach to Pandemic Management

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G20 Digital Health Taskforce and subject matter experts 2020
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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AI</td>
<td>Artificial Intelligence</td>
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<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<td>CDRs</td>
<td>Call Detail Records</td>
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<tr>
<td>DHIS</td>
<td>District Health Information Software</td>
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<td>DPG</td>
<td>Digital Public Goods</td>
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<td>FHIR</td>
<td>Fast Healthcare Interoperability Resource</td>
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<td>ECDC</td>
<td>European Centre for Disease Prevention and Control</td>
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<td>EU</td>
<td>European Union</td>
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<td>G20</td>
<td>Group of Twenty</td>
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<td>GDHP</td>
<td>Global Digital Health Partnership</td>
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<tr>
<td>HHS</td>
<td>Health and Human Services</td>
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<td>HIS</td>
<td>Health information system</td>
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<td>HL7</td>
<td>Health Level 7</td>
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<tr>
<td>ICD</td>
<td>International Classification of Diseases</td>
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<td>ICT</td>
<td>information and communications technology</td>
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<td>IFRC</td>
<td>International Federation of Red Cross and Red Crescent Societies</td>
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<td>IHR</td>
<td>International Health Regulations</td>
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<td>ITU</td>
<td>International Telecommunication Union</td>
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<td>MNO</td>
<td>mobile network operators</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>OpenHIE</td>
<td>Open Health Information Exchange</td>
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<td>PRISM</td>
<td>Performance of Routine Information System Management</td>
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<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
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<tr>
<td>UHC</td>
<td>universal health coverage</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<td>UNECA</td>
<td>United Nations Economic Commission for Africa</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WSIS</td>
<td>World Summit on the Information Society</td>
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Acknowledgements

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* via Global Digital Health Partnership (GDHP)

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Executive Summary

Strategic uses of digital health have the potential to transform health systems to achieve improved health outcomes and wellbeing, and to realize economic and social benefits. All countries are investing in digital health, frequently in the context of developing related national strategies and looking to accelerate and scale-up digital health transformation in an effort to address the challenges and realize the opportunities of healthcare in the 21st Century.

Digital health, including, mobile health, telehealth, artificial intelligence and other information and communications technologies are showing great promise. However, in many countries the uptake of digital health solutions at scale by health systems has been slow, hindering the opportunity to equitably extend these benefits to all. Countries face similar challenges in effectively supporting the user environments for these tools- from the comprehensive rollout of digital infrastructure, to robust policy and regulatory environments keeping pace with fast-changing digital innovations. Planning for, and aligning investments in, a standards-based digital architecture that facilitates data interoperability and maintains cybersecurity at the health systems-level, as well as managing patient safety, and data privacy and protection at the clinical level remain as common challenges among countries.

The COVID-19 pandemic underscored the need for individual countries to strengthen their pandemic preparedness and management plans in alignment with planning for, and investing in, digital health infrastructure and tools used as part of health systems. Nevertheless, it is becoming increasingly clear that even strong health systems are at times under immense pressure. Many countries have scaled the use of digital health as a fundamental tool, especially during this pandemic, to support health emergency management by strengthening existing response and care delivery mechanisms. Tools, consistent with privacy and data protection frameworks, make information sharing more immediate and help enable innovative and safe access to health services, raise the awareness of the public, and help improve coordination of the healthcare workforce and essential supplies.

In these unprecedented times, international collaboration is essential to facilitate the sharing and use of digital health tools and best practices to support countries’ responses to the pandemic and prepare us for the post-pandemic phase as well as future emergency response needs.

As time was of the essence, the Saudi Arabian G20 Digital Health Secretariat collated voluntary contributions on COVID-19 digital health activities from the G20 members, the Global Digital Health Partnership members, and international organizations. The Data Collection tool is attached in Appendix 2. The data were used as the basis for discussion and input from the G20 Digital Health Taskforce. This document aims to help countries (high-, middle- and low- income) to develop a blueprint on how to handle a major health crisis such as COVID-19.

The digital health tools used in all phases of the emergency response have included both modifications of existing tools and the acquisition or development of a significant range of new digital health tools. These tools were needed in a very short time period due to the rapid spread of the virus and the rapid need for tools, workforce, infrastructure, and data that an emergency of this scale requires. Countries have faced a range of challenges related to the rapid deployment of digital health tools including policy, regulatory, infrastructure, and workforce capacity deficits. The success of digital health solutions often correlates with the strength of the enabling environment for these technologies. Critically important are country “building blocks” including readiness of IT infrastructure, workforce and institutional capacity, equity of access/ the digital divide, data standards and interoperability, the policy and regulatory environment, investment strategies and governance.

Acknowledging critical success factors for the implementation of digital health in low- and middle-income countries needs to be addressed to enable a global improvement of digital health. Equal access

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to digital health needs to be at the top of the SDG3 agenda supporting universal health coverage. With the adoption of the 2030 Agenda for Sustainable Development, 193 United Nations Member States pledged to ensure “no one will be left behind”. The WHO’s Department of Digital Health and Innovation is in the process of finalizing the Global Strategy for Digital Health to promote healthy lives and wellbeing for everyone, everywhere, at all ages.

This report highlights the following gaps and recommendations:

- **Gap:** The availability of a **digital health emergency response plan** that includes digital health emergency preparedness protocols in advance of an emergency that could be triggered with the declaration of the emergency was lacking.
  - **Recommendation** – International collaboration is required to develop a digital health emergency response plan template that can be modified by countries.

- **Gap:** The Principles for Digital Development tell us that the effective integration of new digital technologies requires an effective understanding that is currently lacking, of the ecosystem in which digital tools are intended to be used.
  - **Recommendation** – Countries should work to document digital health maturity in key ‘building blocks’ areas including leadership and governance; strategy and investment; legislation, policy, and compliance; workforce; standards and interoperability; and infrastructure. The Global Digital Health Index is one of the emerging standards for the collection and publication of this information. (Lead by: WHO)

- **Gap:** **Digital Health Workforce** has also been impacted in this pandemic including the need for additional skills as new systems are rolled out and for managing digital health staff affected by the pandemic.
  - **Recommendation** A template Digital Health Workforce emergency management plan should be developed for inclusion as an appendix for this report. (Lead by: Saudi Digital Health Secretariat)

- **Gap:** **Interoperability and international data standards** have been often limited to those needed for case and outbreak surveillance and mortality reporting. There have been efforts for vendors to adopt the OpenHIE and FHIR standards and architectures. However, globally aligned and accepted Implementation Guides/best practices for the high-priority eHealth use-cases (leading to interoperable products on the market and systems) related to the pandemic response were not sufficiently available to drive the implementation in countries. In many instances, this has been exacerbated by un-harmonious approaches to data governance within and across countries requiring substantial efforts spent cleaning data and trying to create comparability among data elements. This has left individual countries to duplicate effort and develop additional data standards and interoperability specifications where effective ones may already exist. Increased interoperability supports preparedness efforts and supports more effective emergency response.
  - **Recommendation** – International collaboration of countries, in supportive cooperation with the Standards Development Organizations, is required to develop data standards and interoperability specifications for all types of surveillance (e.g. syndromic, virological etc.), data pooling and disease research needs at national, regional and international levels such as virological, syndromic, clinical surveillance in intensive care units, health facility impact monitoring, vaccine distribution and monitoring data, etc. (Lead by: WHO/ITU)

- **Gap:** **Curated information on digital health tools** is available in many forums including the WHO Digital Health Atlas and ongoing efforts to promote and encourage countries to adopt Digital Global Goods through Digital Square and the Digital Public Goods Alliance, however it is difficult to find the applications standards compliance, country endorsement of these tools, information on clinical relevance, policies and guidelines used to implement these digital health tools.
  - **Recommendation** - International collaboration is required to determine the best process for supplementing the available information. (Lead by: WHO)

- **Gap:** Access to **digital health tools** for essential components of emergency response is not readily available.

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2 [https://www.itu.int/pub/D-STR-E_HEALTH.05-2012](https://www.itu.int/pub/D-STR-E_HEALTH.05-2012)

3 [https://www.digitalhealthindex.org/](https://www.digitalhealthindex.org/)
Recommendation – Open source development should be encouraged for applications necessary for emergency response but not available, including psychological support, geo-fencing, isolation tracing, post-test communication tools, telemedicine tools/platforms, eLearning platforms for health workers, quarantine monitoring tools, ePrescribing tools, interoperability platforms, vaccination management such as digital vaccine certificates, digital mapping of populations at risk, electronic immunization registers and digital tools to monitor supply/cold chains and disease research tools. These open source applications should be compliant with interoperable standards and specifications. (Lead by: WHO)

Recommendation – Where these tools are not available, countries should consider the potential of sharing telemedicine tools and platforms for free/open source during a state of emergency. (Lead by: WHO)

- Gap: The policy and regulatory environment for many applications has lagged behind the development and modifications of the digital health tools.
  - Recommendation - International collaboration is recommended to develop a template for a quarantine management tools policy that finds a balance between privacy and the national good.
  - Recommendation - International collaboration is recommended for sharing best practice on policy.

- Gap: Lessons learned during this pandemic, especially on the implementation of new digital health tools, and the availability of post-pandemic plans for all aspects of the digital health ecosystem including disposal of sensitive data, addressing the digital divide, expansion of disease surveillance etc. while extremely important have not been addressed as part of this report.
  - Recommendation - Lessons learned should be collated after the pandemic and should be collated as an addendum to this report
  - Recommendations - International collaboration to develop a template post-pandemic policy is recommended for inclusion as an appendix for this report

The objective of the information in this report is to facilitate countries’ digital health emergency responses with proposed actions and implementation resources/recommendations for countries to consider as part of their emergency response lifecycle. The information is grouped by major objective:

1. Prepare & Initiate,
2. Prevention & Triage,
3. Track, Tracing & Testing,
4. Treatment, including vaccine preparation and roll-out, and
5. Post-pandemic preparation

However, many of the actions identified in the first phase are relevant across all phases. Where additional focus is required on these actions within a later phase, these have also been highlighted especially the different focus on privacy and security relevant to certain tools as illustrated in the diagram below.
A summary of the desired outcome, proposed actions and implementations resources is detailed in the table below. This document is enriched in the remaining sections by the many case studies from countries of the digital health emergency response to COVID-19.

### 1. Prepare and initiate

#### 1.1 Digital Health Foundation preparedness

**Desired outcomes:**
- Availability of safe robust & scalable infrastructure (Servers, Networks, Connectivity, licenses)
- An infrastructure emergency response plan exists, and key stakeholders are ready to implement the plan to enable scaling infrastructure; emergency connectivity protocols and address gaps in above such as digital divide

<table>
<thead>
<tr>
<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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| 1. **Invest in physical infrastructure, that extends digital connectivity in order to increase resilience in the context of health, humanitarian, and other crises.** | - ITU-UNICEF: GICA initiative  
  - **USA:** Suggestions for Operationalization from United States Agency for International Development (USAID):  
    - Explore partnerships to create business models that work  
    - Establish models to enable reliable power  
    - Encourage infrastructure sharing to decrease the cost of network expansion  
    - Scale in network investments to last beyond current emergency  
    - Develop and share protocols for quickly assessing the effectiveness of an emergency ICT infrastructure  
    - Explore alternative models to extend connectivity (e.g. low-orbiting satellite-based Internet connectivity) |
| 2. **Conduct baseline, country-wide ICT assessments** to gauge the reach, quality, and citizen access to mobile and broadband connectivity, and publish findings on shared repositories using machine-readable formats. This allows the prioritization of investments to extend the physical infrastructure that enables digital connectivity. | - USA: Suggestions for Operationalization from USAID:  
  - Work with mobile network operators and Internet service providers to identify connectivity "cold spots"  
  - Support the development and deployment of a baseline ICT assessment framework, and an online repository for such assessments to be shared publicly  
  - Support the development, sharing, and adoption of standards to assess consumer access and the reach of digital technology  
  - Digital Health Indicator (e.g. HIMSS INFRAM Infrastructure maturity model)  
  - Early Stage Digital Health Investment Tool (EDIT)  
  - Brazil: Digital Maturity Index  
  - Global Digital Health index  
  - WHO: SCORE for Health Data Technical Package  
  - The Community Health Worker Assessment & Improvement Matrix  
  - PRISM: Tools for Community Health Information  
  - DHIS2: Community Health Information Systems Guidelines  
  - Digital Health Tools for Community Health Worker Programs Maturity Model  
  - The Health Information Systems (HIS) Interoperability Maturity Toolkit |
| 3. **In an emergency, develop and implement emergency protocols for rapid updates to baseline country-wide ICT assessments** that gauge the reach, quality, and citizen access to mobile and broadband connectivity, and catalogue the effects of an emergency on baseline connectivity infrastructure and access. Doing so enables an understanding of the extent to which mobile and broadband technologies can support the response by rapidly identifying critical connectivity gaps. | - **ITU:** activities in response to COVID-19:  
  - Global Network Resiliency Platform (REG4COVID)  
  - Addressing the response to COVID within the Broadband Commission  
  - Guidelines for National Emergency Telecommunications Plans  
  - Collaboration with International Partners  
  - Leveraging resources from ITU and Cybersecurity partners  
  - ITU and USG Fabrizio Hochschild’s office Joint Webinars on “Digital Cooperation in the Crisis of COVID19”  
  - United for Smart Sustainable Cities (U4SSC)  
  - **WSIS TalkX**  
  - **WSIS ICT Case Repository** (part of stocktaking)  
  - Cybersecurity Resources for COVID-19 (CYB4COVID)  
  - Collection of best practices by the ITU/WHO Focus Group on artificial intelligence for health (FG-AI4H). Ad hoc group on digital technologies for the COVID-19 health emergency, and initiative on open source for AI for health  
  - **USA:** Suggestions for Operationalization from USAID:  
    - Develop and share protocols for quickly assessing the necessary ICT infrastructure  
    - Identify and designate a lead agency to implement the protocol  
    - Deployment of the emergency telecommunications if necessary  
    - Continue monitoring the connectivity/mobile network during the emergency and respond as necessary |

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**USA:** ITU: Digital Health Tools for Community Health Information Systems Guidelines (EDIT)

**Brazil:** Digital Health Index

**WHO:** SCORE for Health Data Technical Package

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| 4. **Negotiate preparedness protocols with key actors (governments, mobile network operators (MNOs), and regulatory bodies) to increase telecommunications network access in emergency situations.** This will facilitate rapid collaboration with key actors and support the deployment of ICTs during an emergency response. Note Other communication channels such as radio may also need to be included. | • ITU: Collaboration with UNICEF East Asia and Pacific Regional Office in Bangkok  
• ITU: Collaboration to support WHO AFRO  
• USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Before emergency negotiate:  
    - Public availability of connectivity maps of mobile network  
    - Negotiate with MNOs to obtain short codes that can be used to support an emergency response (workforce and citizen)  
    - Reverse billing capacity for short codes  
  o Ensure emergency priority on mobile networks for emergency short codes  
  o Designate and distribute emergency response short codes  
  o Negotiate protocols to share aggregated mobility patterns from mobile CDRs to assist emergency responders |
| 5. **Build staff capacity and data literacy as well as institutional capacity to leverage digital systems and real-time data in support of operations, programs, and decision-making.** Effective using data and digital technologies require more, not fewer, staff to coordinate and manage collection of information across multiple partners, to support use and adaptation of digital platforms, and — most importantly — to analyze data in order to inform decision-making. | • USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Assess existing staff capacity in data and digital literacy, informatics, software engineering, and other technical areas  
  o Build capacity of existing staff and retain new staff with relevant expertise  
  o Support the development of technical capacity  
  o Support digital literacy and the regular use of digital technologies  
  o Invest in and grow niche expertise  
  o Address the salary competition that governments face in the retention of top technical talent  
• Australia: [National Digital Health Workforce and Education Roadmap](https://www.nationaldigitalhealthworkforce.com.au)  
• WHO: [Digital Implementation Investment Guide](https://www.who.int) chapters on health workforce planning  
• [OpenWHO](https://openwho.who.int) is WHO’s new interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies  
• [WHOCA](https://whoacademy.org) (WHO Academy App) A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response  
• European Centre for Disease Prevention and Control training  
• European Centre for Disease Prevention and Control Virtual Academy (EVA)  
• COVID-19 digital classroom for frontline and community health workers |
| 6. **Develop, implement and adopt a Digital Health workforce emergency plan** to manage:  
  • surge staffing  
  • staff affected by the emergency. | • USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Deploy data managers and analysts in an emergency alongside sector experts to provide critical data capacity needed to support operations and decision-making  
  o Recommend a template Digital Health Workforce emergency management plan be developed for inclusion as an appendix for this report (Lead by Saudi Digital Health Secretariat) |
| 7. **Access to Online recruitment and training of health professionals** to cope with emergency response (e.g. COVID-19) including training for health professionals in the use of digital health tools. | • [OpenWHO](https://openwho.who.int) is WHO’s new interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies  
• [WHOCA](https://whoacademy.org) (WHO Academy App) A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response  
• European Centre for Disease Prevention and Control training  
• European Centre for Disease Prevention and Control Virtual Academy (EVA)  
• COVID-19 digital classroom for frontline and community health workers |
| 8. **Build institutional capacity to leverage digital systems and real-time data.** | • USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Assess existing institutional capacity  
  o Implement change management strategies to increase institutional capacity  
  o Designate an internal champion to shepherd the change management strategy, and to regularly assess how expenditures need to be realigned to meet changing needs  
  o Establish a national digital health committee or technical working group to guide and support the deployment of digital health |

**Case Studies**
Brazil, Canada, WHO

### 1.1.2 Workforce

**Desired outcomes:**

- Increase digital literacy of staff and increase digital institutional capacity
- A workforce plan is ready to be implemented to manage: the surge of staff and staff effected by the emergency
- All institutions are ready to leverage digital systems and real-time data

| 5. **Build staff capacity and data literacy as well as institutional capacity to leverage digital systems and real-time data in support of operations, programs, and decision-making.** Effective using data and digital technologies require more, not fewer, staff to coordinate and manage collection of information across multiple partners, to support use and adaptation of digital platforms, and — most importantly — to analyze data in order to inform decision-making. | • USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Assess existing staff capacity in data and digital literacy, informatics, software engineering, and other technical areas  
  o Build capacity of existing staff and retain new staff with relevant expertise  
  o Support the development of technical capacity  
  o Support digital literacy and the regular use of digital technologies  
  o Invest in and grow niche expertise  
  o Address the salary competition that governments face in the retention of top technical talent  
• Australia: [National Digital Health Workforce and Education Roadmap](https://www.nationaldigitalhealthworkforce.com.au)  
• WHO: [Digital Implementation Investment Guide](https://www.who.int) chapters on health workforce planning  
• [OpenWHO](https://openwho.who.int) is WHO’s new interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies  
• [WHOCA](https://whoacademy.org) (WHO Academy App) A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response  
• European Centre for Disease Prevention and Control training  
• European Centre for Disease Prevention and Control Virtual Academy (EVA)  
• COVID-19 digital classroom for frontline and community health workers |
| 6. **Develop, implement and adopt a Digital Health workforce emergency plan** to manage:  
  • surge staffing  
  • staff affected by the emergency. | • USA: [Suggestions for Operationalization](https://www.state.gov) from USAID:  
  o Deploy data managers and analysts in an emergency alongside sector experts to provide critical data capacity needed to support operations and decision-making  
  o Recommend a template Digital Health Workforce emergency management plan be developed for inclusion as an appendix for this report (Lead by Saudi Digital Health Secretariat) |
| 7. **Access to Online recruitment and training of health professionals** to cope with emergency response (e.g. COVID-19) including training for health professionals in the use of digital health tools. | • [OpenWHO](https://openwho.who.int) is WHO’s new interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies  
• [WHOCA](https://whoacademy.org) (WHO Academy App) A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response  
• European Centre for Disease Prevention and Control training  
• European Centre for Disease Prevention and Control Virtual Academy (EVA)  
• COVID-19 digital classroom for frontline and community health workers |

**Case Studies**
Brazil, Hong Kong, India, Russian Federation, Singapore, Sweden

### 1.1.3 Privacy and Security

**Desired outcomes:**

- Ensuring digital health solutions delivered during the emergency have appropriate clinical safety and privacy controls
- Transparency is key, involving all relevant stakeholders is another

| 9. **Advance the ethical and responsible use of data and digital technology.** Good data practices include establishing protocols that protect individuals’ privacy and security, including for vulnerable populations. | • The OECD Council Recommendation on Health Data Governance  
  o Recommends an internationally harmonized approach to governing health data to improve national and cross-border health data interoperability  
  o Calls on countries to implement national health data governance frameworks and the key principles to follow when doing so |
### Proposed Actions

<table>
<thead>
<tr>
<th>Case Studies</th>
<th>Implementation Resources/Recommendations</th>
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</thead>
</table>
| Russian Federation | * USA: [Suggestions for Operationalization](https://www.usaid.gov) from USAID:  
  o Develop processes and protocols that respect individual data privacy and facilitate data sharing  
  o Promote policies that encourage responsible data sharing and ownership for different types of response data, and the circumstances under which special processes would apply  
  o Adapt policies and processes to include risk and benefit analysis for sharing different types of data  
  o Invest in resources for capacity building to enable responsible and safe data use  
  o Negotiate a protocol to share case data with full protection of personally identifiable information, to pre-approved actors  
  o Develop a methodology to assess risks and benefits of data use in emergencies that could be tailored by emergency type  
  - UNICEF & GOVLAB: Responsible Data for Children (RD4C)  
  - UNICEF: [Industry Toolkit on Children’s online privacy and freedom of expression](https://www.unicef.org)  
  - UNICEF: [Ethical Considerations for Evidence Generation Involving Children on the COVID-19 Pandemic](https://www.unicef.org)  
  - OECD: [Ensuring data privacy as we battle COVID-19](https://www.oecd.org)  
  - OECD: [Dealing with digital security risk during the Coronavirus (COVID-19) crisis](https://www.oecd.org)  
  - ITU: activities in response to COVID-19 and cybersecurity  
    o Leveraging resources from ITU and Cybersecurity partners  
    o Cybersecurity Resources for COVID-19 ([CYB4COVID](https://www.ITU/))  
  - Five safes Framework  
  - Australian Institute of Health and Welfare: data governance framework  
  - EU: Guidance on privacy and data protection for APPS supporting the fight against COVID-19  
  - GDHCP: [Securing Digital Health](https://www.gdhcp.org) Initial reflections for steering global cyber security efforts in health ([2019, white paper on cybersecurity](https://www.gdhcp.org))  
  - GDHCP: [Cyber Security: Foundational Capabilities](https://www.gdhcp.org) (2020, white paper on cybersecurity)  
  - Hong Kong: [Personal Data Privacy Ordinance](https://www.hkgo.gov.hk)  
  - Hong Kong: [The Electronic Health Record Sharing System Ordinance](https://www.hkgo.gov.hk)  
  - Turkey: [Regulation on Personal Health Records](https://www.tuank.gov.tr)  
  - Turkey: [Law on the Protection of Personal Data](https://www.tuank.gov.tr)  
  - WHO-ITU toolkit for designing national strategy for digital health has a relevant section on privacy and security  

### 1.1.4 Data and Data standards

**Desired outcomes:**

- To have information systems that address and generate information on different aspects of the emergency, in order to facilitate the decision-making process and support operational requirements at all levels

| 10. Agree upon and support the broad uptake of common data standards to enable effective sharing of data across sectors, systems, and silos. | USA: [Suggestions for Operationalization](https://www.usaid.gov) from USAID with USA update:  
  o Understand common barriers  
  o Support the mapping of public and private infrastructure, such as hospitals, clinics, or schools  
  o Integrate GIS into preparedness protocols related to data standardization and data collection  
  o Collect only what is needed  
  o Identify and agree upon data standards, including harmonized disease case definitions and reporting formats in preparation for potential future outbreaks  
  o Leverage health IT that is developed and is recognized internationally by standard development organizations  
  o Convene discussions about data standards that cut across sector silos and skill sets  
  o Gather relevant stakeholders to develop minimum data collection standards, the minimum viable product and baseline data, including definitions product and baseline data  
  o Contractually require funded organizations to adopt and implement harmonized data standards  
  o Data sharing and use agreements for intra- and international exchange should be automatically triggered with the declaration of the emergency  
  o Contribute to periodic reports documenting the maturity of digital |
1.1.5 Interoperability and Architecture

Desired outcomes:
- The interoperability of the information systems used, allows the exchange of data from different sources in order to facilitate the decision-making process and support operational requirements at all levels.
- Architecture to support the interoperability requirements and facilitates modular microservices approaches.
- Investment in interoperable data and data systems or platforms.

Proposed Actions

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| Support the development of digital health strategies connected to interoperable emergency preparedness protocols. Where appropriate, linking emergency health data systems with national routine health data systems, such as disease surveillance, will make standing up emergency systems during a crisis easier and faster, and help to improve data quality. | and information systems
  - Design protocols for emergency data-standards development to simplify and harmonize data collection in a crisis.
  - During a crisis, emergency data standards should be reviewed on a periodic basis (such as once a month) to assess and update standards, and to push out related changes.
  - Leading international health authorities, should publish working emergency data standards and liaise with country governments to adopt them.
  - WHO: Surveillance and case definitions to provide guidance to Member states.
  - WHO: Death certification guidance.
  - CDHP: Connected Health: Empowering Health through Interoperability.
  - ICD-11 is available to report mortality data, a primary indicator of health.
  - Joint Initiative Council (JIC): re Covid-19: resources from SNOMED CT, LOINC, and CDISC.
  - HL7: SANER project FHIR-based implementation guide for public health reporting.
  - HL7: International Patient Summary may be a good starting point to establish agreement on data elements with additional work required to agreement on the terminologies.
| USA: Suggestions for Operationalization from USAID with USA update:
  - Assess and strengthen national health information systems, with a particular focus on interoperable, country-level digital information systems.
  - Establish toll-free URLs that allow health workers and other emergency responders to access certain websites or IP addresses.
  - Confer upon an established national digital health committee or technical working group a special role to advise on implementing a national digital health strategy in emergencies, and update it as needed.
  - In an emergency, conduct country-level rapid assessments of available digital platforms and identify those that should serve as primary tools to support the response. Ensure these are widely available to responders, together with guidelines and supporting standard operating procedures guiding digital platform use.
  - Develop or adapt existing standards related to unique identifiers for an emergency outbreak.
  - Integrate "disease surveillance and reporting" data and systems with national health information systems so that disease outbreak data can be readily collected alongside and compared to routine health data.
  - In routine and outbreak disease surveillance reporting, ensure that missing data are reported as missing and not as zero cases.
  - In building new health information systems, adapting existing systems, and linking existing systems, support and leverage global public goods to minimize duplication of effort and wasted resources.
  - Support revisions to the IHR to expand WHO Member State required reporting to facilitate infectious disease data sharing.
  - Develop country-specific emergency outbreak protocols, including the use of digital technologies. These protocols should identify existing forms and platforms, outline standard operating procedures, and make them available for use by responders.
  - UNICEF: Example of toll-free URLs include Internet of Good Things (IoGT), now launched on free URLs in 61 countries.

Case Studies
Argentina, Australia, Austria, Brazil, Canada, Global Fund, Hong Kong, India, Italy, The Netherlands, OECD, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Sweden, Turkey, UAE, UNICEF, United Kingdom, Uruguay, USA, WHO.
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| 12. **Build processes that work toward openness and interoperability.** Reduce fragmentation and duplication related to data and ICT to maximize investments and to ensure maximum value of data. | - USA: Department of Health and Human Services, Office of the National Coordinator for Health IT’s (HHS/ONC) Interoperability Proving Ground
- **USA: Suggestions for Operationalization** from USAID:  
  - To enable open sharing and to facilitate re-use of data, ensure published data are machine readable  
  - Identify, modify, and implement policies that support sharing of line-list case data or machine-readable data, ideally by default  
  - When creating new data policies or practices, build on existing international standards  
  - For datasets relevant to emergency response, use HXL as a starting point for terminology and taxonomies to enable data sharing  
  - Set up an easily accessible website for standardized forms (with version numbers) and key messages  
  - Data standards must proactively address the question of who “owns” data, and not only the products that result from use or analysis of data (e.g., research papers or reports)  
  - Publish data early and often, enabling others to cross-check and confirm data  |
| 13. **Architecture:** There is a need to establish standard “federated” architectures for technology, data and applications that truly facilitate modular microservices approaches. | - **WHO: Digital Implementation Investment Guide**
- European Interoperability Certificate Governance - A Security Architecture for contact tracing and warning apps  
- European Proximity Tracing an Interoperability Architecture for contact tracing and warning apps  |
| 14. **Encourage coordinated and sustained investments in interoperable data and data systems or platforms.** Minimize duplication of efforts and funding and co-invest to achieve scale. | - USA: **Suggestions for Operationalization** from USAID with USA update:  
  - Prioritize investments in interoperable platforms and systems  
  - Build upon existing open, adaptable processes, technical standards, tools, and platforms, whenever possible  
  - Invest in digital health knowledge-sharing systems, tools, and processes that can be accessed by a variety of global health, humanitarian, and development partners  
  - Invest in and provide other needed support to intra- and inter-donor coordination around digital health technologies to promote aligned policies and actions  
  - Create funding mechanisms and models that enable co-funding among donors and both build and sustain digital health commons  
  - Create review boards for spending on digital health through collaborative funding mechanisms  
  - Support more collaborative, participatory design and investment, and build processes in donor-funded development work to reduce parallel investments  
  - Ensure that funded efforts build on national systems, reuse existing tools, and align with standards whenever possible  
  - Encourage sustained donor coordination around the use of data and data systems and platforms  |
### Proposed Actions

<table>
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<tr>
<th>Case Studies (included in Data and Data standards above)</th>
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<tbody>
<tr>
<td><strong>1.1.6 Usability and availability</strong></td>
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<tr>
<td>Desired outcomes:</td>
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<td>- User friendly applications are available to all sectors, including people who are not confident in using technological tools (such as the elderly people), economically disadvantaged, visually impaired, do not have a contract with a mobile network provider, or do not own a smartphone or other application-enabled device.</td>
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| 15. Consider the use environment, including the digital infrastructure, sociocultural, and psychosocial context in designing and deploying digital technologies. Ensure digital technologies are used in a manner that is relevant, appropriate, ethical, and efficient. |
| 16. Insert feedback loops in the full lifecycle of project conceptualization, from design and delivery to monitoring and evaluation. Increase the effectiveness of programming and improve humanitarian and development outcomes. Design programs to incorporate digitized data and information flows. Enable faster feedback and iteration and expand the nodes of connection in order to increase the effectiveness of programming. |
| 17. Tools to overcome the digital divide. |

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<tr>
<th>Implementation Resources/Recommendations</th>
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<tr>
<td>o Integrate explicit guidance that adheres to established best practice, such as the Principles for Digital Development, in requests for proposals and other development funding application processes.</td>
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<td>- USA: Suggestion for Operationalization from USAID:</td>
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<td>- ITU: Keeping Children Safe Online during COVID-19</td>
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<td>- UN: Intergovernmental Network on Youth Development</td>
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<tr>
<td>- ITU: Use of ICTs to assist persons with disabilities cope with COVID-19</td>
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<tr>
<td>Brazil</td>
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| Brazil Action Plan, Monitoring and Evaluation of the Digital Health Strategy For, Brazil 2019-2023 |

Singapore: TraceTogether token is a physical device that participates in the TraceTogether national digital contact tracing programme to aid digital contact tracing efforts. The token does not have internet / cellular connectivity |

USA: CDC has an Office of Health Equity that is actively engaged in this work as part of their mission and for COVID-19 response |
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<tr>
<td><strong>1.1.7 Investment Strategy</strong></td>
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| Desired outcomes: | - Coordination of funding in digital technologies, leading to coordination of tools and platforms used in the response which meets the needs of the response, include funding for the non-digital aspects of effective technology  
- Uptake of digital health tools is sustainable after the response  
- Ensuring the protection of intellectual property  |
| | **Resources/Recommendations**  
- WHO: Digital Health Clearinghouse  
- WHO: Digital Health Atlas  
- WHO: Digital and Innovation Community of Practice  |
| **Development of a digital health emergency preparedness/pandemic investment strategy** |  |
| which includes: |  |
| - Coordination of funding in digital technologies  
- Sufficient funding in the non-digital aspects of effective technology uptake  
- Ensuring the protection of intellectual property  
- Exploring the opportunities to generate alliances between the public (State) and the private (companies) sector. |  |
| | Case Studies  
- Russian Federation  |
| **1.1.8 Governance, Policy and regulations** |  |
| Desired outcomes: | - Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage and review the emergency response  |
| | **Cases Studies**  
- Brazil, Russian Federation, WHO  |
| **Development of a digital health emergency/pandemic response strategy** |  |
| which highlights the changes required to: |  |
| - Governance  
- Policies  
- Implementation plans/procedures (Infrastructure & workforce)  
- Digital Health emergency/pandemic response tools. |  |
| | Case Studies  
- Brazil: Contingency plan  
- ITU: activities in response to COVID-19 See Appendix 5 for details including:  
  - Guidelines for National Emergency Telecommunications Plans  
  - Italy: Preparation and response to COVID-19 over the autumn/winter period 11 August 2020  |
| **Acknowledgement of the Principles of Donor Alignment for Digital Health.** |  |
| | Case Studies  
- Principles of Donor Alignment for Digital Health  |
| **1.2 Disease Surveillance and Emergency Response** |  |
| Desired outcomes: | - Access to updated Disease Surveillance tools are deployed to manage the emergency response including:  
  - Virological surveillance  
  - Syndromic surveillance  
  - Clinical surveillance in hospitals  
  - Monitoring of long-term care facilities e.g. aged care  
  - Case and outbreak notification  
  - Mortality surveillance  
  - Initial action stage / First Few 100 surveillance  
  - Health facility impact monitoring  
  - Detailed clinical surveillance in intensive care units  
  - Vaccine distribution and monitoring data  
  - Adverse event following immunization surveillance  
  - Modelling of impact projection  
- Disease Surveillance processes and tools are available where limitations in digital connectivity exists  
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage disease surveillance as part of the emergency response  |
| | **Resources/Recommendations**  
- WHO: Surveillance strategies for COVID-19 human infection  
- DHIIS2: COVID-19 Surveillance Digital Data Packages  
- Sormas: Surveillance, Outbreak response management and Analysis system  
- WHO: Epidemic Intelligence from Open Sources (EIOS) Initiative supports public health intelligence  
- Russia: monitoring of health system response e.g. hospital capacity example  
- Italy: Quantitative risk and health service resilience monitoring during COVID-19  
- ECDC: COVID-19 situation dashboard  
Note additional open source applications may be listed in the WHO Digital  |
#### 1.3 Data Pooling

**Desired outcomes:**
- The availability and sharing of international data to manage the emergency response including:
  - Virological surveillance
  - Syndromic surveillance
  - Case and outbreak notification
  - Mortality surveillance
  - Adverse event following immunization surveillance
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage data pooling as part of the emergency response.

**Proposed Actions**

- **Desired outcomes:**
  - Data Pooling

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<tr>
<th>Proposed Actions</th>
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</table>
OECD: Beyond containment: Health systems responses to COVID-19 in the OECD includes the section: Detect: Use routine and big data for early warning and surveillance as well as digital diagnosis  
OECD: AI Principles overview  
ECDC: "Baseline projections of COVID-19 in the EU/EEA and the UK"  
USA: COVID-19 Mathematical Modeling Overview:  
  - cases  
  - hospitalizations  
  - deaths  
Broadband commission for sustainable development: Working Group on Digital and AI in Health Reimagining Global Health through Artificial Intelligence: The Roadmap to AI Maturity |
| 24. Establish Disease Surveillance processes where limitations in digital connectivity exists. | USA: Suggestions for Operationalization from USAID:  
  - Establish access such as mobile credit top-ups for health workers to facilitate reporting of case data  
  - Solutions that functioned in both online and offline environments are essential  
  - Agreeing upon a simple and straightforward paper-based data collection approach at the beginning of the response, prior to digitization |
| 25. Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support disease surveillance as part of the emergency response. | Brazil: Protocol for notification of COVID-19 test results  
USA: Laboratory Data Reporting Guidance for COVID-19 Testing:  
  - HHS Announcement  
  - Laboratory Reporting Guidance, June 4, 2020  
  - CDC Update on COVID-19 Laboratory Reporting Requirements July 31, 2020 |
| 26. Development of a post-pandemic policy (for example disposal of sensitive data). | Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report |

**Case Studies**

Argentina, Austria, Brazil, Canada, Germany, Global Fund, Hong Kong, India, Italy, Japan, Portugal, Russian Federation, Saudi Arabia, Sweden, Turkey, UAE, UNICEF, Uruguay, USA, WHO
## 2. Prevention and triage tools

### 2.1 Risk Communication and Community Engagement Action Plan - Digital Health

**Desired outcomes:**
- Countries have a Risk Communication and Community Engagement action plan developed and available to deploy.

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| 31. Finalize your national High-Risk Group definitions needed to implement the RCCE Action Plan. | High Risk Group definitions - examples below  
  - WHO Western Pacific: COVID-19, vulnerable and high risk groups  
  - UK: NHS, Who’s at higher risk from coronavirus  
  - USA: CDC, People of Any Age with Underlying Medical Conditions  
  - UK: NHS Shielded Patient List |

### 2.2 Emergency (e.g. COVID-19) public Information and online triage

**Desired outcomes:**
- The public have access to information and online triage tools to be able to keep them safe and access diagnostic tools and care when necessary.
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to support public information and online triage as part of the emergency response.

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| 32. Access to quality content which can be easily and readily updated as information changes. | UNICEF: has developed a mechanism to increase the speed and agility to be able to localize and integrate new content at country and regional level to fit programmatic needs.  
  - UNICEF: has developed other digital solutions, including RapidPro and the Internet of Good Things to support the COVID-19 response  
  - UNICEF: COVID-19 Information Chatbot based on U-Report  
  - In England, the NHS website provides free clinically assured health information with up to date COVID-19 content that is available for free. Access to the content is shared with a number of countries free of charge  
  - WHO: Algorithm for symptom checker and chat Bot can be shared internationally. WHO chatbots are being updated and enhanced  
  - WHOA (WHO Academy App): A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response  
  - European Centre for Disease Prevention and Control (ECDC): Threat Reports app is available for the major mobile OSes and usable by the general public  
  - European Centre for Disease Prevention and Control (ECDC): Virtual Academy  
  - Global fund, WHO and others policy guidance around the triage of patients including other health issues |
| 33. Access to quality content which can be easily and readily updated as information changes for:  
  - People from culturally and linguistically diverse backgrounds  
  - People without access to the necessary digital health tools/data plans. | Recommend review of implementation resources in Infrastructure and Connectivity above that address access to connectivity (physically and financially)  
  - ITU: guidelines on accessibility  
  - Recommend countries should implement an ongoing synchronization process to ensure information on digital tools/platforms is available and aligned with other communication channels which are easier to reach for people affected by the digital divide such as radio, tv etc. |
| 34. Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support online triage as part of the emergency response. | EU: Guidance on privacy and data protection for APPS supporting the fight against COVID-19  
  - Global fund, WHO and others policy guidance around the triage of patients including other health issues |
| 35. Development of a post-pandemic policy (for example disposal of sensitive data). | Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report |

**Case Studies:**
- Argentina, Austria, Australia, Brazil, Canada, Germany, India, Italy, The Netherlands, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Sweden, Turkey, UAE, UNICEF, United Kingdom, Uruguay, USA, WHO

### 2.3 Call Center, SMS and automated telephone triage

**Desired outcomes:**
- The emergency response has access to, when required, a call/communications center that manages incoming and outgoing telephone calls with individual (health care professionals, disease data collectors and the public), SMS and automated triage.
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage as...

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**Note:** The provided text appears to be incomplete and contains placeholders for further content. The table structure and some sections are not fully expanded, indicating that the document may contain more detailed information that is not visible in the current representation.
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| **36.** Operationalize the relevant Digital Health Foundations. | • USA: *Suggestions for Operationalization* from USAID:  
  o Having all the necessary shortcodes ready to be operationalized  
  o A rapid assessment of communications infrastructure can be done quickly at the onset of a crisis to enable quick fixes and planning to mitigate weaknesses, as necessary  
  o Governments should negotiate with mobile network operators for crisis-related shortcode messages to be prioritized in messaging queues  
  o All actors should have low tech and nondigital back-up options for relaying critical information in cases in which mobile networks are overwhelmed or inoperable  
  o It is critical to understand how user behavior will affect the design and requirements of a digital system. In this case, health workers (as with others) frequently used more than one SIM card and phone number. To design for this variability, mechanisms that gather health worker phone numbers must establish a process--ideally an automated one--to regularly update those numbers  
  o Short codes should have reverse billing capacity, so that charges for messages sent over the system are borne by a government or other specialized agency, not the individuals receiving and sending responses  
  • UNECA/ITU: interactive voice response for automated triage  
  • USA: CDC symptom checker app  
  • England NHS: 111 Online eTriage and routing of patients to the most appropriate care and NHS Pathways that provide the triage algorithms underpinning NHS 111 |
| **37.** Access to Communications tools specifically targeted to communication in health settings in support of the emergency response such as Call Center, SMS and automated telephone triage. | • mHero is a two-way, mobile phone-based communication system that connects ministries of health and health workers using iHRIS and RapidPro  
  • RapidPro collects data via short message service (SMS) and other communication channels (e.g. voice; social media channels, such as Facebook Messenger, Telegram, WhatsApp) to enable real-time data collection and mass-communication with target end-users, including beneficiaries and frontline workers  
  Note additional open source applications may be listed in the [WHO Digital Health Atlas](https://www.who.int/health-topics/digital-health) or EU [Digital Response to COVID-19](https://ec.europa.eu/health/web/digital-response-to-covid-19) or European mhealth hub | COVID-19 apps Hub Repository |
| **38.** Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Call Center, SMS and automated telephone tools as part of the emergency response. | • Examples of privacy statement (which are subject local privacy legislation and regulations):  
  o NHS UK  
  o Healthdirect Australia  
  • EU: *Guidance on privacy and data protection for APPS supporting the fight against COVID-19* |
| **39.** Development of a post-pandemic policy. | • Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report |

**Case Studies**
Austria, Brazil, India, ITU, Portugal, Russian Federation, Saudi Arabia, Singapore, UAE, United Kingdom

### 2.4 Psychological support

**Desired outcomes:**
- The emergency response has access to, when required, psychological support tools to assist the public and in specific healthcare workers
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage psychological support as part of the emergency response

| **40.** Access to tools to support Psychological support | Note additional open source applications may be listed in the [WHO Digital Health Atlas](https://www.who.int/health-topics/digital-health) or EU [Digital Response to COVID-19](https://ec.europa.eu/health/web/digital-response-to-covid-19) or European mhealth hub | COVID-19 apps Hub Repository |
| **41.** Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Psychological support tools as part of the emergency response. | • EU: *Guidance on privacy and data protection for APPS supporting the fight against COVID-19* |
| **42.** Development of a post-pandemic policy. | • Turkey: Outputs and lessons learned from Turkish MoH’s RUHSAD (Mental Health Support System) system, which is a psychological support system for health professionals can be used for post-pandemic policy development activities. Data regarding the usage of the system, user count, difficulties regarding providing the service can be valuable for a permanent healthcare professionals support system that can be installed in the post-pandemic period  
  • Recommend a template post-pandemic policy be developed for the technical and functional requirements of such a system |
3 Track, tracing and testing

3.1 Contact Tracing, Geofencing, Isolation Tracing

Desired outcomes:
- The emergency response has access to Contact tracing tools as an essential public health measure and a critical component of emergency responses. Additionally, the emergency response has access to, when required, geofencing and isolation tracing tools as part of the emergency response
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage contact tracing, geofencing and isolation tracing as part of the emergency response

<table>
<thead>
<tr>
<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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</table>
| 43. Access to digital health tools to support contact tracing, Geofencing and Isolation Tracing. | WHO: Contact tracing in the context of COVID-19 (includes Tools section)  
- Go.Data: a data collection platform focusing on case data (including lab, hospitalization and other variables though case investigation form) and contact data (including contact follow-up)  
- CommCare: a data collection platform by Dimagi to support organizations and governments with their ongoing COVID-19 response efforts  
- USA: CDC, contact tracing information:  
  - Guidelines for the Implementation and Use of Digital Tools to Augment Traditional Contact Tracing  
- WHO: Digital tools for COVID-19 contact tracing  
- Germany: Corona Warn App  
- ECDC: Mobile applications in support of contact tracing for COVID-19 - A guidance for EU EEA Member States  
- India: AarogyaSetu application, an open-source cross-platform COVID-19  
- Italy: National contact tracing App (IMMUNI)  
- Canada: COVID Alert app: exposure notification app code is open source  
- Additional open source applications may be listed in the WHO Digital Health Atlas or EU Digital Response to COVID-19 or European mHealth Hub |
| 44. Operationalize the additional digital health foundations necessary to support Contact Tracing, Geofencing, and Isolation Tracing as part of the emergency response. | EU: Interoperability specifications for cross-border transmission chains between approved apps |
| 45. Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support contact tracing, Geofencing and Isolation Tracing as part of the emergency response. In addition to the actions above on Privacy and Security. | WHO: Ethical considerations to guide the use of digital proximity tracking technologies for COVID-19 contact tracing  
- OECD: Tracking and tracing COVID: Protecting privacy and data while using apps and biometrics  
- UNICEF: Digital contact tracing and surveillance during COVID-19: General and Child-specific Ethical issues  
- UNICEF & GOVLAB: Responsible Data for Children (RD4C): guidance, tools and leadership to support the responsible handling of data for and about children  
- UNICEF: Industry Toolkit on Children’s online privacy and freedom of expression  
- UNICEF: Ethical Considerations for Evidence Generation Involving Children on the COVID-19 Pandemic  
- Blockchain and Self-Sovereign Identity: how to fight covid-19 without sacrificing privacy Tiziano Lattis  
- EU: Guidance on privacy and data protection for APPS supporting the fight against COVID-19  
- Italy: National law to allow the use of contact tracing APP Decree n.28 on April 30, 2020 article 6 |
| 46. Development of a post-pandemic policy. | Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report |

Case Studies
- Canada, India, Russian Federation, Turkey

3.2 Testing and Results communications

Desired outcomes:
- Availability of testing tools and results communications tools  
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage test reporting and post-test communications as part of the emergency response

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<tr>
<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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<tr>
<td>47. Access to laboratory information systems and post test.</td>
<td>Note additional open source applications may be listed in the WHO Digital Health Atlas or EU Digital Response to COVID-19 or European mHealth Hub</td>
</tr>
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</table>
## Proposed Actions

<table>
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<tr>
<th>48. Operationalize the additional digital health foundations</th>
<th>Implementation Resources/Recommendations</th>
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</table>
| necessary to support test reporting and post-test communications as part of the emergency response. | • Turkey’s experience can be a good example to follow in this respect. Test results are directly sent to the patient’s e-Nabız PHR account via LBYS (Lab Information Management System) and HYS (Public Health Management System). All the data flow regarding case tracking, contact tracking, filiation process, home isolation process, treatment details, testing process are administered through these systems. Operational information on additional infrastructure needs can be specified and provided with these systems.  
| | • Interoperability specifications –  
| | o Brazil: COVID-19 test results with lab connection accreditation |

<table>
<thead>
<tr>
<th>49. Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support test reporting and post-test communications as part of the emergency response.</th>
<th>Implementation Resources/Recommendations</th>
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</table>
| | • Brazil: Protocol for notification of COVID-19 test results  
| | • Turkey: testing algorithms |

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<td>• Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report</td>
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### Case Studies
- Austria
- Brazil
- India
- Russian Federation
- Saudi Arabia
- Singapore
- Turkey

## 4 Treatment

### 4.1 TeleHealth / Telemedicine solutions

#### Desired outcomes:
- Accessibility and availability of Telehealth tools as part of the emergency response including:
  - Triage suspected cases of epidemic (e.g. COVID-19) or patients at risk
  - Treat mild cases of epidemic (e.g. COVID-19) in the home
  - Using health workers who are quarantined
  - Supplemented health workforces
  - Delivering non-epidemic (e.g. COVID-19) medical and ancillary care remotely
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage TeleHealth/telemedicine tools as part of the emergency response.

<table>
<thead>
<tr>
<th>51. Access to TeleHealth/Telemedicine tools/platforms.</th>
<th>Implementation Resources/Recommendations</th>
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</table>
| | • ITU-WHO: Be Healthy, Be Mobile” (BHBM)  
| | • WHO: Digital health clearing house  
| | • India: National Teleconsultation Service Tool  
| | Note additional open source applications may be listed in the WHO Digital Health Atlas or EU Digital Response to COVID-19 or European mhealth hub & COVID-19 apps Hub Repository  
| | recommend where tools are not available, countries should consider the potential of sharing telemedicine tools and platforms for free/open source during a state of emergency (Lead by: WHO) |

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<tr>
<th>52. Operationalize the additional digital health foundations</th>
<th>Implementation Resources/Recommendations</th>
</tr>
</thead>
</table>
| necessary to support TeleHealth as part of the emergency response. | • Recommend the need to have a clear funding/payment approval process  
| | • WHO: COVID-19 and telemedicine Tool for assessing the maturity level of health Institutions to implement telemedicine services |

<table>
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<tr>
<th>53. Establish Guidelines, Training and change management to support the adoption and rollout of TeleHealth.</th>
<th>Implementation Resources/Recommendations</th>
</tr>
</thead>
</table>
|  | • Canada Royal College: Telemedicine and virtual care guidelines  
| | • Canadian Medical Protective Association (CMPA): Telehealth and virtual care  
| | • Federation of Medical Regulatory Authorities of Canada (FMRAC): Framework on Telemedicine  
| | • Canadian Medical Association: Virtual Care playbook  
| | • India: Telemedicine Practice Guidelines Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine  
| | • Italy: Interim provisions for Telemedicine healthcare services during COVID-19 health Emergency  
| | • Poland: Telemedicine Guidelines for doctors and patients, which contains basic principles of telemedicine health services provision  
| | • Singapore: Medical Association, Leveraging on Telemedicine during an Infectious Disease Outbreak  
| | • USA: Getting Started (TeleHealth)  
| | • USA: CDC, Using TeleHealth to Expand Access to Essential Health Services during the COVID-19 Pandemic  
| | • USA: CDC, Framework for Healthcare Systems Providing Non-COVID-19 Clinical Care During the COVID-19 Pandemic  
| | • UK: British Medical Association, COVID-19: video consultations and homeworking  
| | • UK: NHS, Using online consultations in primary care: implementation toolkit  
| | • UK: NHS, Clinical guide for the management of remote consultations and remote working in secondary care during the coronavirus pandemic |
### Proposed Actions | Implementation Resources/Recommendations
---|---
54. **Ensure the necessary policies, regulation and legislation are in place** including operationalize the relevant additional Privacy and Security necessary to support TeleHealth as part of the emergency response. | - Australia: Privacy Checklist for Telehealth Services
- Brazil: Federal LAW NO. 13,989, OF APRIL 15, 2020
- EU: Guidance on privacy and data protection for APPS supporting the fight against COVID-19
- Russia: Legislation for telemedicine consultation with a special recommendation for COVID-19
- Saudi Arabia: Telemedicine Regulations in the Kingdom of Saudi Arabia
- Singapore: Health Science Authority, Regulatory Guideline for Telehealth Products (62)
- Turkey: Telemedicine and Teleradiology Circular
- USA: Policy changes during the COVID-19 Public Health Emergency
- USA: The Office for Civil Rights at the U.S. Department of Health and Human Services, Announces Notification of Enforcement Discretion for Telehealth Remote Communications During the COVID-19 Nationwide Public Health Emergency

55. **Development of a post-pandemic roadmap.** | - Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report

### Case Studies
Argentina, Australia, Brazil, Canada, Hong Kong, India, Italy, The Netherlands, OECD, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Sweden, Turkey, UAE, United Kingdom, Uruguay, USA, WHO

### 4.2 Quarantine monitoring
**Desired outcomes:**
- Availability of quarantine monitoring tools to support:
  - Compliance with isolation orders
  - Online tracking of symptoms and request ongoing guidance
  - TeleHealth, Telemonitoring and telecontrol
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage quarantine monitoring tools as part of the emergency response

<table>
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<tr>
<th>Proposed Actions</th>
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</table>
Note additional open source applications may be listed in the WHO Digital Health Atlas or EU Digital Response to COVID-19 or European mhealth hub | COVID-19 apps Hub Repository |
57. **Operationalize the additional digital health foundations necessary to support quarantine monitoring as part of the emergency response.** | - Turkey: EU-financed ProEmpower H2020 project aims to develop mHealth solutions for online tracking of people with diabetes mellitus and ProEmpower, just like the Korea, Israel and Hong Kong examples, can be a source of additional infrastructure with its multi-national formation and also adds private sector in the game. Apart from that, as a notion, mHealth is a very important aspect of TeleHealth and Telemonitoring |
58. **Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Quarantine monitoring as part of the emergency response.** | - Canada: Lessons learned from other tools such as the Canada COVID-19 app, the COVID Alert app, and Wellness Together Canada, could also be shared with G20 partners, particularly with respect to considerations around privacy and the importance of public confidence therein.
- Recommend international collaboration to develop a template for a quarantine management policy that finds a balance between privacy and the national good |
59. **Development of a post-pandemic policy.** | - Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report |

### Case Studies
Argentina, Brazil, India, Italy, The Netherlands, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Turkey

### 4.3 ePrescribing
**Desired outcomes:**
- Availability of ePrescribing tools
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage ePrescribing tools as part of the emergency response

<table>
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<tr>
<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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60. **Access to e Prescribing tools.** | - India: National Teleconsultation Service Tool includes ePrescribing
Note additional open source applications may be listed in the WHO Digital Health Atlas or EU Digital Response to COVID-19 or European mhealth hub | COVID-19 apps Hub Repository |
61. **Operationalize the additional digital health foundations necessary to support ePrescribing as part of the emergency response.** | - With the use of existing communication channels like SMS and email (see infrastructure implementation resources)
- Austria: Standards-based architecture and Interoperability Specifications for nation-wide e-Prescribing/e-Dispensing infrastructure, fully operational as part of the Austrian National eHealth Infrastructure (ELGA) |
62. **Ensure the necessary policies, regulation and legislation are in place** | - Australia: Prescriptions via telehealth – state and territory rules
- Italy: ePrescription legislation to digitalize therapeutic plans and
### 4.4 eSick Leave

#### Desired outcomes:
- Availability of eSick Leave tools
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage eSick Leave tools as part of the emergency response

#### Case Studies
- Austria, Australia, India, Poland, Russian Federation, Saudi Arabia, Turkey, United Kingdom

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<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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<tr>
<td>64. Access to eSick Leave tools</td>
<td>Note additional open source applications may be listed in the <a href="https://www.who.int/digitalhealth/topics/health-atlas">WHO Digital Health Atlas</a> or <a href="https://ec.europa.eu/digital-single-market/en/digital-response-corona">EU Digital Response to COVID-19</a> or <a href="https://mhealth.globalsites.com/">European mHealth hub</a></td>
</tr>
</tbody>
</table>
### 4.7 Supply Chain Management

**Desired outcomes:**
- Availability of supply chain management tools as part of the emergency response
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage supply chain management tools as part of the emergency response

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<th>Proposed Actions</th>
<th>Implementation Resources/Recommendations</th>
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<tr>
<td>70. Access to Supply Management tools</td>
<td>• <strong>OpenLMIS</strong> is a powerful, open source, cloud-based electronic logistics management information system (LMIS) purpose-built to manage health commodity supply chains. Note additional open source applications may be listed in the <a href="https://www.who.int/digital-health">WHO Digital Health Atlas</a> or <a href="https://ec.europa.eu/healthtopics/coronavirus-19">EU Digital Response to COVID-19</a> or European mhealth hub</td>
</tr>
<tr>
<td>71. Ensure the necessary policies, regulation and legislation are in place to support supply chain management as part of the emergency response</td>
<td>• Recommend national governments to develop policies necessary to support the emergency response (such supply of protective equipment and medications)</td>
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**Case Studies**
India, Russian Federation, Saudi Arabia, USA

### 4.8 Vaccination Management

**Desired outcomes:**
- Availability of vaccination management tools to support:
  - Prioritization of vaccine recipients
  - Communication tools (reminders etc.)
  - Vaccination records and tracking
  - Links to immunization records and registries
  - Supply chain/cold storage management etc.
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage vaccination management tools as part of the emergency response

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<th>Proposed Actions</th>
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<tr>
<td>72. Access to vaccination management tools</td>
<td>Note additional open source applications may be listed in the <a href="https://www.who.int/digital-health">WHO Digital Health Atlas</a> or <a href="https://ec.europa.eu/healthtopics/coronavirus-19">EU Digital Response to COVID-19</a> or European mhealth hub</td>
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<tr>
<td>73. Operationalize the additional digital health foundations necessary to support vaccination management as part of the emergency response</td>
<td>• <strong>WHO: Effective Vaccine Management</strong> (EVM) Initiative</td>
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<tr>
<td>74. Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support vaccination management tools as part of the emergency response</td>
<td>• Recommend national governments to develop policies necessary to support the emergency response to support the vaccination management tools</td>
</tr>
<tr>
<td>75. Development of a post-pandemic policy</td>
<td>• Recommend a template post-pandemic policy be developed for inclusion as an appendix for this report</td>
</tr>
</tbody>
</table>

**Case Studies**
Brazil, Russian Federation, Saudi Arabia

### 4.9 Disease research

**Desired outcomes:**
- Availability of disease research tools as part of the emergency response
- Establishment and enabling of legislative, regulatory, policy frameworks and governance bodies to prepare for, manage disease research tools as part of the emergency response

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<tr>
<td>76. Access to Disease research tools</td>
<td>Note additional open source applications may be listed in the <a href="https://www.who.int/digital-health">WHO Digital Health Atlas</a> or <a href="https://ec.europa.eu/healthtopics/coronavirus-19">EU Digital Response to COVID-19</a> or European mhealth hub</td>
</tr>
<tr>
<td>77. Ensure the necessary policies, regulation and legislation are in place to support disease research as part of the emergency response</td>
<td>• Recommend National governments to develop policies necessary to support disease research as part of the emergency response</td>
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**Case Studies**
Germany, Russian Federation

### 5 Post-pandemic preparation

#### 5.1 Lessons learned

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<th>Proposed Actions</th>
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<tr>
<td>78. Learn from this crisis and build resilience for the next outbreak</td>
<td>• Separate and shared endeavors of countries on COVID-19 will shape the future together. In this respect, first step must be overcoming this pandemic with available resources and then, combining all the lessons learned in order to create a shared platform consisting of knowledge, collaboration, technology and common sense will come afterwards. • Recommend lessons learned be collated after the pandemic and be collated as an addendum to this report</td>
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<th>Proposed Actions</th>
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<tr>
<td><strong>5.2 Operationalize Post-pandemic plan and Roadmaps</strong></td>
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<tr>
<td>79. Finalize all Post-pandemic plans for all tools (especially those not mentioned previously) and operationalize these plans and roadmaps.</td>
<td>• Recommend a draft template post-pandemic policy be developed for inclusion as an appendix for this report</td>
</tr>
</tbody>
</table>
1. Prepare and initiate pandemic response implementation resources

When the Ebola outbreak hit West Africa in late 2013, the world was caught unprepared. The consequence: over 30,000 Ebola cases, including approximately 11,000 dead, and billions of dollars lost across the global system USAID (1). Globally, as of 31 October 2020, there have been 45,428,731 confirmed cases of COVID-19, including 1,185,721 deaths, reported to WHO from 219 countries [with at least one confirmed case] with an unprecedented global cost. During the current pandemic, many countries with stronger health systems have been caught unprepared. This has also been experienced in digital health systems with speed being highlighted as a key challenge identified in the 2020 data collection as summarized in the table below, which similar to the Ebola outbreak although on a much bigger scale across more countries with diverse digital health maturity, highlight the rapid spread of the virus and the rapid need for coordination of actors, systems, and data that an emergency of this scale entails.

Table 1: Data Collection key challenge – speed.

| Enabling digital health solutions delivered during the pandemic have appropriate clinical safety and privacy controls and are able to be deployed quickly. Australia (2). |
| In emergency situations, data updating from all stakeholders in near real time is a prerequisite for data driven policy decisions. Delays in data collections/reporting may lead to inaccurate projections and hampers timely containment of pandemic. India (3) |
| Time – pandemic spreads dynamically and time is needed to create and implement new solutions. Poland (4). |
| Deploying systems across the Kingdom as quickly as possible. Saudi Arabia (5). |
| Rapid change of situation requires digital technologies and enhancements to iterate really fast Singapore (6). |
| Rapid spread of COVID-19 and related time pressure and the existence of different communities with different needs and the strange nature of COVID-19 were the key challenges faced Turkey (7). |
| Deploying the correct technology and enabling the business users in a short time UAE (8). |
| Development at pace, leading to a limited testing phase. United Kingdom (9). |

Post response from the Ebola outbreaks in West Africa in late 2013 USAID developed a report and recommendations with the aim that the international community can reflect, learn, and act based on this experience to help ensure such a tragedy is not repeated As one interviewee put it, “We have blueprints for crisis and conflict, but nobody had a blueprint for a major health crisis.” Although there was no set playbook for how to proceed in an epidemic of this type, scale, and speed, or of how to manage related secondary effects, some interviewees noted there were existing mechanisms and protocols that could have been better adapted and reused in the Ebola response. On the health side, one veteran of health responses pointed out that the protocols for responding to infectious disease, and polio in particular, were not consistently deployed in this response, despite similarities in how to contain the two diseases. USAID (1).

The prepare and initiate phase has three major objectives
1) Ensuring foundations are ready to be available in an emergency/pandemic response
2) Disease surveillance is in place
3) Data Pooling ready
1.1. Digital Health Foundation preparedness

The key challenges and comments from countries and organizations identified in the 2020 data collection for this document support many of the key recommendations from this USAID Ebola report which have been combined and summarized below as a basis for consideration by all countries in responding to this crisis and future crisis.

This phase includes recommendations focused on assessment of the current state, addressing gaps and issues, policy and regulatory processes and protocols, as well as capacity-building activities. Addressing these gaps, issues, policy and regulatory deficits requires the development of preparedness protocols in advance of an emergency that could be triggered with the declaration of an emergency within all the following focus areas.

Many of these will be ongoing actions across all phases including: 1) Prepare & Initiate 2) Prevention & Triage, 3) Track, Tracing & Testing, 4) Treatment, and 6) Post-pandemic.

1.1.1. Infrastructure

The need for safe, robust and scalable infrastructure was highlighted as a key challenge during the 2020 data collection including:

- The technological infrastructure that allows the expansion of tools at the territorial level (connectivity, number of equipment available, servers, licenses, etc.). Argentina (10).
- Lack of affordable, accessible and quality network connectivity, ensuring affordable, accessible and quality network connectivity (adequate bandwidth, coverage and penetration to remote areas, stable networks) Global Fund (11).
- Adequate understanding of the quality and reach of digital connectivity, such as in rural and border areas, some of which lacked persistent digital access and were hotspots for Ebola transmission USA (12).
- Enabling Infrastructure: This can range from Internet penetration and bandwidth (thereby necessitating corresponding design) to elasticity of developed solutions. WHO (13).
- Cloud computing in health will provide infrastructure with feature like on the go upscaling and down scaling of resources. India (3)

1. Action

Invest in physical infrastructure that extends digital connectivity in order to increase resilience in the context of health, humanitarian, and other crises. USAID Page 101 (1).

Implementation resources

- **ITU-UNICEF GIGA initiative** further extending school connectivity to include connectivity in health facilities.
  - ITU is leveraging the work of the ITU-UNICEF GIGA initiative (https://www.itu.int/en/ITU-D/Initiatives/GIGA/Pages/default.aspx) to accelerate the development of financing structures in a number of “quick start” GIGA priority countries, including Niger, Kenya, Kazakhstan, Uzbekistan, and the OECS countries, with an aim to catalyze the funding required to accelerate national connectivity. GIGA is also working to update its broadband connectivity maps to in order to provide Ministers/regulators advice on how they can bring connectivity to health centres. (14)
- **USA: Suggestions for Operationalization from USAID Page 101 (1)**
  - Explore partnerships to create business models that work, potentially including development funding, to build out infrastructure in areas where market incentives do not otherwise exist.
  - Create incentives to expand digital infrastructure. This could include public-private partnerships, subsidies, or tax-based incentives to help MNOs reach rural communities.
  - When building out digital infrastructure, consider power and seek alternative models to enable reliable power. Solar panels, for example, could be outfitted to key government ministries, prioritizing those responsible for managing critical data sets in emergencies, and to district health facilities.
  - Encourage infrastructure sharing, such as base stations, to decrease the
cost of network expansion. This might require incentives, such as tax breaks, to encourage sharing.

- Encourage long-term thinking and scale in network investments so that emergency-related investments in digital infrastructure last beyond the emergency phase.
- Explore alternative models to extend connectivity, such as TV white space, and balloon-, drone-, or low-orbiting satellite-based Internet connectivity to extend coverage in remote or hard-to-reach areas.

2. Action

Conduct baseline, country-wide ICT assessments to gauge the reach, quality, and citizen access to mobile and broadband connectivity, and publish findings on shared repositories using machine-readable formats. This allows the prioritization of investments to extend the physical infrastructure that enables digital connectivity. [USAID](1).

Implementation resources

- **USA:** Suggestions for Operationalization from [USAID](Page 103 (1)).
  - Work with mobile network operators and Internet service providers to develop protocols for reporting data that identify connectivity “cold spots” in order to prioritize them for delivery and easy identification in an emergency scenario.
  - Support the development and deployment of a baseline ICT assessment framework, and an online repository for such assessments to be shared publicly. Assessment categories might include: citizen literacy and digital technology uptake and common citizen digital use patterns; mobile and Internet network reach and capacity by geographic area; e-payments infrastructure capacity to deliver payments to frontline workers and other actors; national health information systems’ capacity to manage routine and health crisis-related data; and a mapping of other commonly used digital information systems that can be used for real-time data and e-payments management.
  - Support the development, sharing, and adoption of standards to assess consumer access and the reach of digital technology. This could include emergency response protocols that enable the rapid assessment of the potential of an emergency scenario (whether conflict, disaster, and/or health related) to affect mobile and Internet network capacity, as well as the likelihood of response demands to burden existing physical infrastructure.

- **Digital Health indicator (e.g. HIMSS INFRAM Infrastructure maturity model)** (15).

- **Early Stage Digital Health Investment Tool (EDIT)**
  [http://www.katicollective.com/tools.html](UNICEF (16))

- **Brazil:** [Digital Maturity Index](see case study below). (17)

- **Global Digital Health Index:** The Principles for Digital Development tell us that the effective integration of digital technologies into any development programming requires an effective understanding of the ecosystem in which digital tools are intended to be used. Understanding the state of country digital health building blocks—including leadership and governance; strategy and investment; legislation, policy, and compliance; workforce; standards and interoperability; infrastructure, and more—is, however, no easy task. The Global Digital Health Index is an interactive digital resource that tracks, monitors, and evaluates the use of digital technology for health across countries. It was launched at the May 2018 World Health Assembly alongside the approval of the WHO digital health resolution - it could be used to help inform global health funders' country- and program-specific investments. [https://www.digitalhealthindex.org/](12).

- **WHO:** [SCORE for Health Data Technical Package](https://www.who.int/data/data-collection-tools/score) (16).
• The Community Health Worker Assessment & Improvement Matrix (CHW AIM) defines how CHW programs can optimally support CHWs and communities. [https://chwimpact.org/chw-aim](https://chwimpact.org/chw-aim) (16).


• The Health Information Systems (HIS) Interoperability Maturity Toolkit addresses challenges in low- and middle-income countries (LMICs), where information systems are largely fragmented. The purpose of the HIS Interoperability Maturity Toolkit is for ministries of health, their implementing partners, and other stakeholders to identify the key domains for interoperability and the required levels of maturity to achieve HIS interoperability goals. [https://www.measureevaluation.org/resources/tools/health-information-systems-interoperability-toolkit](https://www.measureevaluation.org/resources/tools/health-information-systems-interoperability-toolkit) (16).

3. Action

In an emergency, develop and implement emergency protocols for rapid updates to baseline country-wide ICT assessments that gauge the reach, quality, and citizen access to mobile and broadband connectivity, and catalogue the effects of an emergency on baseline connectivity infrastructure and access. Doing so enables an understanding of the extent to which mobile and broadband technologies can support the response by rapidly identifying critical connectivity gaps. [USAID](https://www.usaid.gov) (1).

Implementation resources

• ITU activities in response to COVID-19 (14) See Appendix 5 for details including:
  a. Global Network Resiliency Platform (REG4COVID)
  b. Addressing the response to COVID within the Broadband Commission
  c. Guidelines for National Emergency Telecommunications Plans
  d. Collaboration with International Partners
  e. Leveraging resources from ITU and Cybersecurity partners
  f. ITU and USG Fabrizio Hochschild’s office Joint Webinars on “Digital Cooperation in the Crisis of COVID19”
  g. United for Smart Sustainable Cities (U4SSC)
  h. WSIS TalkX
  i. WSIS ICT Case Repository (part of stocktaking)
  j. Cybersecurity Resources for COVID-19 (CYB4COVID)
  m. ITU/WHO Focus Group on AI for health, Ad hoc group on digital technologies for the COVID-19 health emergency: best practices, open source initiative on AI for health

• USA: Suggestions for Operationalization from [USAID](https://www.usaid.gov) Page 104 (1).
  o Develop and share protocols for quickly assessing the ICT infrastructure in a country as an essential component of emergency preparedness and response.
  o Identify and designate a lead agency to implement the protocol on behalf of the international community.
  o Include as part of the rapid ICT assessment updates to the baseline assessment of mobile and Internet network capacity and latency by geographic area, and the operational and business viability of MNOs in an emergency. Such assessments could update the baseline ICT assessment with critical post-disruption updates and could be automatically triggered with the activation of the deployment of the Emergency Telecommunications Cluster in a humanitarian emergency.
  o Encourage aid workers to download and use applications that report the
availability of mobile networks to crowdsource a picture of network connectivity. These apps could be linked to apps such as OCHA’s Humanitarian ID or others designed for use in emergency situations.

4. Action

**Negotiate preparedness protocols with key actors** (governments, mobile network operators (MNOs), and regulatory bodies) to increase telecommunications network access in emergency situations. This will facilitate rapid collaboration with key actors and support the deployment of ICTs during an emergency response. [USAID](1).

Note: Other communication channels such as radio may also need to be included.

**Implementation resources**

- **ITU Collaboration with UNICEF East Asia and Pacific Regional Office in Bangkok**
  Leveraging ongoing discussions with UNICEF East Asia and Pacific Regional Office in Bangkok to support engagement with telecom authorities in the region to get dedicated telecom resources for Covid-19 such as short codes, zero-rated messages, etc. (14)

- **ITU Collaboration to support WHO AFRO**

- **USA: Suggestions for Operationalization from USAID** Page 108 (1).
  1. In advance of an emergency, negotiate a process to secure the public availability of connectivity maps of mobile network providers operating in countries affected by an emergency. (See related baseline ICT assessment action above.)
  2. In advance of an emergency, negotiate with MNOs to obtain short codes that can be used to support an emergency response, and those that can be used to support ongoing SMS-based communication between ministries and their remote workforce, particularly for health and social sector programs.
  3. Short codes should have reverse billing capacity, so that charges for messages sent over the system are borne by a government or other specialized agency, not the individuals receiving and sending responses.
  4. Ensure emergency short codes are given priority on mobile networks so that if network capacity is limited these messages will still be delivered.
  5. Designate emergency response short codes to be distributed to and accessible by response organizations in emergency settings. Some organizations could be pre-approved to reduce the vetting process in an emergency context.
  6. Negotiate protocols to share aggregated mobility patterns from mobile CDRs to assist emergency responders.

**Case study**

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil Sept 2020</td>
<td><strong>Connectivity of primary care health units – family health units</strong> The Brazilian Ministry of Health (MoH) and the Ministry of Science, Technology, Innovation and Communications (MCTIC) have worked together with the National Network of Education and Research (RNP) to connect up to 16,000 family health units (USF) to the Internet throughout the country. The focus of the action is to provide the Unified Health System (SUS) with information necessary for the control of Covid-19 and actions to cope with the corona virus pandemic, such as the feasibility of technical conditions for the execution of telemedicine activities. The more than 42,000 health centers distributed throughout the country can attend 80% of cases related to coronavirus infection. In the first four months of the provision of services, the contracted companies will do voluntary work, therefore without burden for public management. The amounts will be paid only for the next eight months to ensure the provision of connectivity for a period of twelve months. Telecommunications services will be contracted, including the installation, activation, operation and maintenance of internet access connections with operators that already provide service in the country. With this, the units that are not yet connected will now have internet broadband solutions, preferably in fiber optics with service and monitoring of the provider, 24 hours,</td>
</tr>
</tbody>
</table>
7 days a week. In places where there is no availability in fiber optics, it will be considered an alternative in licensed frequency radio or satellite link. The speed for any of the types of access will be made available depending on the number of Family Health Teams of each of the health posts to be connected.

After the first year, the connectivity of these family health units should be funded by the municipality itself and can count on the resources transferred by the federal government through the financing action “Informatiza APS”.

https://aps.saude.gov.br/ape/informatizaaps/conectividade
https://datasus.saude.gov.br/unidades-de-saude-familiar-de-todo-o-pais-terao-acesso-a-internet/

Digital Maturity Index

It is recognized that more digitally mature health facilities improve the experience of patients and health professionals and are able to offer better continuity and transition of care to individuals. But what is the current stage of health facilities in this journey of digital transformation? How to measure the level of digital maturity?

It was thinking about these issues that the concept of Digital Health Maturity Index (IMDS) was developed, based on international methods of assessment of digital maturity in health, such as the maturity models of HIMSS Analytics, the NHS Digital Assessment Tool of the Ministry of Health and the Who Global Digital Health Index.

IMDS is a tool for evaluating and monitoring the maturity of health institutions in relation to digital health. Such a tool consists of a set of questions classified into one dimension and one domain. Each question is composed of five possible answers that indicate the degree of maturity of the different aspects of digital health, such as governance, interoperability, information security, use of the Electronic Patient Record, etc. and results in a percentage index that identifies the digital level of a health institution, considering the adoption of technology and the preparation for the digital journey.

Following the proposed methodology, a percentage index is generated that allows a measurement of the maturity stage on a graduation scale: traditional – 25%, evolution – 50%, sophistication – 75% and Innovation – 100%.

These stages of maturity presented above help identify the profile of health establishments from the point of view of digital evolution, allowing local managers themselves or national researchers to monitor the progress of digital health in the country.

In July 2020, IMDS finalised its application pilot. In this stage, 18 establishments were evaluated, 15 health care facilities (2 UBS, 1 UPA, 1 Clinic and 11 Hospitals) and 3 Clinical Analysis Laboratories. This pilot stage of the IMDS, although it was also impacted by the pandemic (sample initially had 33 establishments distributed in 11 municipalities), was fundamental to evaluate and refine the questionnaire applied and the weighting of responses.

Once the evaluation of the results of the IMDS pilot application has been completed, the next step is to systematize how these results will be documentation in the proposition of the new waves of application of the questionnaire in the rest of the country.

By the end of 2020, DATASUS aims to fulfill the following steps:

• Define a strategy for the expansion, dissemination and presentation of IMDS
• Prepare the database for IMDS expansion
• Develop IMDS technical documentation and educational materials and IMDS training
• Apply IMDS in health institutions (in waves) defined in the expansion strategy.
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada Oct 2020</td>
<td>The Centre for Digital Health Evaluation (CDHE), Women's College Hospital is undertaking work to establish a pan-Canadian approach to a digital health evaluation framework. Health Standards Organization (HSO) has co-designed a standard on integrated people-centred care and services, including key system design principles that could help to guide the effective integration of digital tools into coherent, people-centred health systems. The standard is expected to be released in November 2020.</td>
</tr>
</tbody>
</table>

WHO Oct 2020 | The WHO new dynamic digital health maturity model (under development) will provide an assessment for use by WHO member states. The dynamic digital health maturity model will be driven by business use cases aimed at improving health outcomes at the national and sub-national level. The dynamic maturity model will help countries to identify evidence-based digital health interventions and prioritize country-level investments in digital health to support primary health care and universal health coverage (WHO 2019) |

### 1.1.2. Workforce

The USAID Ebola reported acknowledged that using digital technologies does not remove the need for human capacity; it increases it. The Ebola outbreak illustrated the critical need for technological literacy and capacity, specifically that of staff and national communities of practice who were best positioned to deploy quickly and support long-term recovery efforts. The best time to build human capacity, however, is before an emergency hits. The data and information demands of the response made it difficult to build national capacity while meeting operational needs. Moreover, the volume and velocity of data and information collected and shared occasioned the need for specific expertise, including a cadre of epidemiologists, data scientists, data visualization specialists, and data analysts to manage, interpret, and render data useable. The 2020 data collection echoed some of these points including:

- **Country resource bottlenecks.** Countries not having enough specialized resources to support design and deployment of solutions. Global Fund (11)
- **Human Resources:** We simply do not have sufficient human resources to support/coordinate all of the required developments and implementations. WHO (13)
- **Ensure the timely professional training of health professionals to the use of new health care tools.** Italy (18)
- **This is even more important in a situation where social distancing must be practiced, and solutions for COVID-19 can only be deployed using remote mechanisms and trainings UNICEF (16)
- **Training / “Digital Literacy”:** In some cases, especially with the current restrictions around travel, training on digital technologies can be time-consuming and challenging, especially when people are already strapped for time WHO (13)

### 5. Action

**Build staff capacity and data literacy as well as institutional capacity** to leverage digital systems and real-time data in support of operations, programs, and decision-making. Effectively using data and digital technologies require more, not fewer, staff to coordinate and manage collection of information across multiple partners, to support use and adaptation of digital platforms, and — most importantly — to analyze data in order to inform decision-making. USAID (1).

**Implementation resources**

- **USA:** Suggestions for Operationalization from USAID Page 105 (1).
- o Assess existing staff capacity in data and digital literacy, informatics, software engineering, and other technical areas, identifying where staff capacity is thin.
- o Build capacity of existing staff and retain new staff with relevant expertise to support a cadre of data and digital experts with specialized knowledge of digitized data collection, sharing, management, analysis, and use for decision-
making to help quickly aggregate, manage, and interpret (digital) data. Many response actors—NGOs and donors—need to recruit for and grow their workforce's technical capacity. This includes: technical capacity to collect, manage, and analyze data in an ethical and responsible way; methodological expertise requiring a clear understanding and awareness of what data to collect and how; the capacity to input and manage large quantities of data; and mastery of data analysis and visualization.

- Support the development of technical capacity among host country national governments and at the regional level, such as through technical associations. During the Ebola outbreak, the most-affected countries had to request and wait for technical assistance from outside experts to adapt their HIS to track Ebola cases. Critical time, information, and ground in the fight against Ebola were lost waiting for outside experts to make these adaptations.
- Support digital literacy and the regular use of digital technologies within national governments, local organizations, and response agencies, both to strengthen health systems with routine reporting and to enable proficient use of digital technologies in the context of an emergency response.
- Invest in and grow niche expertise. The data demands of the Ebola outbreak response required unique and hard-to-find skill sets that encompassed global health, epidemiology, data science, and technology expertise. Although the combination of sector and technological expertise is rare, it is valuable to governments and response organizations, both in ongoing program management and during crises.
- Address the salary competition that governments face in the retention of top technical talent. Alternative models could include limited-term fellowship positions or senior executive service models with pay at slightly higher rates than normal government salaries.

- **Australia: National Digital Health Workforce and Education Roadmap.** The roadmap seeks to provide a basis for understanding the digital capability requirements of all those involved in the healthcare system including the health workforce, volunteers and health consumers. The roadmap also acknowledges how the application of digital technologies in health are impacting the workforce and associated education requirements and anticipates how these technologies are likely to impact the workforce and education requirements in the medium term, including emerging technologies. It is intended to offer a common foundation for the work that will be performed by a broad range of health system participants to address the challenges and opportunities presented by digital health in all its guises. [https://www.digitalhealth.gov.au/about-the-agency/workforce-and-education/Workforce%20and%20Education%20-%20Roadmap.pdf](https://www.digitalhealth.gov.au/about-the-agency/workforce-and-education/Workforce%20and%20Education%20-%20Roadmap.pdf) Australian Digital Health Agency (19).


6. **Action**
Develop, implement and adopt a Digital Health workforce emergency plan to manage surge staffing requirements and staff effected by the emergency.

**Implementation resources**

- **USA:** Suggestions for Operationalization from [USAID](https://www.usaid.gov) Page 105 (1).
  - Deploy data managers and analysts in an emergency alongside sector experts to provide critical data capacity needed to support operations and decision-making.

**Recommendation**

- A template Digital Health Workforce emergency management plan be developed for inclusion as an appendix for this report. (Lead by Saudi Digital Health Secretariat).

7. **Action**
Access to Online recruitment and training of health professionals to cope with emergency
response (e.g. COVID-19) including training for health professionals in the use of digital health tools.

**Implementation resources**

- **OpenWHO** is WHO’s new interactive, web-based, knowledge-transfer platform offering online courses to improve the response to health emergencies. OpenWHO enables the WHO and its key partners to transfer life-saving knowledge to large numbers of frontline responders. OpenWHO aims to equip all frontline responders with the knowledge they need to better contain disease outbreaks and manage health emergencies. It also aims to foster discussions, feedback and sharing of expert knowledge on public health. Currently more than 2 million health workers are using the platform. WHO (13)

- **WHOA** (WHO Academy App) a mobile app to improve knowledge and skills of Health Workers working on COVID-19 response. Enabling health workers to access trusted and up-to-date COVID-19 informational and learning resources, such as:
  - Technical resources and training that update in real-time and are available on multiple platforms
  - Virtual learning events (classes, workshops, webinars).
  - Connects health workers to experts and real-time technical Q&A. WHO (13)


8. **Action**

**Build institutional capacity to leverage digital systems and real-time data.**

**Implementation resources**

- **USA:** Suggestions for Operationalization from [USAID](https://www.usaid.gov) Page 106 (1).
  - Assess existing institutional capacity to leverage digitized data and information flows, and to enable adaptive, data-driven programming, noting where deficits exist.
  - Implement change management strategies to increase institutional capacity to address existing deficits. This may include organizational policies, processes, staff positions, workflows, and budgets required for implementation ([USAID](https://www.usaid.gov) Page 107 (1)).
  - Designate an internal champion to shepherd the change management strategy, and to regularly assess how expenditures need to be realigned to meet changing needs.
  - Establish a national digital health committee or technical working group to guide and support the deployment of digital health information systems.

**Case study**

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Workforce and Training</th>
</tr>
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<tbody>
<tr>
<td>Brazil Sept 2020</td>
<td><strong>Online recruitment and training of health professionals to cope with COVID-19</strong></td>
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<tr>
<td></td>
<td>The Strategic Action “O Brasil Conta Comigo - Profissionais da Saúde” is an initiative aimed at training and registering health professionals to cope with the Coronavirus pandemic (COVID-19). Instituted through Ordinance GM/MS No. 639, of March 31, 2020, the registration and course were made available to the public on April 2, 2020. The technological solution of the registration, training and certification of health professionals was developed in one month by the Ministry of Health, in partnership with The Bridge Laboratory, linked to the Federal University of Santa Catarina (UFSC). In attention to the emergency demand, the Social Security Information Technology Company DATAPREV made available a computer environment of GovCloud, with the hosting resources of the software, so that it was possible to operationalize the first months of the action, allowing the structure to be the number of simultaneous accesses in the register and Moodle environment of remote training, in addition to sending emails necessary for the implementation of registration.</td>
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<tr>
<td>Country/IO</td>
<td>Description - Workforce and Training</td>
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<tr>
<td></td>
<td>&quot;Brasil Conta Comigo – Profissionais da Saúde&quot; surpassed the historical mark of more than one million registered in the largest self-declaratory bank of health professionals in Brazil. Of these, more than 34% have already been trained in the course Clinical Management Protocols of Corona virus (COVID-19). Training is an important instrument for the safe care and self-protection of health professionals. The registration allows mapping the profile of the professional and identifying those who wish to be part of the actions of direct confrontation to COVID-19. Due to the high transmissibility of the disease and the illness of health professionals, managers needed agile solutions to meet the growing demand for care in the health service. Thus, the initiative makes it possible to make the database available to assist local health managers in recruitment actions. Given the worsening of the scenario in some locations and, after the request of managers, the Ministry of Health sent the database with updated information about professionals willing to act, qualified in their respective councils and trained in the updated protocols of coping with COVID-19.</td>
</tr>
</tbody>
</table>

See also: Infrastructure, Usability and availability, Governance, Policy and regulations, Vaccine Mgt, Contact, Training, Standards, Disease Surveillance, Data Pooling, Information & Triage, Call Center, Testing, TeleHealth, Quarantine monitoring.

| Hong Kong | Oct 2020 | Hong Kong has established both Health Informatics and IT domain expertise in digital health through nearly three decades of comprehensive development of digital health systems in the public sector. Extensive user involvement at all stages of development, deployment and operations mean that there is also a widespread culture of digital health use in the frontline clinical and service management workforce. Such a capability and culture enabled rapid development and deployment of multiple COVID-19 related systems including real-time dashboards of hospital bed capacity and Hong Kong wide COVID-19 case distribution. |

See also: Training, Standards, Disease Surveillance, TeleHealth, EMR.

<p>| India | Sept 2020 | During this COVID pandemic, mobility and mass gatherings is a challenge so most of the trainings are being conducted over digital platforms under modalities of Video conferencing or Webinar mode. India has conducted multiple virtual trainings including (but not limited to): • COVID management Team provides training to State Surveillance Officers (SSO) and District Surveillance Officer (DSO) are getting conducted on periodic manner wherein new guidelines and treatment procedure are detailed out. • Centre for Health Informatics (CHI) keeps conducting orientation session for State, District and facility nodal officers regarding IT readiness and its usage. • Training of trainers with WHO for state health functionaries • Training of frontline workers on COVID • Training of health professionals on ventilators etc. Oximeters, N95 masks, PPE kits etc. • Set up Clinical Centers of Excellence Program for training of health professional across the country. Few of the themes of trainings are as follows: - Medical management and ICU care for severe COVID-19 cases - Infection Prevention and Control - Management of complications: use of inflammatory markers - Optimizing pregnancy outcomes during COVID-19 - Screening and management of patients with Diabetes in COVID-19 facilities More detail: <a href="https://www.mohfw.gov.in/">https://www.mohfw.gov.in/</a> <a href="https://www.youtube.com/watch?v=jHtZf-hCEM">https://www.youtube.com/watch?v=jHtZf-hCEM</a> • Ministry of Human Resources Development (MHRD)’s digital infrastructure |</p>
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Workforce and Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Federation</td>
<td>knowledge sharing platform (DIKHSA), which is used for conducting training is also used for conducting online trainings on containing, preventing and managing covid-19 infections</td>
</tr>
<tr>
<td>Oct 2020</td>
<td>• Online training platform such as Integrated government online training (iGOT) has been leveraged to prepare training content on Covid-19 for numerous stakeholders - district administration, medical officers, nurses, paramedics, ANMs, hygiene workers, technicians and volunteers from various ministries, departments and organizations. More detail visit: <a href="https://igot.gov.in/igot/explore-course">https://igot.gov.in/igot/explore-course</a></td>
</tr>
<tr>
<td>Singapore</td>
<td>Each medical facility obligatory must send information about number of physicians and nurses who can provide care for COVID-19 patients to Information Resource “COVID-19”. Information Resource “COVID-19” collect, analyze and aggregate information from local to federal level. Authorities at each level have daily actual information about situation with physicians and nurses. This database together with patient’s database give possibility to assess needs in medical workers Artificial Intelligence. Ministry of Health elaborate special training courses for physician and other medical workers to care patient with COVID-19 and safety workplace. Each medical worker must go through this training obligatory with control by employers. <a href="https://edu.rosminzdrav.ru/covid-19/">https://edu.rosminzdrav.ru/covid-19/</a></td>
</tr>
<tr>
<td>Sweden</td>
<td>Methods and recommendations were developed for the prevention of diseases of the population, diseases of medical personnel, and for carrying out disinfection measures. <a href="https://minzdrav.gov.ru/ministry/med_covid19">https://minzdrav.gov.ru/ministry/med_covid19</a></td>
</tr>
<tr>
<td>April 2020</td>
<td>In March 2020, the Ministry of Health (MOH) launched free Telemedicine e-training to help doctors and other healthcare professionals design and deliver safe telehealth services, especially to support continuity of care during COVID-19. The training covers the safe use, limitations and implementation of telehealth services, with insights collated from the Telemedicine Regulatory Sandbox. <a href="https://minzdrav.gov.ru/ministry/med_covid19">https://minzdrav.gov.ru/ministry/med_covid19</a></td>
</tr>
<tr>
<td>1.1.3. Privacy and Security</td>
<td>The Ebola outbreak response highlighted the tensions between data sharing needs on the one hand, and privacy and security concerns on the other, and the need for emergency preparedness protocols for</td>
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</table>
data and digital information management. The report also highlighted that although privacy protection and ethics often stand alone as separate recommendations, putting them into practice and making them meaningful requires that these considerations be integrated into policy and regulatory processes and protocols, as well as capacity-building activities. Similarly, the 2020 data collection highlighted the following key challenges:

- Ensuring digital health solutions delivered during the pandemic have appropriate clinical safety and privacy controls and are able to be deployed quickly. Australia (2)
- The key challenges that the digital technologies face at pandemic situation is to take into account privacy protection. Japan (20)
- Ensuring privacy of all citizens while conducting contact tracing is also a sensitive and critical yet challenging task. India (3)
- Combine the need to manage personal data with the need to guarantee data protection and compliance with fundamental rights. Italy (18)
- Dutch civil society is very critical about government access to personal data (healthcare is delivered by private providers, no government delivery), and has a very active lobby looking at the necessity and execution, as well as the duration and technology used for managing the pandemic. Transparency is key, involving all relevant stakeholders is another. This is central in the Dutch digital health approach of the past few years, so it fits our modus operandi. The Netherlands (21)
- Private and secure by design. This is a design challenge, where the crisis gives us little time to prepare and act, but we need the technology used to be private and secure by design. We learn from other examples in other countries and regions but have to make a tailor-made solution. The Netherlands (21)
- See OECD comments under data and data standards below which highlights legal and policy limitations to sharing and providing access to data and data localization laws and policies that prohibit data sharing across borders; and concerns about data security vulnerabilities. OECD (22)
- Protecting the privacy of citizens/residents/visitors/etc. Saudi Arabia (5)
- USAID also has released responsible data guidance to inform steps that should be taken to ensure privacy and security safeguards in the origination, transfer, analysis, and use of digitized data. USA (12) On April 15th, 2020, the Agency will release its inaugural Digital Strategy, soon to be followed by its first-ever Digital Health Vision providing guidance for its use of program funding to invest in digital technologies that support country health programs. USA (12)
- Clear guidelines on privacy and ethical use of data, as well as educating the public on data needs, can be major impediments. WHO (13)
- Country policy regulation and policy environments do not facilitate scaled and/or interoperable system development. For example, standards on data management are not defined; critical policies on data access, security and privacy are not in place which can slow systems development and adoption, as well put people at risk; communications access to send public messages and protocols for us are not in place. Global Fund (11)

9. Action
Advance the ethical and responsible use of data and digital technology. Good data practices include establishing protocols that protect individuals’ privacy and security, including for vulnerable populations. USAID (1).

Implementation resources
- Data Governance
The OECD Council Recommendation on Health Data Governance aims to address these challenges by asking countries to develop national health data governance frameworks that adhere to a set of key principles that support the development, accessibility, and use of health data within countries and across borders while protecting data privacy and security. OECD, Recommendation of the Council on Health Data Governance, OECD/LEGAL/0433, https://www.oecd.org/health/health-systems/Recommendation-of-OECD-Council-on-Health-Data-Governance-Booklet.pdf OECD (22)

- Governments adhering to the OECD Council Recommendation on Health Data Governance will implement a national health data governance framework to encourage the availability and use of personal health data to serve the health-related public interest while promoting the protection of privacy, personal health data and data security.
o The Recommendation sets out twelve key elements of the development and implementation of national health data governance frameworks. The elements encourage greater cross-country harmonisation of data governance frameworks so that more countries can use health data for research, statistics and health care quality improvement.

• USA: Suggestions for Operationalization from USAID Page 111 (1).
  o Develop processes and protocols that respect individual data privacy and facilitate data sharing. Integrate privacy risk and ethical analysis into processes for aligning data collection and use from the beginning.
  o Promote policies that encourage responsible data sharing and ownership for different types of response data, and the circumstances under which special processes would apply.
  o Adapt policies and processes to include risk and benefit analysis for sharing different types of data (e.g., data owned by an MNO versus a government versus an NGO) among actors in an emergency.
  o Invest in resources for capacity building to enable responsible collection, use, and management of data, including the necessary information security tools, policies, and human resources.
  o Negotiate a protocol to share case data, with full protection of personally identifiable information, to pre-approved actors (e.g., academics, response agencies) in order to facilitate disease modeling upon declaration of a PHEIC.
  o Develop a methodology to assess risks and benefits of data use (collecting, storing, managing, sharing) in emergencies that could be tailored by emergency type (conflict, natural disaster, health emergency).


• ITU: activities in response to COVID-19 and cybersecurity (14) See Appendix 5 for details including:
  e. Leveraging resources from ITU and Cybersecurity partners

• Five safes Framework (see Cases studies Standards) Australia (2).


• WHO ITU toolkit for designing national strategy for digital health has a relevant section on privacy and security would assist with this https://apps.who.int/iris/handle/10665/75211, page 8 (13).

### Case Studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Privacy and Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Federation Oct 2020</td>
<td>All Russian organization work under the Federal law About Personal Data – all database must have certificate of governmental authorized body. <a href="http://www.consultant.ru/document/cons_doc_LAW_61801">http://www.consultant.ru/document/cons_doc_LAW_61801</a>; See also Governance, Policy and regulations Standards Training</td>
</tr>
<tr>
<td></td>
<td>Disease Data Pooling Information Call Center Contact Testing</td>
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<tr>
<td></td>
<td>Surveillance ePrescribing eSick Leave EMI Facility manager Supply chain</td>
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<tr>
<td></td>
<td>Disease Surveillance Data Pooling Information Call Center</td>
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<tr>
<td>TeleHealth Quarantine monitoring TeleHealth Quarantine</td>
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</table>

1.1.4. Data and Data standards

Following on from Privacy and Security concerns addressed above, the 2020 data collection highlighted other Data and Data standards key challenges:

- To have information systems that address and generate information on different aspects of the epidemic, in order to facilitate the decision-making process Argentina (10)
- Able to use our current data to support the population from an individual as well as population health point of view Australia (2)
- The speed between the data capture, processing and availability Brazil (17)
- The balance between the amount of variables + data quality Brazil (17)
- One of the key challenges is balancing between volume and quality of data. Since the ground personnel need to implement containment strategies as well as maintain data discipline, doing both at the speed required for emergency management can become extremely challenging. This is especially true when new data systems have been put in place as in the case of COVID. India (3)
- Challenges common to most OECD countries in being able to create information and tools from health data include concerns with the quality of key health datasets that limit their usefulness, lack of consistent standards for key clinical terms, and legal and policy limitations to sharing and providing access to data, to linking datasets and to extracting data from electronic clinical record systems. Further challenges to cross-border collaborations include lack of data interoperability due to the lack of agreed global standards for key terminology and data exchange; data localization laws and policies that prohibit data sharing across borders; and concerns about data security vulnerabilities. OECD (22)
- Adequate standardization of critical data elements (e.g. evolving and non-aligned definitions for probable, suspected, and confirmed Ebola cases) as highlighted in USAID report. USA (12)
- Publication of key datasets in machine-readable format, with many Situation Reports published in PDF format, posing difficulty to researchers attempting to access case data for analytical purposes. USA (12)

10. Action

Agree upon and support the broad uptake of common data standards to enable effective sharing of data across sectors, systems, and silos. USAID (1).
Implementation resources

- **USA**: Suggestions for Operationalization from [USAID](https://usaid.gov) Page 112-113 (1) with USA update (12):

  o Understand common barriers to paper-based data and information flows, since these are likely to impact digital information and data flows as well.
  o Support the mapping of public and private infrastructure, such as hospitals, clinics, or schools. Include these maps as part of the “common operational datasets” that are available to response actors at the beginning of an emergency situation.
  o Integrate GIS into preparedness protocols related to data standardization and data collection.
  o Collect only what is needed. In adopting digitized data collection and use, the types of data collected should first match the information needs of those collecting and using the data.
  o Identify and agree upon data standards, including harmonized disease case definitions and reporting formats in preparation for potential future outbreaks. This will help to decrease confusion among responders, facilitate data aggregation over the course of an outbreak, and minimize the data burden on frontline responders. Where these data standards have not yet been agreed upon, (see the [Action](https://www.usaid.gov) regarding the creation of emergency data standards in the next section)
  o Leverage health IT that is developed and is recognized internationally by standard development organizations.
  o Convene discussions about data standards that cut across sector silos (e.g., health, WASH, education, logistics) and skill sets (e.g., technologists/developers, operational humanitarians, development practitioners, researchers). Such discussions could eliminate some issues that arose from non-aligned data standards and interoperability challenges.
  o In advance of or at the outset of an emergency, gather relevant stakeholders to develop minimum data collection standards, particularly in the early phases of the emergency. Defining the minimum viable product and baseline data, including definitions product and baseline data, including definitions and standards for data collection, can minimize the data burden and help increase the likelihood that data collected are of higher quality (due to reduced competing demands for data collection) and of the broadest possible utility to response and other actors. NOTE: Standards development, even with a sense of urgency, can take time. Therefore, leveraging existing standards will be key and identifying new standards that may be needed in a public health emergency should occur on an ongoing basis in order to be prepared in advance.
  o Governments and multilateral partners in this space should strongly encourage and, ideally, contractually require funded organizations to adopt and implement harmonized data standards for both paper and digital technology-based systems.
  o Data sharing and use agreements for intra- and international exchange (such as between and among national governments and international agencies) should be automatically triggered with the declaration of a Public Health Emergency of International Concern or a Level-3 Emergency.
  o Contribute to periodic reports documenting the maturity of digital and information systems, such as the ITU’s annual eHealth survey or the Demographic and Health Survey program, to enable continuously updated indexing of the capability and reach of country-level “infostructure.”

- **USA**: Suggestions for Operationalization from [USAID](https://usaid.gov) Page 109 -110 (1).

  o Design protocols for emergency data-standards development to simplify and harmonize data collection in a crisis. For example, a joint public health advisory board for a particular crisis could be tasked with agreeing upon developing common working standards (e.g., case definitions, indicators) within a period of days of the declaration of a PHEIC or a Level-3 Humanitarian Emergency. This body should work with existing humanitarian coordination bodies, such as OCHA and the humanitarian health cluster led by WHO, to designate or create
temporary standards for the specific emergency, if needed. Immediately following the announcement of public health advisory board designated standards, an associated technology advisory board would then be responsible for developing and publicly posting the associated software code to ensure interoperability of these data across commonly used data systems.

- During a crisis, emergency data standards should be reviewed on a periodic basis (such as once a month) to assess and update standards, and to push out related changes.
- Leading international health authorities should publish working emergency data standards and liaise with country governments to adopt them. This process would be facilitated by groundwork laid in advance to create awareness of and to formalize this process so that all parties are prepared to expect and quickly implement new data standards as needed. Such a process could be linked to the negotiation of data sharing protocols or the IHR. Governments, multilaterals, and donors could contractually enforce the adoption of those standards in software and data analysis related to the response.

- **WHO: Surveillance and case definitions** to provide guidance to Member states (13)
- **WHO: Death certification guidance** (13)
- **GDHP: Advancing Interoperability Together Globally** (2020, white paper on interoperability) [https://www.gdhp.org/gdhp-whitepapers](https://www.gdhp.org/gdhp-whitepapers) (3)
- **ICD-11** is available in all 6 official languages since its publication (English, French, Spanish, Russian, Chinese and Arabic). Most countries (115 in 2017) use the system to report mortality data, a primary indicator of health status. [https://icd.who.int/en](https://icd.who.int/en) (30)
- **HL7 SANER Project** is developing a FHIR-based implementation guide for public health reporting [https://blog.hl7.org/saner-project-using-hl7-fhir-to-enable-easier-reporting-for-public-health-reports](https://blog.hl7.org/saner-project-using-hl7-fhir-to-enable-easier-reporting-for-public-health-reports) (12)
- **HL7 International Patient Summary** may be a good starting point to establish agreement on data elements with additional work required to agreement on the terminologies (12)

### Case Studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - International Data Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina April 2020</td>
<td>The Digital Health Strategy uses SNOMED CT and HL7 FHIR syntactic standards as the semantic standard. See also Standards, Disease Surveillance, Data Pooling, Information &amp; Triage, TeleHealth, Quarantine, Facility Management.</td>
</tr>
<tr>
<td>Australia April 2020</td>
<td>Australia uses the international data standards listed in Appendix 2 Data Collection Appendix B. In addition, the Commonwealth utilizes the five safes framework in its use of confidential and sensitive data. The Five Safes is a risk assessment framework for data access: safe people, safe projects, safe settings, safe data and safe outputs. See also Standards, Data Pooling &amp; Triage, Contact Tracing, TeleHealth, ePrescribing, EMR. Further information regarding Australia’s digital health response to COVID-19 is available online at <a href="https://covid-19.digitalhealth.gov.au/">https://covid-19.digitalhealth.gov.au/</a></td>
</tr>
<tr>
<td>Austria October 2020</td>
<td>The National eHealth Infrastructure ELGA is based on IHE profiles and shares structured documents (HL7 CDA). DICOM is used for image sharing. Terminologies used are ICD-10 for diagnosis, LOINC for lab tests and Austrian terminologies (e.g., medicines, etc.). <a href="http://www.elga.gv.at">http://www.elga.gv.at</a> Additionally, aiming at facilitating both monitoring and control of future outbreaks of any highly infectious diseases, Austria already implemented its designated Epidemic Reporting System (EMS) by 2008. EMS provides a shared database for collecting information for all cases within a defined range of diseases. Following international...</td>
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<tr>
<td>Country/IO</td>
<td>Description - International Data Standards</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>Brazil April 2020</td>
<td>Uses only those standards mentioned in Appendix 2 Data Collection Appendix B. See also Standards: Disease, Surveillance, Data Pooling, Information &amp; Triage, Call Center, Contact, Testing, ePrescribing.</td>
</tr>
<tr>
<td>Canada Oct 2020</td>
<td>We are only using those that are listed in Appendix 2 Data Collection Appendix B. Canada recognizes the importance of interoperability and data standards to enabling effective digital tools that contribute to coherent health systems. Canada also recognizes the importance of enabling appropriate access to health data for research purposes – for example, through the Strategy for Patient-Oriented Research Health Data Platform – while safeguarding privacy. Some provinces and territories have now launched similar efforts (e.g. British Columbia and Ontario). See also Standards: Disease, Surveillance, Data Pooling, Information &amp; Triage, Call Center, Testing, TeleHealth, Quarantine monitoring.</td>
</tr>
<tr>
<td>Global Fund April 2020</td>
<td>The Global Fund relies on and supports MoH information for its analysis. See also Standards: Disease, Surveillance, Data Pooling, Information &amp; Triage, Call Center, EMR.</td>
</tr>
<tr>
<td>Italy Sept 2020</td>
<td>In Italy, we use ICD9-CM and an extension of the ICD9-CM has been developed to include new codes related to COVID-19 diagnoses and procedures. The new codes are going to be adopted officially by the Minister of Health. Use cases are currently limited to hospital admissions and in the emergency department. Other standards concerning EHR, for instance HL7 for International Patient Summary, will be completed in the next future to facilitate the integration of healthcare services at a national level and also interoperability at EU level. See also Standards: Disease, Surveillance, Data Pooling, Information &amp; Triage, Call Center, EMR, Facility Manager.</td>
</tr>
<tr>
<td>The Netherlands April 2020</td>
<td>IHE profiles to transfer patient data. See also Standards: Data Pooling, Information &amp; Triage, Contact, Testing, TeleHealth, Quarantine monitoring, EMR, Facility Manager.</td>
</tr>
<tr>
<td>OECD May 2020</td>
<td>OECD surveys indicate that most countries are not using SNOMED CT within national e-HR systems. Five of twenty-eight countries reported in 2016 that SNOMED CT was the standard for several key elements (such as diagnoses, medications, surgical procedures, and lab tests and medical images) and in four countries, SNOMED CT was</td>
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<tr>
<td>Country/IO</td>
<td>Description - International Data Standards</td>
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<tr>
<td>Poland April 2020</td>
<td>From Appendix 2 Data Collection Appendix B:</td>
</tr>
<tr>
<td></td>
<td>LOINC is used mostly as regards types of documents</td>
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<tr>
<td></td>
<td>See also Standards Data Pooling ePrescribing eSick Leave</td>
</tr>
<tr>
<td></td>
<td>Data Pooling Information &amp; Triage Call Center Tracing Quarantine &amp; Triage</td>
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<tr>
<td></td>
<td>Health TeleHealth Quarantine &amp; Triage Monitoring</td>
</tr>
<tr>
<td>Portugal April 2020</td>
<td>Concerning the usage of international data standards for the registry of COVID-19 disease related information, Portugal is resorting to the usage, at a National level, of four terminologies: LOINC, ICD10, ICD10CM and ICDPC-2. Because almost 90% ICT systems in healthcare in Portugal are provided by the Government, through the National Agency for IT and eProcurement – SPMS, we are able to adopt in full scale these terminologies. The definition of these codeset is governed by the National Body responsible for defining and maintaining healthcare related valueset with national interest – the Clinical Terminology Center, in which SPMS is part of the board. Given this context, we are currently resorting to the following valuesets for the following contexts, See Appendix 4 – Portugal COVID-19 codes.</td>
</tr>
<tr>
<td></td>
<td>See also Standards Disease Surveillance Data Pooling Information &amp; Triage Call Center Contact Tracing TeleHealth Quarantine &amp; Triage Monitoring</td>
</tr>
<tr>
<td></td>
<td><a href="http://nsi.rosmzdrav.ru/">http://nsi.rosmzdrav.ru/</a></td>
</tr>
<tr>
<td></td>
<td>Order of the Ministry of Health of the RF dated August 27, 2020 No. 906n “On approval of the list, procedure for maintaining and using classifiers, reference books and other regulatory and reference information in the field of healthcare“ is the bases of unified all classifications and standards in the Russian Health Information System.</td>
</tr>
<tr>
<td></td>
<td>See also Governance Policy and Regulations Standards Privacy &amp; Security Disease Surveillance ePrescribing eSick Leave</td>
</tr>
<tr>
<td></td>
<td>Data Pooling Information &amp; Triage Call Center Contact Tracing TeleHealth Quarantine &amp; Triage Monitoring Facility Manager Supply chain Vaccine Mgt</td>
</tr>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>Using different standards such as SNOMED CT, HL7 / FHIR, IHE Profiles (different domains) and DICOM. Additionally, Saudi Arabia has created a COVID-19 data dictionary which outlines the definitions, references, data types, obligations and code sets for the minimum data set data elements to be collected for COVID-19 Pandemic.</td>
</tr>
<tr>
<td></td>
<td>See also Standards Disease Surveillance Data Pooling Information &amp; Triage Call Center Contact Testing</td>
</tr>
<tr>
<td></td>
<td>TeleHealth Quarantine &amp; Triage ePrescribing eSick Leave EMR Facility Manager Supply chain Vaccine Mgt</td>
</tr>
<tr>
<td>Singapore Sept 2020</td>
<td>We use the standards listed in Appendix 2 Data Collection Appendix B.</td>
</tr>
<tr>
<td></td>
<td>See also Training Standards Call Center</td>
</tr>
<tr>
<td></td>
<td>Testing TeleHealth Quarantine &amp; Triage EMR Facility Manager Contact Tracing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - International Data Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td><strong>April 2020</strong>&lt;br&gt; We are using: Snomed, ICD, KVÅ and NPU for Lab diagnostics.</td>
</tr>
<tr>
<td>Turkey</td>
<td><strong>Sept 2020</strong>&lt;br&gt;We use ICD-O, IHE, HL7/LOINC (for lab processes) and DICOM standards for data sharing.</td>
</tr>
<tr>
<td>UAE</td>
<td><strong>April 2020</strong>&lt;br&gt;We are using the data standards mentioned in Appendix 2 Data Collection Appendix B.</td>
</tr>
<tr>
<td>UNICEF</td>
<td><strong>April 2020</strong>&lt;br&gt;We are using WHO standard indicators for MNCAH being reported for the secondary impact of COVID-19.</td>
</tr>
<tr>
<td>United Kingdom</td>
<td><strong>Oct 2020</strong>&lt;br&gt;We are only using ICD-10 and SNOMED CT that are international standards. We do not use LOINC at the national level, i.e. none of our national data flows have LOINC codes. We use UCUM elements for the units of some qualitative/measurable data components (e.g. pathology). We also have used the Anatomical Therapeutic Chemical (ATC) classification for some ad-hoc analyses. Last, again in the pharmacy field, we are using the GS1 standard GTIN (Global Trade Item Number), a number used to identify healthcare items uniquely. Further information is available on NHS Digital's COVID-19 support to health and social care in England to respond to the Pandemic. <a href="https://digital.nhs.uk/coronavirus/nhs-digital-covid-19-programme-updates/programme-updates-29-july-2020">https://digital.nhs.uk/coronavirus/nhs-digital-covid-19-programme-updates/programme-updates-29-july-2020</a> This report is updated on a regular basis please check the NHS Digital Website Corona for the most up to date information. <a href="https://digital.nhs.uk/coronavirus">https://digital.nhs.uk/coronavirus</a></td>
</tr>
<tr>
<td>Uruguay</td>
<td><strong>April 2020</strong>&lt;br&gt;We are coding the clinical observations with SNOMED CT and we are coding clinical studies in LOINC. All through the use of messaging and / or CDA HL7v3 CIE10 is used to send information to OPS/OMS.</td>
</tr>
</tbody>
</table>
| USA           | **April 2020**<br> USAID participates in the OpenHIE COVID-19 Task Force, a volunteer community of practice dedicated to identifying and collating information relating to data standards and exchange relevant to the COVID-19 response. The Task Force priorities include to: identify gaps in and establish standards for data exchange priorities; provide documentation and guidance (to both the global good community as well as proprietary software tools) to improve adherence to these standards; and ensure that rapidly deployed solutions can be integrated into the national digital health architectures. The Task Force anticipates as an output an HL7 FHIR profile / implementation guide for case reporting and contact tracing. The Interoperability Standards Advisory (ISA) is HHS/ONC’s resource for industry to reference standards and implementation specifications. There is a COVID-19 section of the ISA, which provides reference standards and implementation specifications related to COVID-19. Other resources include:  
  - SANER IG. Links to the project: [http://build.fhir.org/g/HL7/fhir-saner/overview.html](http://build.fhir.org/g/HL7/fhir-saner/overview.html)  
1.1.5. Interoperability and Architecture

One of the major key challenges is the interoperability of systems. The 2020 data collection highlighted the following key issues:

- The interoperability of the information systems used, allowing the exchange of data from different sources. Argentina (10)
- Limit the proliferation of non-interoperable initiatives and solutions on the national territory. Italy (18)
- Weak data interoperability / data siloes to ensure rapid data exchange - rapidly send health information to at-risk population groups which can help slow the spread of the disease and save lives. Global Fund (11)
- Interoperability of systems is a challenge. Since there are large number of stakeholders at different level of government involved, especially since Health is a State subject in India, there is wide variability in data reporting systems. India (3)
- Making sure that systems being deployed are interoperable and reflect the KSA use cases and international standards. Saudi Arabia (5)
- SOPs: Common standards and operating procedures are lacking to harmonise activities and the use of systems globally and within organisations. WHO (13).

11. Action

Support the development of digital health strategies connected to interoperable emergency preparedness protocols. Where appropriate, linking emergency health data systems with national routine health data systems, such as disease surveillance, will make standing up emergency systems during a crisis easier and faster, and help to improve data quality. USAID (1). Note: the need for interoperability is beyond the health sector and needs to include other sectors such as financial, social, and economic sectors and interoperate with Social Determinants of...
Health (SDOH).

Note: Social Determinants of Health (SDOH), which includes access to care, education access and quality, social and community context, economic stability, and neighborhood and built environment. This includes ability to exchange information with social and community-based services. [https://www.cdc.gov/socialdeterminants/about.html](https://www.cdc.gov/socialdeterminants/about.html).

**Implementation resources**

- **USA**: Suggestions for Operationalization from USAID Page 109 -110 (1) with USA update (12):
  - Assess and strengthen national health information systems, with a particular focus on interoperable, country-level digital information systems.
  - Establish toll-free URLs that allow health workers and other emergency responders to access certain websites or IP addresses. For example, the website domain for the national HIS (such as District Health Information Software 2 (DHIS2: [Community Health Information Systems Guidelines](https://www.unicef.org/innovation/IoGT))) could be toll free, allowing clinics and health workers to access the site even without data credit on their phones. Alternatively, an OpenDataKit (ODK) server could be toll-free, allowing enumerators to continue to submit data and download new forms regardless of the data available on their phones. These sites could be reverse billed and paid for via a central body such as a ministry of health.
  - Confer upon an established national digital health committee or technical working group a special role to advise on implementing a national digital health strategy in emergencies, and update it as needed.
  - In an emergency, conduct country-level rapid assessments of available digital platforms and identify those that should serve as primary tools to support the response. Ensure these are widely available to responders, together with guidelines and supporting standard operating procedures guiding digital platform use.
  - Develop or adapt existing standards related to unique identifiers for an emergency outbreak, if required. The lack of robust unique identifiers for patients (e.g. West Africa for the USAID study) represented a significant hindrance to data integration across data sets and systems. Having pre-negotiated guidance in establishing unique identifiers could have mitigated this problem.
  - Integrate “disease surveillance and reporting” data and systems with national health information systems so that disease outbreak data can be readily collected alongside and compared to routine health data.
  - In routine and outbreak disease surveillance reporting, ensure that missing data are reported as missing and not as zero cases. In the early stages of the outbreak in Liberia, some counties were unable to report their cases. These were counted as zero cases, leading to fluctuations in case data reporting.
  - In building new health information systems, adapting existing systems, and linking existing systems, support and leverage global public goods (including open and reusable frameworks, processes, systems, and tools) to minimize duplication of effort and wasted resources.
  - Support revisions to the IHR to expand WHO Member State required reporting to facilitate infectious disease data sharing. Specifically, global notification of domestic disease outbreaks should be expanded from those for the plague, cholera, and yellow fever to a more comprehensive list of infectious diseases of importance to international public health, such as Ebola. Notifications of disease outbreaks should be routinely published in a format that is machine readable and available to the public. Note if possible, using interoperable formats such as a FHIR resource.
  - Develop country-specific emergency outbreak protocols, including the use of digital technologies. These protocols should identify existing forms and platforms, outline standard operating procedures, and make them available for use by responders.

- **UNICEF**: Example of toll-free URLs include Internet of Good Things (IoGT), now launched on free URLs in 61 countries: [https://www.unicef.org/innovation/IoGT](https://www.unicef.org/innovation/IoGT) [https://www.internetofgoodthings.org/](https://www.internetofgoodthings.org/) (16)
• **GDHP: Advancing Interoperability Together Globally** (2020, white paper on interoperability) [https://www.gdhp.org/gdhp-whitepapers](https://www.gdhp.org/gdhp-whitepapers) (3)
• **GDHP: Consult GDHP survey to COVID-19 related eHealth use-cases for global alignment of standardized exchange of data in these use cases, and the development of guidelines for rapid implementation, based on positive and effective experience in GDHP member countries**
  o Engage in supportive cooperation with Standards Development Organizations in order to jointly create standards-based Implementation Guides / Blueprints for high-priority use-cases, which consequently should serve as reusable basis for national implementations. (3)
  o When developing new specifications consideration should be given to the modern app economy, smartphones, the use of RESTful APIs and the increasing adoption of HL7 Fast Healthcare Interoperability Resources (FHIR) [https://www.hl7.org/fhir/](https://www.hl7.org/fhir/) (12)
• **Interoperability specifications**:
  o **Brazil: COVID-19 test results** The information exchange messages from the laboratories of public and private clinical analyses the individualized information and sent to National Health Data Network (RNDS) to have been implemented with the HL7 FHIR standard, and the corresponding documentation is available at [https://simplifier.net/RedeNacionaldeDadosemSade](https://simplifier.net/RedeNacionaldeDadosemSade) Brazil (17)
  o **Hong Kong: Detailed interoperability standards** have been developed and put into operation in the EHRSS. The EHRSS standards describe the content, terminologies and codesets. [https://www.ehealth.gov.hk/en/information_standards/ehr_information_standards_document/index.html](https://www.ehealth.gov.hk/en/information_standards/ehr_information_standards_document/index.html) (29)
  o **Singapore: Contract tracing (TraceTogether) interoperability specifications** Singapore launched the world’s first national digital proximity tracing solution — TraceTogether — in March 2020. It was built based on the BlueTrace protocol [https://bluetrace.io/](https://bluetrace.io/), which was designed to allow cross-border inter-operability. Singapore also released the code for TraceTogether into open-source, and has shared its experiences with numerous international proximity tracing app development teams, as well as Apple’s and Google’s Exposure Notification development team (6)

12. **Action**

**Build processes that work toward openness and interoperability.** Reduce fragmentation and duplication related to data and ICT to maximize investments and to ensure maximum value of data. [USAID](https://www.state.gov) (1).

**Implementation resources**

• **USA: The Department of Health and Human Services, Office of the National Coordinator for Health IT’s (HHS/ONC) Interoperability Proving Ground (IPG)** is an environment for crowdsourced solutions where users can learn, share, and be inspired by independent, stakeholder interoperability projects nationally and internationally. Organizations working on COVID-19 interoperability projects have the ability to share those projects, through a crowdsourced manner, with their colleagues through the IPG with a “COVID-19” tag to increase coordination and collaboration. USA (12)
• **USA: Suggestions for Operationalization from USAID** Page 113 (1) with USA updates (12).
  o To enable open sharing and to facilitate re-use of data, ensure published data are machine readable. If data are published in a non-machine-readable format,
such as many PDF documents, release the same data simultaneously in a machine-readable format such as .csv-compatible spreadsheets.

- Identify, modify, and implement policies that support sharing of line-list case data or machine-readable data, ideally by default.
- When creating new data policies or practices, build on existing international standards.
- For datasets relevant to emergency response, use HXL as a starting point for terminology and taxonomies to enable data sharing. To institutionalize its use, donors could require its adoption as part of standard data collection in grants and contracts for emergency operations. HXL was developed collaboratively by and for humanitarians to simplify the aggregation of diverse datasets. The HXL hashtag-based approach is broadly relevant and should be expanded for use across other sectors and datasets. Note: There are fairly robust HL7 standards recognized internationally for health care. If possible, consider leveraging existing standards with broader adoption particularly for areas that have health care automation.
- Set up an easily accessible website for standardized forms (with version numbers) and key messages.
- Data standards must proactively address the question of who “owns” data, and not only the products that result from use or analysis of data (e.g., research papers or reports).
- Publish data early and often, enabling others to cross-check and confirm data (e.g., in the case of GIS locations of health facilities).

13. Action

Architecture: there is a need to establish standard “federated” architectures for technology, data and applications that truly facilitate modular microservices approaches. WHO (13)

Implementation resources

- WHO: Digital Implementation Investment Guide
  https://www.who.int/publications/i/item/who-digital-implementation-investment-guide (13)
- European Interoperability Certificate Governance - A Security Architecture for contact tracing and warning apps
- European Proximity Tracing an Interoperability Architecture for contact tracing and warning apps

14. Action

Encourage coordinated and sustained investments in interoperable data and data systems or platforms. Minimize duplication of efforts and funding and co-invest to achieve scale. USAID (1).

Implementation resources

- USA: Suggestions for Operationalization from USAID Page 114-115 (1) with USA updates (12).
  - Prioritize investments in interoperable platforms and systems to increase the ability of country governments and other actors to readily compare and share data that originate from different sources.
  - Build upon existing open, adaptable processes, technical standards, tools, and platforms, whenever possible. Particularly during emergencies, the most useful innovations frequently are those that make incremental changes to existing tools, processes, and operations. Where broader changes and breakthrough innovations do occur in a crisis response, often they grow to be implemented at scale only during the recovery phase of the response or thereafter.
  - Invest in digital health knowledge-sharing systems, tools, and processes that can be accessed by a variety of global health, humanitarian, and development partners. This could include repositories of commonly used, open source tools,
maturity indexes of national digital health ecosystems, documentation of processes and planning, decision-support tools (such as checklists), guiding policies, and frameworks, such as enterprise architecture frameworks that can bring greater coherence to the proliferation of platforms and tools in use in many countries.

- Invest in and provide other needed support to intra- and inter-donor coordination around digital health technologies to promote aligned policies and actions, such as through technical working groups within donor organizations and among donors, as in the example of Health Data Collaborative’s Digital Health and Interoperability Working Group.

- Create funding mechanisms and models that enable co-funding among donors and both build and sustain digital health commons so that related platforms, systems, frameworks, and tools are more sustainable than the current program, sector, and/or disease vertical-oriented funding streams may allow.

- Create review boards for spending on digital health through collaborative funding mechanisms to provide input, feedback, and guidance on digital health investments and deployments. Members might include representation from donors, governments, technical experts, and civil society groups who together offer cross-sector insights.

- Support more collaborative, participatory design and investment, and build processes in donor-funded development work to reduce parallel investments, such as through co-design among local and global development partners, and mechanisms that enable pooling of financial resources and technical expertise.

- Ensure that funded efforts build on national systems, reuse existing tools, and align with emergent local standards, and map to international health IT standards whenever possible.

- Integrate explicit guidance that adheres to established best practice, such as the Principles for Digital Development, in requests for proposals and other development funding application processes. In the reviewing proposals, award technical points to proposals that adhere to best practice.

### Case Studies

(see Data and Data Standards Case studies)

#### 1.1.6. Usability and availability

The user experience and the rapid adaptability of the tools has never been so important to ensure that all sectors of the community have access to the information and support needed during this pandemic. This with special attention to specific user groups was highlighted both in the USAID Ebola report and the 2020 data collection including:

- The ease and user-friendly access to services, especially in automated channels. Brazil (17)
- Guarantee the availability of digital solutions also to people who are not confident in using technological tools (such as the elderly people) or people economically disadvantaged; Italy (18)
- Coverage – there are excluded groups of people who can’t use digital technologies (e.g. people with visual impairment, persons who don’t use/ don’t have a contract with mobile network provider or don’t own a smartphone or other appropriate device to use the application). Vulnerable groups – seniors who need a special attention when designing and deploying e.g. social distancing measures. Poland (4)
- Adequate consideration of the anthropological aspects of information production, exchange, and use, such as the critical role of trusted, affinity (e.g. community- or faith-based) networks as highlighted in the USAID Ebola report USA (12)
- Digital health only works if and when it is an integral part of a broad legal, social, medical, technical, financial, economical etc. epidemiological approach. And with so many factors in play it becomes harder to determine the effect of technology in managing the pandemic. Also: not everything has an actual effect, so evidence and research are crucial. The Netherlands (21)
15. Action

Consider the use environment, including the digital infrastructure, sociocultural, and psychosocial context in designing and deploying digital technologies. Ensure digital technologies are used in a manner that is relevant, appropriate, ethical, and efficient. USAID (1).

Implementation resources

- USA: Suggestions for Operationalization from USAID Page 116-117 (1) with USA updates (12).
  - Incorporate human-centered design processes into the deployment of digital technologies in humanitarian and development contexts, to ensure that the technology is accessible and any data and information it relays are appropriate to the context.
  - Consider rates of literacy, phone ownership, and access to power among intended audiences when designing digital information programming, including SMS-based communications. (See related baseline ICT assessment action.)
  - Use hybrid communication approaches (e.g., digital in combination with print, radio, television) that reflect and are appropriate to the country and cultural context, in a way that reinforces messages across multiple channels.
  - When using digital approaches, ensure that they work in both online and offline environments, such as the use of mobile data collection programs that automatically sync data collected in offline environments once reconnected to Wi-Fi or a mobile signal.
  - When using mobile applications that require phone numbers, such as mHero or uReport, incorporate a process to regularly update users’ phone numbers.
  - When developing digital systems, consider barriers to paper-based information flows (e.g., lack of roads, rainy season) since they are likely to impact digitized data and information flows as well.
  - In designing digitally-supported programs, draw on available information about consumer use patterns, literacy, and numeracy. Design digital programs with the understanding that digital tools are not a panacea and reflect the information environment in which they are used.
  - When building data collection systems, design with a degree of flexibility to enable adaptation based upon circumstances and the specific requirements of a particular outbreak.
  - Analyze what national systems are in place to handle information and data, and what capacity exists to act on it. Understand the capacity and limitations of the existing digital ecosystem and design digital programming accordingly.
  - Whether using digital or paper-based tools, frame messaging according to the local cultural context and leverage existing trust networks to maximize impact. It is important not to forget empathy in developing messaging, especially when sent through digital channels.
  - Employ digital technologies to support psychosocial needs where face-to-face contact is not possible. In a number of circumstances, organizations operating treatment centers facilitated digital connections (e.g., Skype or video-conferencing) between family members who were unable to meet face to face. These virtual connections helped to address the emotional needs of patients.
  - In building new digital technology systems, adapting existing systems, and linking existing systems, support and leverage global public goods (including open and reusable frameworks, processes, systems, technical standards, and tools) to minimize duplication of effort and wasted resources.

- ITU: Keeping Children Safe Online during COVID-19
  - The protection of children online is a global challenge. It is even more challenging now during the COVID-19 pandemic during which children and teens are now spending much more time online. The dependency on technology to remain connected is inevitable. There is high reliability on ICT networks to help reduce the impact of COVID-19 while allowing people to continue with their lives. However, this also poses risks and dangers, especially to children and teens who are vulnerable.
ITU, under its Child Online Protection (COP) Initiative, is reaching out to children, teens, parents and guardians to create awareness on how to keep children safe online during COVID-19. More information can be found here: https://news.itu.int/covid-19-7-key-ways-to-keep-children-safe-online/. (14)

- **UN: Interagency Network on Youth Development**
  - ITU has issued a statement jointly with the UN Interagency Network on Youth Development regarding COVID-19 and Youth. It calls for agencies to make provisions that are responsive for the needs of young people, upholding their rights /youth-specific provisions when needed. 

- **ITU: Use of ICTs to assist persons with disabilities cope with COVID-19**
  - ITU published Guidelines on how to ensure that digital information, services and products are accessible by all people, including persons with disabilities (PWDs) during COVID-19. The full text is available here. (14)

16. **Action**

Insert feedback loops in the full lifecycle of project conceptualization, from design and delivery to monitoring and evaluation. Increase the effectiveness of programming and improve humanitarian and development outcomes. USAID (1).

Design programs to incorporate digitized data and information flows. Enable faster feedback and iteration and expand the nodes of connection in order to increase the effectiveness of programming. USAID (1).

**Implementation resources**

- **USA:** Suggestions for Operationalization from USAID Page 118 (1).
  - Treat information and information sharing as an essential activity in an emergency response, as pivotal as providing food, water, or shelter in emergency response, recovery, and in longer-term resilience planning. This requires ensuring affected communities have regular access to vital and up-to-date information about the crisis and response, conveyed in culturally relevant and appropriate formats, from the beginning of an emergency.
  - Design programs to create bidirectional feedback loops from the outset. Digital data flows can support bidirectional communications and feedback loops. By providing data collectors with the assurance that the data they collect will be returned to them with contextualized information that can support informed decision-making at the point of data origin, these digitized, bidirectional feedback loops can help to create incentives for regular and high quality data collection. Feedback loops also promote accountability and generate new insights, such as in data and information flows both “up” and “down” between government ministries and their remote workforce, and/or between local communities and response organizations.
  - Use digital data flows to support a plurality of communications and feedback between responders, such as those among peer groups or health workers from across the range of response actors. Such communications can support a variety of functions, including community needs and actions, routine disease surveillance, and health information systems strengthening.
  - Design and implement flexible programs that allow faster feedback and proactive iteration throughout the program cycle.

- **Hong Kong: HA Go** is the single stop mobile app that provides one stop digital health services from the Hospital Authority with two-way data flows from the electronic medical record. Telehealth capabilities have also been built into both HA Go and the electronic medical record system so Telehealth capabilities are easily accessible to both the patients and clinicians. (29)

17. **Action**

Tools to overcome the digital divide.

**Implementation resources**

- **Singapore: TraceTogether token** is a physical device that participates in the TraceTogether national digital contact tracing programme to aid digital contact tracing efforts. It is designed for those may not own or prefer not to use a mobile phone — the
users only need either the mobile app or token. Like the App, the Token only captures proximity data via Bluetooth signals and does not capture GPS/geolocation data. The encrypted data is kept on the device until the user consents to share it with MOH for contact tracing. The token does not have internet/cellular connectivity. The Token is designed to be convenient, light and easy to use, with a battery life of 6 to 9 months. (6)

- **USA: CDC** has an **Office of Health Equity** that is actively engaged in this work as part of their mission and for COVID-19 response [https://www.cdc.gov/healthequity/index.html](https://www.cdc.gov/healthequity/index.html) (12)

### 18. Action


Implementation resources


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**Case Studies**

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Digital Health Monitoring and Evaluation</th>
</tr>
</thead>
</table>
| Brazil Sept 2020 | Monitoring and Evaluation of the Digital Health Strategy  

The document was approved by the Digital Health Strategy Steering Committee (CGESD) in July and at the Ordinary Meeting of the Tripartite Intermanagers Commission (CIT) on August 27, 2020, and presents the Digital Health Vision, the Action Plan and priorities to achieve it, and the Monitoring and Evaluation Plan necessary to keep actions aligned with the needs of the Digital Health Strategy 2020-2028 (ESD28).  

The first report on monitoring and evaluating the Digital Health Strategy for Brazil 2020-2028 (ESD28) (MINISTRY OF HEALTH, 2020) is in completion. The report has, among others, the objective of identifying and proposing organizational and operational resources so that this key instrument of Digital Health Monitoring and Evaluation has a semiannual periodicity and fulfills the purposes defined in the ESD28.  

The process of monitoring and evaluating The ESD28 will be systematic and permanent, developed through the understanding of the proposed objectives, the definition of criteria for determining success, identification of metrics and indicators that measure success, the establishment, collection and periodic analysis of indicators, followed by the analysis of the results obtained and the decision-making on the next cycle of actions, in order to contemplate intrinsic needs of the Strategy, as changes in the national and international scenario for Digital Health and, above all, in health, whose impact was evidenced by the recent pandemic.  

ESD28 recognizes the need for defined, robust and rigorous methods used for monitoring and evaluating the Digital Health Action Plan. However, as the initiatives described and evaluated in the above report are very recent and developed under the direct impact of the pandemic of the New Corona virus, the desired and expected methodological rigor still has the potential for evolution to its full extent.  

In the document, it is perceived that there were actions that did not achieve the expected and desired results. Many of the difficulties and failures are certainly explained by the direction of efforts of the Ministry of Health, through DATASUS, to meet the pressing demands of the Corona virus pandemic, as presented in the Report.  

Sources:  


See also: Disease Surveillance, Data Pooling, Information, & Triage, Governance, Policy and regulations, Vaccine Mgt, Contact Tracing, Training Standards, Call Center, Testing, TeleHealth, Quarantine monitoring.
1.1.7. Investment Strategy

So many organisations have stepped up to tackle the current situation, however in reacting we are potentially creating unsustainable and potentially ungeneralizable solutions and may therefore find ourselves in a similar situation with the next event. WHO (13). This sentiment was echoed by others including:

- Coordination of funding in digital technologies, leading to a proliferation of tools and platforms used in the response, and a corresponding difficulty in accessing or comparing data across systems. USA (12)
- Sufficient funding in the non-digital aspects of effective technology uptake and use, to include:
  - human and technical capacity to adequately support/manage digital tools, particularly when tools were newly introduced in the disaster context,
  - institutional and workforce capacity to effectively use the data digital tools/systems produced, as in many cases effective use of digitized data required new workflows, skills, and processes. USA (12)
- Key challenge is to avoid new and untested solutions being “dumped” in countries, with no plans for sustainability or long-term maintenance. Instead, existing digital health solutions need to be leveraged and supported. UNICEF (16)
- Intellectual Property: There are legal implications to development and ownership, especially when this is the basis for a thriving business. WHO (13)
- The ability to generate alliances between the public (State) and the private (companies) sector, in order to be able to give faster and more adequate responses to the identified needs. Argentina (10)
- Scalability of Tools - The type of code used in the development of the tools, to favor their greater use. Argentina (10)

19. Action

Development of a digital health emergency preparedness/pandemic investment strategy which includes:

- Coordination of funding in digital technologies, USA (12) including:
  - physical infrastructure that extends digital connectivity (see Action 1)
  - interoperable data and data systems or platforms (see Action 12)
  - Other digital health tools or modifications required for the response
- Sufficient funding in the non-digital aspects of effective technology uptake and use, to include:
  - human and technical capacity to adequately support/manage digital tools, particularly when tools were newly introduced in the disaster context,
  - institutional and workforce capacity to effectively use the data digital tools/systems produced, as in many cases effective use of digitized data required new workflows, skills, and processes USA (12)
- Ensuring the protection of intellectual property
- Exploring the opportunities to generate alliances between the public (State) and the private (companies) sector, in order to be able to give faster and more adequate responses to the identified needs.

Implementation resources

- **WHO: Digital Health Clearinghouse** A digital platform that curates a WHO vetted list of digital solutions relevant to pandemic response, connecting Ministries of Health to a listing of mature and effective solutions. It supports Member State institutions to identity relevant digital solutions, providing:
  - A list of digital health solutions deemed to be relevant based on expert review
  - Filtering and navigating to a specific set of digital health solutions based on Institutions’ public health needs
  - A forum for feedback about digital health solutions WHO (13)
- **WHO: Digital Health Atlas** A global registry of digital health deployments, facilitating consistent documentation, monitoring, coordination of investments, and governance of COVID-19 and other digital health deployments, that offers a unique ID, and is consistent with the WHO and ITU health and ICT classification standards. WHO (13)
- **WHO: Digital and Innovation Community of Practice** Fight COVID-19 - a digital community of practice that supports discussions of digital solutions, country needs, and experiences with
digital and innovations deployments related to the pandemic response. It gives solution providers a platform to:

- Offer and broadcast existing digital solutions in a lean and standardized way
- Receive structured feedback to digital health solutions
- Address unmet public health needs through new solution development

**WHO** [13]

### Case Studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Investment Strategy</th>
</tr>
</thead>
</table>
https://minzdrav.gov.ru/ministry/programms/health/info
06.06.2019, No 254 Decree of the President of the Russian Federation On the Strategy for the Development of Healthcare in the Russian Federation for the Period up to 2025
http://docs.cntd.ru/document/557308809
http://docs.cntd.ru/document/563474987
02.22.2019, No 87, Order Ministry of Health of The Russian Federation On approval of the departmental target program "Promotion of international cooperation in the field of health"
http://docs.cntd.ru/document/553834688

See also Governance, Policy and regulations

<table>
<thead>
<tr>
<th>TeleHealth</th>
<th>Quarantine monitoring</th>
<th>Disease Surveillance</th>
<th>Data Pooling</th>
<th>Information &amp; Triage</th>
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<th>Facility, Manager</th>
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<tbody>
<tr>
<td>Training</td>
<td>Privacy &amp; Security</td>
<td>Disease Research</td>
<td>eSick Leave</td>
<td>Exit</td>
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### 1.1.8. Governance, Policy and regulations

Many of the actions above require establishment and enabling of legislative, regulatory and policy frameworks. Especially where this is required instituted or modified as part of the emergency response. As highlighted by The Netherlands [21], Healthcare law is complex, and in our case not always fit for purpose in this crisis. Digital health solutions are not always conforming to current legal requirements and vice versa. This requires quick fixes, but without taking any irreversible steps.

Digital Health Governance and ownership was also highlighted by some countries including:

- The importance of governance, policy, and regulatory avenues to advance digital health needs of the country. USA [12]
- Governance over the systems to be used and how they will be used. Argentina [10]
- Ensuring strong Governance and Leadership is in place to deploy digital technologies Global Fund [11]
- See OECD comments under Data Governance
- Ensuring the systems are meeting the business needs of the Kingdom and compatible and with the future KSA vision 2030 and Digital Health Transformation Strategy Saudi Arabia [5]
• As with any digital deployment, operational interaction with the professionals using the technology is key, both when developing the tool as well as during the implementation phase Sweden (33)
• Retaining public trust United Kingdom (9)
• To ensure effective implementation of Digital Health, Role of Governance, policy & regulations is very critical as well as important. India has recently launched National Digital Blueprint as an architectural framework with future vision to align all the digital solutions with its principles India (3)
• Artificial intelligence:
  o Updating Chatbots with rapidly changing information Saudi Arabia (5)
  o Develop the workflows and feed the AI-based technologies with the correct information UAE (8)

20. Action
Development of a digital health emergency /pandemic response strategy that highlights the changes required to:
• Digital Health emergency /pandemic response Governance
  o Develop plans for a Digital Health Emergency Response Oversight committee to ensure shared vision for the emergency response and shared accountability on how it will be achieved.
• Digital Health emergency /pandemic response Policies modifications especially any changes required to:
  o Privacy & Security (Action 7)
  o Data & Data Standards (Action 8)
  o Interoperability (Action 9)
• Digital Health emergency /pandemic response implementation plans/ procedures such as:
  o Infrastructure:
    ▪ Action 3 In an emergency, develop and implement emergency protocols for rapid updates to baseline country-wide ICT assessments
    ▪ Implement the preparedness protocols with key actors as negotiated as part of Action 4
  o Workforce:
    ▪ Develop and implement workforce plans especially those required for:
      • Digital Health Tools development
      • Digital Health Tools implementation and training
• Digital Health emergency /pandemic response tools:
  o Digital Health Tools roadmap and modifications
  o Adaptive software development ensures usability. (see Action 13 and Action 14).

Implementation resources
• Brazil: Contingency plan with technology, information and communication strategies in health for the control of the public health situation, as well as the incident management process. In addition to presenting ICT strategies in Health, the Contingency Plan describes the measures taken and establishes a responsibility structure for decision making
  https://datasus.saude.gov.br/wp-content/uploads/2020/04/Plano-de-conting%C3%AAncia-DATASUS.pdf (17)
• ITU: activities in response to COVID-19 See Appendix 5 for details including:
  o Guidelines for National Emergency Telecommunications Plans (14)
• Italy: Preparation and response to COVID-19 over the autumn/winter period, 11 August 2020

21. Action
Acknowledgement of the Principles of Donor Alignment for Digital Health.
### Implementation resources

- **Principles of Donor Alignment for Digital Health**
  [https://digitalinvestmentprinciples.org/](https://digitalinvestmentprinciples.org/) (34)

### Case Studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Governance Policies and regulations</th>
</tr>
</thead>
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| **Brazil Sept 2020** | **Contingency plan**  
Because of the occurrence of the state of public calamity caused by the new Coronavirus (COVID-19) in Brazil, the Ministry of Health, through DATASUS presented April/2020 a contingency plan with technology, information and communication strategies in health for the control of the public health situation, as well as the incident management process.  
The demands for agile and coordinated actions to disseminate information about the disease favored the integration of epidemiological notification and surveillance into the National Health Data Network (RNDS) as a strategic measure.  
In addition to presenting ICT strategies in Health, the Contingency Plan describes the measures taken and establishes a responsibility structure for decision making.  
The document is available at:  
https://datasus.saude.gov.br/wp-content/uploads/2020/04/Plano-de-conting%C3%AAncia-DATASUS.pdf  
The main strategies and actions adopted by DATASUS to assist the Ministry of Health during the crisis installed by the new coronavirus were:  
- Official information solution for the citizen - App Coronavirus SUS  
- Structuring the Notification System (e-SUS Notifica)  
- Provision of strategic information - Coronavirus Brazil Panel  
- Integration of information through the prioritization of COVID-19 in the implementation of RNDS  
- Management of connectivity solutions for Primary Health Care  
- Provision of preclinical health care service communication actions  

| **Russian Federation Oct 2020** | Preparedness for Human Emergencies is part of Governmental Security System. Digital Health system is part of Digital Governmental System. Appropriated parts of digital systems were involved/modified/developed when pandemic started in Russia.  
  
  The Operational Government Headquarters for interagency cooperation was established on January 27, 2020 to develop measures to prevent the import and spread of a new coronavirus infection in the Russian Federation. On March 14, 2020 Prime-Minister headed the Coordination Council for the fight against coronavirus. The Council daily develops solutions and coordinates actions to stop the spread of the new coronavirus infection and its consequences.  
  
  
  Accordingly the Decree, new governmental information resource was created:  
https://стопкоронавирус.рф or [https://xn--80aesfpebagmfb0a.xn--plai/](https://xn--80aesfpebagmfb0a.xn--plai/)  
  
  Special webpages were created by ministries and agencies at their websites:  
  
  In the Regulation, approved by the decree of the Government of the Russian |
The critical success factors for the implementation of digital health in low- and middle-income countries need to be addressed to enable a global improvement of digital health. Equal access to digital health needs to be on the top of the healthcare agenda supporting universal health coverage. With the adoption of the 2030 Agenda for Sustainable Development, 193 United Member States pledged to ensure "no one will be left behind. WHO’s Department Digital Health and Innovation is in the process of developing the Global Strategy for Digital Health is to promote healthy lives and wellbeing for everyone, everywhere, at all ages. To deliver its potential, national or regional Digital Health initiatives must be guided by a robust Strategy that integrates financial, organizational, human and technological resources. It proposes a framework for regulating, benchmarking, and certifying digital health solutions for countries to implement. It also proposes a regulatory framework for health data to protect the safety and privacy of personal health data. It calls for all digital health stakeholders, both private and public, to take action to align with principles that govern health data and safeguard data providers’ anonymity and safety.

WHO continues to lead the development of a global framework on global interoperability and connectivity for digital health in collaboration with all stakeholders. The WHO’s Department of Digital Health and Innovation is in the process of finalizing the Global Strategy for Digital Health to promote healthy lives and wellbeing for everyone, everywhere, at all ages. The departments will implement the strategy through its four main lines of work, including capacity building and collaboration, Strategy and Governance, Innovation, public health tools and BeHealthy BeMobile, including an emerging role in infodemic and emergencies.

### 1.2. Disease Surveillance and Emergency Response

Surveillance as defined by the WHO as “an ongoing, systematic collection, analysis and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice” [WHO](35). It is undertaken to inform disease prevention and control measure and is in place in nearly all countries worldwide for mainly existing reportable disease. As part of an emergency response this definition was extended by [USAID](1) epidemiologists and researchers in and outside the formal response, gaining access to case data to predict the trajectory of the disease and resource requirements. The most accurate disease models require individual case-level data about the date of exposure, diagnosis, and outcome (i.e., recovery or death) in order to understand disease behavior and transmission. In this current pandemic the identification of symptoms has also been found to be important.

Disease surveillance as part of the current pandemic has had challenges as previously highlighted above especially in sections 1.1.3 Privacy and Security, 1.1.4 Data and Data standards and 1.1.5 Interoperability and Architecture as summarized by OECD “Challenges common to most OECD countries in being able to create information and tools from health data include concerns with the quality of key health datasets that limit their usefulness, lack of consistent standards for key clinical terms, and legal and policy limitations to sharing and providing access to data, to linking datasets and to extracting data from electronic clinical record systems. Further challenges to cross-border..."
collaborations include lack of data interoperability due to the lack of agreed global standards for key terminology and data exchange; data localization laws and policies that prohibit data sharing across borders; and concerns about data security vulnerabilities. OECD (22)

In addition to these, as highlighted in the 2020 data collection and the in the Ebola report by USAID there are challenges specific to emergency response including:

- The speed between the data capture, processing and availability with the balance between the amount of variables and data quality Brazil (17)
- The key challenge is that it is not fully understood what the underlying biology, especially around when and which patients have symptoms and when and how the disease progresses. This makes it difficult to understand what can and should be measured. USA (12)
- In discussing data use in the response, interviewees pointed out differences between operational data collected at a cluster level that were used to inform the activities of international and national actors, versus the more aggregated data used to influence advocacy and high-level planning efforts. This bifurcation between detailed, local data and aggregated, usually national-level data is characteristic of other emergency responses. The data required to understand the nature and transmission of the disease, particularly in the early days of the response, were detailed, cumbersome to health responders given the scale of this outbreak, and oriented toward a post-epidemic analysis as opposed to real-time operational usage. USAID. Page 28 (1).

Surveillance may include:

- Virological surveillance
- Syndromic surveillance
- Clinical surveillance in hospitals
- Monitoring of long-term care facilities e.g. aged care
- Case and outbreak notification
- Mortality surveillance
- Initial action stage / First Few 100 surveillance
- Health facility impact monitoring
- Detailed clinical surveillance in intensive care units
- resources Vaccine distribution and monitoring data
- Adverse event following immunization surveillance
- Modelling of impact projection

22. Action

Access to updated Disease Surveillance tools to reflect national requirements. In addition to the Actions above on Privacy and security, Data and Data standards and Interoperability and Architecture and associated implementation resources, the following are actions and implementation to modify existing tools. Note: This should include monitoring the capacity and impact on hospitals and long-term care facilities e.g. aged care.

Implementation resources

- **WHO: Surveillance strategies for COVID-19 human infection** This document provides an overview of surveillance strategies that Member States should consider as part of comprehensive national surveillance for COVID-19. This document emphasises the need to adapt and reinforce existing national systems where appropriate and to scale-up surveillance capacities as needed. [https://www.who.int/publications/i/item/surveillance-strategies-for-covid-19-human-infection](https://www.who.int/publications/i/item/surveillance-strategies-for-covid-19-human-infection) (36)
- **DHIS2 COVID-19 Surveillance Digital Data Packages:** DHIS2 is a free, open-source software platform for collecting, analyzing, visualizing and sharing data. The DHIS2 data model supports both aggregate and individual-level data--including features for monitoring and following up with individual people or entities over time--and data entry via the DHIS2 web portal, mobile Android app, or direct import. [https://www.dhis2.org/overview](https://www.dhis2.org/overview) (37)
- **Sormas:** Surveillance, Outbreak response management and Analysis system [https://sormas.helmholtz-hzi.de/sormas-ui/login](https://sormas.helmholtz-hzi.de/sormas-ui/login) (38)
- **WHO: Epidemic Intelligence from Open Sources (EIOS)** Initiative supports public
health intelligence. (13)

- **Russia:** monitoring of health system response e.g. hospital capacity (30)
- **Italy:** Quantitative risk and health service resilience monitoring during COVID-19 see Italy case studies below (18)
- **ECDC:** COVID-19 situation dashboard

23. Action
Using AI and other mathematical models to help detect the spread of the coronavirus.

**Implementation resources**

- **OECD:** Using artificial intelligence to help combat COVID-19

- **OECD:** Beyond containment: Health systems responses to COVID-19 in the OECD includes the section:

- **OECD:** AI Principles overview [https://oecd.ai/ai-principles](https://oecd.ai/ai-principles) (41)


  - cases: [https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/forecasts-cases.html](https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/forecasts-cases.html)


24. Action
Establish Disease Surveillance processes where limitations in digital connectivity exists.

**Implementation resources**

- **USA:** Suggestions for Operationalization from [USAID](https://www.usaid.gov) Page 58 (1) 
  - Establish access such as mobile credit top-ups for health workers to facilitate reporting of case data
  - Solutions that functioned in both online and offline environments are essential.
  - Agreeing upon a simple and straightforward paper-based data collection
approach at the beginning of the response, prior to digitization, could have enabled comparable data across paper and digitized datasets, and facilitated the implementation of digitization where connectivity existed.

25. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support disease surveillance as part of the emergency response. In addition to the Actions above on Privacy and Security

Implementation resources
• Brazil: Protocol for notification of COVID-19 test results. This document outlines the necessary protocols and policies required the National Health Data Network (RNDS) to receive directly from the laboratories of public and private clinical analyses the individualized information of the examinations performed and their respective results. With the mandatory submission of the results of COVID-19 exams to the RNDS, the updating of suspected cases with test results became automatic in the e-SUS Notifies system, transforming into digital and dynamic a process that was performed manually by health surveillance teams in municipalities and states. https://saudedigital.saude.gov.br/wp-content/uploads/2020/09/BRAZIL-Protocol-for-notification-of-COVID-19-test-results.pdf (17)
• USA: Laboratory Data Reporting Guidance for COVID-19 Testing (12)

26. Action
Development of a post-pandemic policy (for example disposal of sensitive data).

Recommendation
• A template post-pandemic policy be developed for inclusion as an appendix for this report.

Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description- Disease Surveillance and Emergency Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Digital health tools are currently being used in Argentina. The same correspondences, according to Annex A, to the categories of &quot;prevent and control mild disease&quot;; &quot;Mild to moderate disease management&quot; and &quot;high-risk critical care&quot;. Dashboard for monitoring coronavirus cases: Through this dashboard, data from official registries is exposed, processed and connected through an API (protocols used to integrate software, which may include products and services applications communicate with others). Thus, real-time information is available on the evolution of the pandemic in Argentina.</td>
</tr>
<tr>
<td>April 2020</td>
<td>See also Standards, Disease Surveillance, Data Pooling, Information, TeleHealth, Quarantine, Facility Manager</td>
</tr>
<tr>
<td>Austria</td>
<td>Fed directly in real-time with data from EMS' database, internal and public online dashboards provide a real-time overview of pandemic and epidemic disease outbreaks, structured by spatial occurrence. The data is presented in a visually appealing and easily understandable format by being projected onto a simplified map of Austria. The same dashboards also provide a data history and time-line, along a short-term scenario forecast and trend analysis of outbreaks. On top of this regionally structured data, the Austrian government developed a national traffic light system for each district. In addition to the number of infections per 100,000 habitants, this traffic light system also takes into account the number of hospital beds and intensive care units available locally, and the traceability of cases</td>
</tr>
<tr>
<td>October 2020</td>
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</tr>
</tbody>
</table>

61
back to clusters. Hence, this traffic light system provides at one glance a single unified source of information for the people of Austria, in order to assess the danger coming along trips to each area.

At the same time, the traffic light system for compound risk assessment also serves national and regional bodies as reliable source of information to act upon, especially for defining regionally differentiated measures of emergency response. As such, it represents one of the key elements of Austria's effective approach to contain and fight both epidemics and pandemics.

See also
Standards
Disease Surveillance
Data Pooling
Information & Triage
Call Center
Contact Tracing
Testing
ePrescribing

Brazil Sept 2020
COVID-19 Case Notification System, monitoring contact with exposure,
Epidemiological Surveillance and Information to Patients and Professionals
One of the digital solutions developed in Brazil to cope with the pandemic is the "e-SUS Notifica" system, aimed at reporting suspected cases of COVID-19 or mild influenza syndrome, as well as for epidemiological surveillance. Additionally, this system is responsible for recording bed occupancy of more than 5,000 hospitals reaching 27,000 simultaneous accesses.

In addition to the "e-SUS Notifica" the Ministry of Health has made available the application "Corona Virus SUS", which has a mechanism for monitoring contact with exposure notification (Contact tracing). This mechanism was developed through a partnership between Google and Apple to assist governments and the global community in combating the COVID-19 pandemic, with the purpose of reducing the spread of the virus. It is a secure mechanism, without exposure of citizen data, in which the citizen download the application and share the result of his positive test, through bluetooth, another citizen who also has access to the application can receive a notification if it is close to a person already infected.

Integration between the "e-SUS Notifica" system and other state and municipal epidemiological surveillance systems
The "e-SUS Notifica" system also has an integration mechanism available to state health departments and municipal departments of capitals that have developed their own systems for recording hospital occupancy and for reporting suspected cases of COVID-19 and mild influenza syndrome. This mechanism is based on a simple process of inserting a file into a folder in the cloud, in which a robot program in the Ministry of Health automatically processes the reading of the data and includes it in the system database "e-SUS Notifica".

Integration between the "e-SUS Notifies" system, RNDS and the CONECTE-SUS application
Through the National Health Data Network (RNDS), which receives data from COVID-19 test results submitted by public and private laboratories, the original notification of the patient's case is updated in the database of the "e-SUS Notifica", closing the information cycle.

In addition, through the application "CONECTE-SUS", the patient and the professional who attends him can consult the test results. In the CONNECT SUS app, the citizen receives their data to track their attendances, exams, vaccines already performed and keep their records archived for consultations when necessary.

Health professionals have access to the patient's information at the time of care, but with the patient's permission. All this integration of systems allows the continuity of patient care and the reduction of unnecessary exams.

With the mandatory submission of the results of COVID-19 exams to the RNDS, the updating of suspected cases with test results became automatic in the e-SUS Notifies system, transforming into digital and dynamic a process that was performed manually by health surveillance teams in municipalities and states. The results of laboratory tests performed by private laboratories will be made available to local managers of the Unified Health System (SUS) to update and
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description</th>
<th>Disease Surveillance and Emergency Response</th>
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<tbody>
<tr>
<td>Canada April 2020</td>
<td>In Canada, many provinces are using Panorama, a public health surveillance tool that has an outbreak management module. This module is not in use in all jurisdictions but is proving helpful for those that have it. Panorama is an IBM product that could be available internationally.</td>
<td></td>
</tr>
</tbody>
</table>
| Germany Oct 2020 | • RKI Dashboard for CV-19-notifications [https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf64/](https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf64/)  
  • Federal wide electronic system for the notification is being build up |
| Global Fund April 2020 | Our implementing partners actively use digital health tools in disease control, patient management and triage, information analysis and presentation. We also support health system development, including DHIS2, but also critical elements such as interoperability of data streams which is critical in coordinating efficient response to diseases. |
| Hong Kong Oct 2020 | Hong Kong has used tracker wristband and mobile app with geofencing technology for monitoring of persons under compulsory quarantine since March 2020. All COVID-19 cases are reported using the eNID (eNotification system for COVID-19) system. Community testing results are collated using the CTS (COVID-19 Test System) and patients are notified of results by SMS. COVID-19 admissions are coordinated through the CAAS (COVID-19 Admission Allocation System). |
| India Sept 2020 | For internal administrative purpose, India has developed a Central CoVID Dashboard which is called OVID INDIA PORTAL (also known as Special Surveillance System (S3)) for COVID. This Dashboard collects data from all states and generates dashboard which are used for:  
  • Disease tracking by geography (including confirmed cases, deaths and recoveries)  
  • Inventory tracking for essential items like drugs, PPEs and ventilators and predicting demand at National, State and district level based on case loads  
  • Infrastructure tracking for COVID specific hospital beds, quarantine beds, ICU beds etc.  
  • Collating best practices adopted for CoVID-19 Management  
  The dashboard also provides a case and infrastructure forecasting tools which allows the states to predict number of cases in forthcoming days (based on historical growth rate) and forecast the infrastructure (beds, ventilators etc.) required to manage the predicted caseload.  
  • Data based Decision support System: this help to take proactive measures in identifying Hotspot areas and its containment strategies.  
  In India, all states and Unions Territories have established a 24*7 control room at state and districts level. This is accomplished to ensure seamless operations of manufacturing, processing, transportation, distribution storage, trade and logistics. |
Country/IO | Description - Disease Surveillance and Emergency Response related to all services.
---|---
**AI**
- Ministry of Health & Family Welfare in India uses Business Intelligence (BI) dashboard & analytics for comprehensive monitoring and planning at the national level
- Government of India also uses forecasting tools for estimating future caseloads and health infrastructure & medical supplies requirement and assess readiness index for constantly monitoring preparedness of the states for the pandemic
- For citizens, Government of India launched Aarogya Setu open source mobile application which provides quick, Artificial Intelligence-driven self-assessment test for Covid-19 to enable people determine their current risk levels.

**Emergency Response**
- Government of India announced a Rs. 20 lakh crore economic package under the 'AatmaNirbhar Bharat Abhiyaan', to aid our country out of the Coronavirus crisis (by making us self-reliant).
- Government of India launched a massive rural public works scheme ‘GaribKalyanRojgarAbhiyaan’ to empower and provide livelihood opportunities to the returnee migrant workers and rural citizens.
- Government of India launched an online grievance redressal system (https://champions.gov.in/) which aims to support MSMEs during COVID-19.
- Ministry of Tourism launched a web-portal ‘StrandedinIndia.com’ to help foreign traveller stranded in India due to the COVID-19 pandemic to connect with concerned authorities.
- Government of India also launched ‘National Migrant Information System (NMIIS)’ portal which maintains a central repository of the migrants travelling from one state to other and aids in contact tracing.
- COVID19Warriors portal was launched by Government of India which provides information about COVID-19 warriors across all fields viz. health workers, Anganwadi workers, ex-armymen.
- Government of India also launched national mobile I-Lab (Infectious disease diagnostic lab) for COVID-19 testing for last mile testing access. It may be deployed in remote, interior and inaccessible parts of the country and have capability to perform 25 COVID-19 RT-PCR tests/Day, 300 ELISA tests/day, additional tests for TB, HIV etc. as per CGHS rates.
- Government of India launched India's national Artificial Intelligence Portal - https://indiaai.in/ to provide a one stop digital platform for AI related developments in India, sharing of resources such as articles, startups, investment funds in AI, resources, companies and educational institutions related to AI in India.

**Emergency Response – Policy support**
- National Center for Disease Control released guidelines for setting up isolation facility/ ward.
  https://ncdc.gov.in/WriteReadData/1892s/4247646181584529159.pdf
- To contain the spread of COVID-19 and allow appropriate public movement/activity, Central and state governments identified hotspots, containment zones etc. based on risk profile across the country.
  https://www.mha.gov.in/sites/default/files/MHA%20Order%20Dt.%2015.5.2020%20to%20extend%20Lockdown%20period%20for%202%20weeks%20bw.e.f.%204.5.2020%20with%20new%20guidelines.pdf
Quantitative risk and health service resilience monitoring during COVID-19

Before easing the national lockdown established in March 2020 in its response to the COVID-19 outbreak, Italian authorities designed a comprehensive monitoring system comprising 21 process and result indicators aimed at monitoring:

- the probability of transmission (including the number of new confirmed cases of SARS-CoV-2 infection diagnosed per week by Region, Regional transmission - Rt, ongoing clusters in each Region etc.)
- the impact of COVID-19 on hospital services (e.g. hospital occupancy rates for COVID-19 cases in medical care and in ICU), as well as
- the impact of the epidemic on PH health services that are locally in charge of testing, contact tracing and of implementing correctly isolation and quarantine procedures in the population.

A full description of the indicators and the risk assessment methodology is available in a Decrease of the Minister of Health issued on the 30th of April 2020. The system informs the escalation and de-escalation of measures as described in the Decrease issued by the Prime Minister on April 27th 2020. This approach is part of and is part of the Italian National Strategy guiding the progressive re-opening of activities after its national lockdown and the management of the subsequent epidemic transition phase.

This system has been fully operational since May 2020. Since May 2020 weekly risk and resilience assessments are conducted for every Italian Region, reports with consolidated findings are sent weekly to each Italian Region and main national findings are published online on the website of the Ministry of Health.  

Planned use of AI, the use of AI has been planned to analyze health data and implement predictive models. Specific regulations will be developed in the future to allow its implementation. Regulation on predictive models was adopted in the decree n.34 on May 19th, 2020 art.7. 

We have started to use web-search results to detect outbreaks in its early phase, while taking into account privacy protection.

SINAVE (epidemiological system/registry) or TRACE COVID-19 System (Surveillance and Monitoring. All systems have been updated w/ COVID-19 Info (eDeath Certificate, new ICD-10 code); tracking COVID diagnosis and monitoring;
<table>
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<tr>
<th>Country/IO</th>
<th>Description - Disease Surveillance and Emergency Response</th>
</tr>
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<tbody>
<tr>
<td>Portugal</td>
<td>Comments in Call Center and Contact Tracing about the flow of data</td>
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<tr>
<td>Russia Federation</td>
<td>Oct 2020</td>
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</table>

Specially established Information Resource “COVID-19” as part of the Unified State Health Information System (see Governance) has functions:

- to keep records:
  a) information about people with a confirmed diagnosis of a new coronavirus infection (COVID-19), including about people who are carriers of the causative agent of a new coronavirus infection (COVID-19), people with signs of pneumonia, hospitalized people, sick with influenza and acute respiratory viral infections (hereinafter referred to as patients), as well as data on the number of cases of influenza and acute respiratory viral infections, which were treated on an outpatient basis;
  b) information about persons who have been in contact with persons with a confirmed diagnosis of a new coronavirus infection (COVID-19), including with persons who are carriers of the causative agent of a new coronavirus infection (COVID-19), as well as with persons with signs of pneumonia (hereinafter referred to);
  c) information about persons in quarantine, including in connection with their arrival from countries where cases of a new coronavirus infection (COVID-19) have been registered (hereinafter - the observed persons);
  d) information about persons immunized by vaccines for the prevention of new coronavirus infection (COVID-19);
  e) information about health workers who have received incentive payments for special working conditions and additional workload in connection with their provision of medical care to citizens who have been diagnosed with a new coronavirus infection (COVID-19), and people at risk of contracting a new coronavirus infection (COVID-19), medical and other workers who have been given incentive payments for the performance of particularly important work in connection with direct participation in the provision of medical care to citizens who have been diagnosed with a new coronavirus infection (COVID-19) |
- to keep records about persons:
  a) collection of information about patients, contacts, persons under observation, persons immunized by vaccines for the prevention of a new coronavirus infection (COVID-19), medical and other workers who have been assigned incentive payments;
  b) monitoring and control over the provision of information about patients, contacts, observed persons, persons immunized by vaccines for the prevention of new coronavirus infection (COVID-19), medical and other workers who are established incentive payments;
  c) analysis of the readiness of medical organizations to provide medical care to patients with a new coronavirus infection (COVID-19) and pneumonia;
  d) collection and analysis of information on the effectiveness and safety of immunization against a new coronavirus infection (COVID-19);
  e) collection and analysis of information on operators of specialized websites and mobile applications on immunization or the use of vaccines to prevent a new coronavirus infection (COVID-19);
  f) collection and analysis of information on operator of the system for monitoring the movement of medicines for medical use;
  g) collection and analysis of information on developers of vaccines for the prevention of a new coronavirus infection (COVID-19), holders of registration certificates for vaccines for the prevention of a new coronavirus infection (COVID-19) or other legal entities authorized by them - in terms of information on the effectiveness and safety of the use of vaccines for the prevention of a new coronavirus infections (COVID-19);
  h) collection and analysis of information on persons immunized by vaccines to prevent a new coronavirus infection (COVID-19).
<table>
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<tr>
<th>Country/IO</th>
<th>Description- Disease Surveillance and Emergency Response</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>• Methodological recommendations &quot;Prevention, diagnosis and treatment of new coronavirus infection (COVID-19)&quot;</td>
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<td></td>
<td><a href="https://static-0.minzdrav.gov.ru/system/attachments/attaches/000/052/219/original/%D0%92%D1%80%D0%B5%D0%BC%D0%B5%D0%BD%D0%BD%D1%8B%D0%B5%20%9C%20%D0%A0_COVID-19_%28v.8.1%25.pdf?1601561462">https://static-0.minzdrav.gov.ru/system/attachments/attaches/000/052/219/original/%D0%92%D1%80%D0%B5%D0%BC%D0%B5%D0%BD%D0%BD%D1%8B%D0%B5%20%9C%20%D0%A0_COVID-19_%28v.8.1%.pdf?1601561462</a></td>
</tr>
<tr>
<td></td>
<td>• The scientific community has updated the temporary Guidelines for organizing preventive medical examinations while the risks of the spread of a new coronavirus infection (COVID-19) remain.</td>
</tr>
<tr>
<td></td>
<td>• The Ministry of Health has updated the Methodological Recommendations &quot;Organization of medical care for pregnant women, women in labor, postpartum women and newborns with a new coronavirus infection COVID-19&quot;</td>
</tr>
<tr>
<td></td>
<td>The requirements for the organization of laboratory tests for a new coronavirus infection</td>
</tr>
</tbody>
</table>

Saudi Arabia<br>Sept 2020

Saudi Arabia has been monitoring the Middle East respiratory syndrome coronavirus (MERS-CoV) since 2012. These tools were adapted and expanded to support the monitoring of COVID-19 and enable modelling of policy changes effect on transmission. The Saudi Center for Disease Prevention and Control has a portal providing information about COVID-19 for the community & public, and professionals & health workers while providing daily updates. https://covid19.cdc.gov.sa/<br>MOH has dashboards covering these requirements such as NHCC (National Health Command Center) and NHEOC (National Health Emergency Operation Center) <br>

Sweden April 2020

One example of AI is a project aiming at simulating and study pandemics using AI started by the University of Stockholm and the National board of health and welfare. (algorithm may be available for sharing) <br>

Turkey Sept 2020

Our COVID-19 evaluation system (Korona Onlem) is developed with Machine Learning algorithm. Depending on the users’ answers, the system evaluates the final evaluation based on pre-determined variables specified by Scientific Committee of Turkey.Algorithm may be able to be shared If applicable by national laws and regulations <br>Besides, Hayat Eve Sığar – HES (Life Fits Into Home) mobile app is used for pandemic surveillance, along with FITAS (Filiation and Isolation Tracking System) which is used by mobile teams in the field. Also national PHR system (e-Nabiz) and decision support system (SINA) are updated accordingly to be able to meet the needs occurring during the pandemic.
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description- Disease Surveillance and Emergency Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAE Sept 2020</td>
<td>UAE immediate response to the pandemic was utilizing the currently implemented digital health technologies like <strong>public health solutions</strong>, HIEs, EMR, AI enabled solutions, in addition to deploy new digital health tools like telehealth, virtual clinic, chatbots, central remote consultation call center, and smart apps to contacts tracing, geofencing, and tracking and monitoring positive cases and quarantine patients.</td>
</tr>
<tr>
<td>UNICEF April 2020</td>
<td>Natural Language Processing to make the tools more interactive and engaging. Also, MagicBox is UNICEF's big data platform which is involved in measuring the secondary effects of COVID-19 to understand the impacts on social behavior, education, critical supplies, sentiment, opinion, and vulnerable populations. In addition to providing guidance on how to pinpoint and combat misinformation about COVID-19. Can the algorithm being used be shared internationally? The MagicBox team can work with other partners on big data analysis.</td>
</tr>
<tr>
<td>Uruguay April 2020</td>
<td>We can collaborate with the epidemiological flows used in our country. Regarding to the different objectives defined we can share information about the articulation of the digital strategy implemented. Response - Multichannel in order to attend different kind of population requirements or requests and help not to overflow the assistance health centers or their call centers. Manage all clinical cases unified and distribute them within the national health system (both public and private).</td>
</tr>
</tbody>
</table>
| USA Sept 2020 free and open source tools | USAID created the Digital Square co-investment mechanism to enable pooled funding in support of software global goods that can be adapted and re-used to meet multiple priority health needs. A number of these free and open source tools now have COVID-19-specific modules, including: DHIS2, SORMAS. Learn more [here](https://wiki.digitalsquare.io/index.php/Main_Page#Global_Good_Adaptations_to_COVID-19). CDC and NHSN data fields for reporting of hospital beds, ICU beds, and ventilator use could be shared internationally. CDC provides several sources of information related to COVID-19:  
- Information on overall cases, data, and surveillance can be found at [https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/index.html](https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/index.html);  
- The CDC COVID Tracker dashboards can be found at [https://covid.cdc.gov/covid-data-tracker/#cases_totalcases](https://covid.cdc.gov/covid-data-tracker/#cases_totalcases);  
| WHO April 2020 | **Epidemic Intelligence from Open Sources (EIOS) Initiative** supports public health intelligence. Tools are primarily for the public health intelligence community of practice, not for public consumption, for monitoring, early detection, assessment and communication of health threats based on publicly available information. **COVID-19 Dashboard** It allows access to current and reliable data on COVID-19 cases submitted directly to WHO by countries. Functionality includes:  
- New and confirmed cases and deaths globally with daily statistics  
- Country-specific info by clicking on any country on the interactive map  
- Interactive chart showing reported cases by WHO region including... |
1.3. Data Pooling

Sharing data with the WHO is clearly identified (at differing levels of granularity) including the following examples:

- The International Health Regulations, or IHR (2005), represent an agreement between 196 countries including all WHO Member States to work together for global health security. The purpose and scope of the International Health Regulations (2005) are “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade”. WHO (42)

- Monitoring and evaluation framework WHO (43)

- Global surveillance for COVID-19 caused by human infection with COVID-19 virus: interim guidance

This document provides guidance to Member States on implementation of global surveillance of COVID-19. The objectives of this global surveillance are:

1. to monitor trends of the disease where human to human transmission occurs;
2. rapidly detect new cases in countries where the virus is not circulating;
3. provide epidemiological information to conduct risk assessments at the national, regional and global level; and
4. provide epidemiological information to guide preparedness and response measures. (Note: This includes the recommended case-based form, associated data dictionary and aggregated weekly reporting form) WHO (44)


The clinical characterization case record form (clinical CRF) is intended to provide Member States with a standardized approach to collect clinical data in order to better understand the natural history of disease and describe clinical phenotypes and treatment interventions (i.e. clinical characterization). By using one standardized clinical data tool, there is potential for clinical data from around the world to be aggregated; in order to learn more to inform the public health response and prepare for large scale clinical trials. WHO (45)

- Mortality reporting: This technical note describes medical certification of cause of death and classification (International Classification of Diseases (ICD) mortality coding) of deaths related to COVID-19. The primary goal is to identify all deaths due to COVID-19 in all countries, including those not yet following WHO international norms and standards for medical certificates of cause of death and ICD mortality coding. Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19 Death reporting WHO (46)
Despite these, during the data collection many countries reflected on the inclusion of international data in the local setting to manage their response as outlined in the cases studies.

27. Action
Sharing relevant and appropriate data in an open and machine-readable way opens pathways to new insights and empowers non-traditional health and response actors. Efforts to collect these data should be aligned and streamlined wherever possible to avoid increasing the burden on strained health workers and health systems. USA (12)

Implementation resources
- Johns Hopkins’ website: https://coronavirus.jhu.edu/ (49)
- Hong Kong: All COVID-19 cases are listed in the COVID-19 dashboard, along with GIS integration showing all recent and past buildings with infections. https://www.coronavirus.gov.hk/eng/index.html (29)
- Italian Dashboard data https://opendatadpc.maps.arcgis.com/apps/opsdashboard/index.html#/b0c68bec2ce478eaaac82fe38d4138b1 is available as a download (https://github.com/pcm-dpc/COVID-19 ). Describing text is in Italian. (18)

28. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support data pooling as part of the emergency response. In addition to the actions above on Privacy and Security.

Implementation resources

29. Action
Development of a post-pandemic policy (for example disposal of sensitive data)
Note: post-pandemic usage may require this information to be integrated into national systems for future analysis.

Recommendation
- A template post-pandemic policy be developed for inclusion as an appendix for this report.
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Data pooling COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Data on the international situation is being considered. They constitute part of the information handled by the Situation Room, in charge of managing the epidemic, and are used to analyze the local situation. For this reason, the grouping of international data is considered useful.</td>
</tr>
</tbody>
</table>
| Australia   | Australia has been seeking to learn from countries internationally about their approaches to developing digital technologies to dealing with COVID-19 related key issues and its effects. We have been utilising learned experiences of successfully implemented national digital health initiatives to inform the approach we take domestically.  

The government is pooling international COVID-19 related data from multiple sources to assist in its response planning and management such as John Hopkins and World Health Organisation data. 

The government recognises the potential benefits of, and need for, expanded and continued pooled international data. This pooling has played, and will continue to play, a critical role in supporting efforts to track, identify and combat COVID-19. For example, international data is being used to contrast different responses to COVID-19 and draw lessons from comparable countries that are dealing with the spread of the disease. This will also improve understanding about expected result from a certain mix of measures and processes. It will provide insights to the current and future challenges in the healthcare system and would enable proactive planning.  

| Austria     | Austria’s international exchange of pandemic data is mainly channeled through the European Centre for Disease Prevention and Control (ECDC), which can be performed either manually or in an automated way. Down the line, ECDC forwards Austrian data – along data of other EU member states – to other international organizations, most importantly the World Health Organization.  

This structure circumvents redundancies, while preventing potential divergence of data between different international bodies.  

In addition, Austria makes epidemic data available through its open data initiative https://www.data.gv.at/covid-19/ |
| Brazil      | The Ministry of Health informs international entities, including the network of International Health Regulation (IHR), about case identification, monitoring data, as well as death.  

The Global Fund relies on and supports MoH information for its analysis. We see the value of a central collection of pooled data. However, the data privacy and security policies and procedures will be critically important in building this. The WHO Digital Health Atlas could be expanded for mapping interventions for COVID-19 response. https://digitalhealthatlas.org/en/-/ |
| Canada      | We do see a benefit of pooling data internationally.  

The national COVID control room is tracking international trajectory of
<table>
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<tr>
<td>2020</td>
<td>disease through multiple reliable sources online and reconciling the same to validate accuracy. • WHO situation reports have been one of the most trusted sources of data which are being collated and tracked to develop internal analytics on country level trends • The government is also tracking best practices and strategies that were implemented by other nations. All nations are at different levels in the epidemiological curve and it is valuable to learn what worked and what did not at specific stages of the disease life cycle so that resources can be apportioned judiciously and pitfalls can be potentially avoided.</td>
</tr>
<tr>
<td>Italy April 2020</td>
<td>At the moment aggregate data relating to the COVID-19 epidemic are made available to international health authorities and we use data internationally shared (WHO) also for the health decisions at political level. Moreover, at European level we are actively supporting the sharing and exchange of data and the adoption of interoperable solutions within EU.</td>
</tr>
<tr>
<td>The Netherlands April 2020</td>
<td>Yes. We have collected trusted data sources on a website by the national public health authority: <a href="https://databronnencovid19.nl">https://databronnencovid19.nl</a>. Sharing data sources is something we are positive about. Pooling data in central locations is not something we are very supportive of.</td>
</tr>
<tr>
<td>OECD May 2020</td>
<td>The pandemic is global and that makes it essential to amalgamate data from multiple countries to monitor the spread and impact of the virus. It is also essential for medical, public health and health services monitoring, research and tool and app development that either require large datasets from throughout the world to produce robust conclusions or require them for countries to be able to learn from one another. Multi-country research to evaluate the impacts and effectiveness of different approaches to controlling the epidemic and caring for patients will be essential to preparing to respond better to new waves of COVID-19 or other infectious diseases.</td>
</tr>
<tr>
<td>Poland April 2020</td>
<td>We are gathering data from the EU (via eHealth Network) and WHO. As a rule, gathering data from member states in various level of advancement and differentiated inventory of COVID-19 toolboxes provides a valuable input to our national crisis management. In more detail however, it is not clear whether the COVID-19 related data obtained from another member state is fully applicable to our domestic conditions.</td>
</tr>
<tr>
<td>Portugal April 2020</td>
<td>Public Health Authorities provide data to ECDC by agreed protocols for surveillance and epidemiological purposes; For example, ECDC provide access to Early Warning Response System (EWRS), it’s important to clarify that it follows polling mechanism or not.</td>
</tr>
<tr>
<td>Russian Federation Oct. 2020</td>
<td>Each medical facility obligatory must send information about each disease and mortality case COVID-19 and Pneumonia to Information Resource “COVID-19”. Information Resource “COVID-19” collect, analyze and aggregate information from local to federal level. Authorities at each level have daily actual information about situation. This information is publicly accessible at each level too at local,</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Data pooling COVID-19</td>
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</tr>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>Based on our experience with MERS we support the pooling of international data to support response management.</td>
</tr>
<tr>
<td>Sweden April 2020</td>
<td>We see great value in pooling data and encourage further cooperation and knowledge sharing.</td>
</tr>
<tr>
<td>Turkey April 2020</td>
<td>Only national COVID-19 data are pooled currently. If deemed necessary and in accordance with national and international regulations, international data pooling will be beneficial.</td>
</tr>
<tr>
<td>UAE April 2020</td>
<td>Pooling data internationally enables sharing the right information at the right time to the right people from the right sources. This shall improve the treatment services and help to respond to the pandemic properly.</td>
</tr>
<tr>
<td>UNICEF April 2020</td>
<td>UNICEF is supporting countries to monitor the impact of the COVID-19 pandemic and response efforts on routine health services for maternal and child health using routine data systems or existing digital health platforms. This data ultimately will belong to country governments but given the menu of key set of standardized indicators that are offered through our guidance, there are good opportunities to pool this data internationally.</td>
</tr>
<tr>
<td>United Kingdom Oct 2020</td>
<td>We are pooling our data nationally; we are reviewing international data however have not analysed this in any detail. Yes, we see the need and benefit to pooling data internationally when the time is right.</td>
</tr>
<tr>
<td>Uruguay April 2020</td>
<td>We are not generating information out yet, except for the data requested by OPS (PAHO) and OMS.</td>
</tr>
<tr>
<td>USA April 2020</td>
<td>The private sector Johns Hopkins’ website is a good resource: <a href="https://coronavirus.jhu.edu/">https://coronavirus.jhu.edu/</a> USAID believes the COVID-19 response could benefit from strategic data pooling from multiple sources internationally such as the WHO, national and regional Centers for Disease Control and Prevention, World Bank, UNICEF, and various universities, for example. Data from these and other sources can inform analyses used to inform estimates regarding disease burden and forecasting, and operational response needs. Sharing relevant and appropriate data in an open and machine-readable way opens pathways to new insights and empowers non-</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Data pooling COVID-19</td>
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<tr>
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<td>traditional health and response actors. Efforts to collect these data should be aligned and streamlined wherever possible to avoid increasing the burden on strained health workers and health systems.</td>
</tr>
<tr>
<td></td>
<td>The HHS Protect ecosystem is a secure platform for authentication, amalgamation, and sharing of healthcare information, so that the U.S. government can harness the full power of data for the COVID-19 response.</td>
</tr>
<tr>
<td></td>
<td>U.S. healthcare data has often been fractured and inaccessible. With HHS Protect, more than 200 disparate data sources are brought together into one ecosystem that integrates data across federal, state, and local governments and the healthcare industry. It provides a holistic view of the U.S. healthcare system, so decision makers informed by Protect have near-real-time information to guide action and save lives with a data-driven COVID-19 response.</td>
</tr>
</tbody>
</table>

See also Standards Disease Surveillance Data Pooling Information & Triage Contact Tracking TeleHealth

<table>
<thead>
<tr>
<th>WHO April 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>• We are not pulling data from other sources. We rely on data reported by national authorities under IHR for COVID related cases.</td>
</tr>
<tr>
<td>• For variables like number of beds, travel restrictions, age group – we are pulling from UNOPS, IOM, UNHCR.</td>
</tr>
<tr>
<td>• Yes, there is a need and benefit to pooling data internationally</td>
</tr>
</tbody>
</table>

See also Infrastructure Standards Governance, Policy and regulations Disease Surveillance Data Pooling Information & Triage Contact Tracking TeleHealth
2. Prevention and triage tools

The Prevention phase is ongoing throughout the emergency response especially as more information becomes available. As highlighted by the WHO, country risk communication and community engagement are critical public health interventions in all countries. Countries should prepare to communicate rapidly, regularly and transparently with the population. All countries should prepare existing public health communication networks, media and community engagement staff to be ready for a possible case, and for the appropriate response if this happens. Countries should coordinate communications with other response organizations and include the community in response operations. Partners stand ready to coordinate with partners to support countries in their communication and community engagement response. [WHO](50)

As part of the 2020 data collection it highlighted the following activities:

2. Emergency (e.g., COVID-19) public Information and triage tools
3. Call centers, SMS and automated triage
4. Psychological support

### 2.1. Risk Communication and Community Engagement Action Plan- Digital Health

Risk Communication and Community Engagement (RCCE) is an essential component of your health emergency preparedness and response action plan.

#### 30. Action

Develop and implement Risk Communication and Community Engagement (RCCE) Action Plan -Digital Health Tools. Highlighting, as part of the National RCCE plan, the preparation and deployment of Digital Health Tools.

**Implementation resources**


#### 31. Action

Finalise you national High-Risk Group definitions needed to implement the RCCE Action Plan.

**Implementation resources**

- **High Risk Group definitions** – examples below
  - WHO Western Pacific: COVID-19: vulnerable and high risk groups [https://www.who.int/westernpacific/emergencies/covid-19/information/high-risk-groups](https://www.who.int/westernpacific/emergencies/covid-19/information/high-risk-groups) (52)
  - UK: NHS Shielded Patient List the NHS Shielded Patient List (SPL) was created by NHS Digital in March 2020, at the outset of the Covid-19 pandemic. The list was created as a response to the Chief Medical Officer’s advice for patients at high risk of complications from Covid-19 to shield to avoid infection. Patients on the SPL receive advice and guidance on how to reduce the risk of infection during the
pandemic. The Government also made available priority access to food and medicines for those that requested it. The creation of the SPL relied upon NHS Digital's access to national level data about the patients. Information from GP and hospital records was used to identify patients based upon a set of clinical conditions specified by the Chief Medical Officer for England. GPs and Hospital Trusts were (and still are) also able to identify patients to be added to the list. The first iteration of the list identified 900,000 patients, as more patients have been added this has now grown to 2.3 million. The list is updated on a weekly basis and continues to be maintained by NHS Digital. For further information on the NHS Shielded Patients List please visit: https://digital.nhs.uk/coronavirus/shielded-patient-list (9)

2.2. Emergency (e.g. COVID-19) public Information and online triage

Most countries are using a range of digital technologies to deliver COVID-19 public Information. These can also include access to chatbots and symptom checkers. The USAID (1) Ebola report highlighted two key lessons learned:

- The sociocultural context mattered, with delivery of data and information via digital technologies achieving full value only when tailored to take account of variations in local language, customs, cultures, and user context, including literacy and user behavior patterns.
- Effective behavior change and other messaging, whether delivered using digital technologies, word-of-mouth, or other channels proved most effective when delivered through existing affinity networks, by trusted messengers, and when structured to convey empathy. Messages that failed to do so amplified fear and mistrust, leading to unintended consequences, including the hiding of cases, secret burials, and in some extreme cases violence against health and other response workers.

Additionally, Saudi Arabia at the beginning of the emergency response found:

- Health applications used for COVID-19 were excluded from the telecommunication data plans Saudi Arabia (5)

32. Action

Access to quality content which can be easily and readily updated as information changes.

Implementation resources

- **UNICEF**: has developed a mechanism to increase the speed and agility to be able to localize and integrate new content at country and regional level to fit programmatic needs. This is done through a newly formed “Digital Platforms Working Group” which will continue to develop and distribute new content that can be incorporated locally by programmes. New content and measurement modules are developed and vetted by UNICEF subject matter experts. (16)
- **UNICEF**: has developed other digital solutions including RapidPro and the Internet of Good Things. These solutions are being used for patient self-assessment/telemedicine, for frontline health worker training/communication, and for risk communication and community engagement (RCCE) to influence individual and community adoption of protective and preventive behaviors to support the COVID-19 response. (16)
- **UNICEF COVID-19 Information Chatbot** based on U-Report (16)
- **NHS**: In England, the NHS website provides free clinically assured health information with up to date COVID–19 content that is available for free. There are also other products including a coronavirus status checker. Access to the content is shared with a number of countries free of charge. https://nhs.uk/coronavirus (9)
- **WHO**: Algorithm for symptom checker and chat Bot can be shared internationally. WHO chatbots are being updated and enhanced. (13)
- **WHOA** (WHO Academy App): A mobile APP to improve knowledge and skills of Health Workers working on COVID-19 response. (13)
- **European Centre for Disease Prevention and Control (ECDC)**: Threat Reports app is available for the major mobile OSes
and usable by the general public


- Global fund, WHO and others policy guidance around the triage of patients including other health issues (11)

33. Action
Access to quality content which can be easily and readily updated as information changes for:
- People from culturally and linguistically diverse backgrounds
- People without access to the necessary digital health tools/data plans.

Implementation resources
- Recommend review of implementation resources in Infrastructure and Connectivity above that address access to connectivity (physically and financially)
- Recommend countries should implement an ongoing synchronization process to ensure information on digital tools/platforms is available and aligned with other communication channels which are easier to reach for people affected by the digital divide such as radio, tv etc. (18)

34. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support online triage as part of the emergency response. In addition to the actions above on Privacy and Security.

Implementation resources

35. Action
Development of a post-pandemic policy (for example disposal of sensitive data, review of privacy policies).

Recommendation
- A template post-pandemic policy be developed for inclusion as an appendix for this report.

Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
</tr>
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<tbody>
<tr>
<td>Argentina</td>
<td>COVID-19 symptom self-assessment</td>
</tr>
<tr>
<td>April 2020</td>
<td>From the Ministry of Health page <a href="https://www.argentina.gob.ar/coronavirus/app">https://www.argentina.gob.ar/coronavirus/app</a> it is possible to download an app designed so that people can carry out a COVID-19 symptom self-assessment -19. The next step is to incorporate new features into it, so that it becomes a communication tool and population monitoring. In this way, it will allow anticipating actions to be taken in the situation of a person with symptoms, receiving recommendations for action. Another feature includes information about the day of quarantine being fulfilled, and a symptom log that will be saved in the Ministry's database. The data provided through the Using the app, they will allow you to generate statistics and geolocation analysis of infected people who are in quarantine.</td>
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</tbody>
</table>

See also Standards Disease Surveillance Data Pooling Information & Triage TeleHealth Quarantine monitoring Facility Manager
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
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</table>
| Australia April 2020 | - The Australian Government has launched a mobile application to provide news, updates, some location-based services and push notifications for citizens and medical professionals. The app can be downloaded at: https://www.health.gov.au/resources/apps-and-tools/coronavirus-australia-app
| Austria October 2020 | Weekly information about epidemic clusters, tracing and developments is made available to the public online by AGES (The Austrian Agency for Health and Food Security). For example, under the following URL detailed information on COVID-19 is published for each week: https://www.ages.at/themen/krankheitserreger/coronavirus/epidemiologische-abklarerung-covid-19/ |
| Brazil Sept 2020 | Information to society on COVID-19 cases
The dissemination of data related to COVID-19 to society has been carried out according to the different stakeholders, through portals linked to the main portal of the Ministry of Health. They are:
1. **CORONA VIRUS, COVID-19 - WHAT YOU NEED TO KNOW:** https://coronavirus.saude.gov.br/
   This is the central portal on coping with COVID-19. It contains information about what COVID-19 disease is, what the symptoms are and how it is transmitted. It informs how the citizen should protect himself, how the diagnosis occurs and how he should act if he becomes ill, indicating the health services. Presents a section on fake news and frequent asked questions (FAQs). There is a section on institutional transparency, informing about spending related to coping with the pandemic. In the section addressed to health professionals, epidemiological bulletins, clinical management and treatment protocols, case definitions and notifications and non-pharmacological measures, among others, are included.
2. **CORONA VIRUS BRAZIL PANEL:** https://covid.saude.gov.br/
   It is an interactive dashboard where you can navigate the data of the Unified Health System - SUS, with strategic information about COVID-19 in a transparent and analytical way. The numbers of confirmed cases are presented, in follow-up and recovered, as well as confirmed deaths. The information is distributed by regions and states. In addition, this portal presents data on hospitalizations for Severe Acute Respiratory Syndrome (SRHS).
3. **LOCALIZA SUS:** https://localizasus.saude.gov.br/
   LOCALIZA SUS concentrates a set of interactive panels for the presentation of various information to society, stratified by municipality, on actions related to COVID-19. Among them:
<table>
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<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
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<tr>
<td></td>
<td>a. Cases and deaths of COVID-19, containing the profile of all cases for all municipalities.</td>
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<tr>
<td></td>
<td>b. Implementation COVID-19, with information on the financial implementation of resources in the context of combating COVID-19.</td>
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<td>c. Financial Panel with information on the financial transfers made by the Ministry of Health to the states and municipalities.</td>
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<td>d. Hospital Bed Panel, with information on the availability of hospital beds distributed in the various only months of the world, in the context of the fight against COVID-19.</td>
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<tr>
<td></td>
<td>e. Human Resources Panel, with the availability of health professionals in the context of combating COVID-19.</td>
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<tr>
<td></td>
<td>f. Respirators panels, with information on the availability of respirators distributed by the Ministry of Health to the various municipalities.</td>
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<tr>
<td></td>
<td>g. Panel of medicines, with information on the availability of medicines distributed to the various only municipalities.</td>
</tr>
<tr>
<td></td>
<td>h. Test Panel, with information on the availability of COVID-19 test kits.</td>
</tr>
<tr>
<td></td>
<td>i. Panel of Personal Protective Equipment distributed.</td>
</tr>
<tr>
<td></td>
<td>j. Purchasing and Contracts Panel brings data from electronic trading sessions and non-requirements of registered bidding.</td>
</tr>
</tbody>
</table>

4. **OPENDATASUS:** [https://opendatasus.saude.gov.br/](https://opendatasus.saude.gov.br/)

The OPENDATASUS portal is aimed at the public seeking to download the micro data related to COVID-19 in open government format, aligned with the Open Data Government guidelines. It is possible to import the disseminated data in OPENDATASUS into locally developed applications and, with this, provide new forms of analysis about the disease.

The following datasets are currently available:
- Severe Acute Respiratory Syndrome Database from 2009 to 2020
- Notifications of Influenza Syndrome - including suspected cases of COVID-19
- Record of Hospital Occupancy COVID-19
- Mortality Information System
- National Registry of Health Establishments (CNES)

Brazil April 2020 COVID-19 symptom self-assessment

Please find the Flow of the Pre-Clinical Care System Integrated with the National Health Data Network (RNDS) being utilized in Brazil in Appendix 3. For greater access to health services and to establish alternatives for face-to-face care, the Ministry of Health of Brazil is working aiming mainly at three strategies:

1) the broad clarification of the population about COVID-19 and when to seek health services, helping the correct use of face-to-face services, including primary care;
2) the isolation of the population that is potentially contaminated or at greater risk but does not have signs of seriousness;
3) avoiding the exhaustion of on-site health services as much as possible, whether through home isolation or assistance with remote monitoring through other technologies, or by avoiding contamination by health professionals.

The channels of entry to the proposed health services are the 1) ChatBot Service, 2) the Audible Recognition Unit Service (URA), the 3) Pre-clinical Service (SAPC) and 4) remote monitoring.

1) **Chatbot (passive search):** Service based on searching patients, either through a platform or by an application.

The principle of care is through a conversation between the citizen and the ‘robot’ (pre-established algorithm) that seeks to elucidate common doubts, stratify cases according to severity and to properly handle the person in question. The outcome of the conversation takes the citizen through 4 ways:

- General guidelines and answers to common questions (FAQ) for cases without flu syndrome.
<table>
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<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
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<tr>
<td></td>
<td>• Guidelines for home isolation for cases classified as mild and without comorbidities that contraindicate isolation.</td>
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<tr>
<td></td>
<td>• Search guidelines for a Basic Health Unit / Family Health Unit for mild cases, but which have comorbidities that contraindicate hospitalization.</td>
</tr>
<tr>
<td></td>
<td>• Search guidelines for an Emergency Service / Reference Center / Call Emergency mobile care service (SAMU) for cases classified as severe.</td>
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<tr>
<td></td>
<td>The goal of the ChatBot is to serve as the first relief barrier for people to enter face-to-face services, that is, to relieve emergency and basic health units. In addition, clarifying the population’s doubts is one of the great tools to raise awareness of the importance of adherence to non-pharmacological measures.</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.Saude.gov.br">http://www.Saude.gov.br</a> Chatbot/virtual assistant, Coronavirus App</td>
</tr>
<tr>
<td></td>
<td>The clinical algorithms represent pre-defined clinical content, scientifically supported and prepared for the specifics of a non-face-to-face service, which guide the clinical decision of the attendants / health professionals to classify the level of risk and recommended conduct. The recommended solution is to use algorithms aimed at suspected and confirmed cases of New Coronavirus already made available and used by countries that use the long-standing solution, such as the United Kingdom and Portugal. They begin with signs and symptoms related to the disease caused by the virus (such as cough, fever and shortness of breath) and with discard or suspicion of the case, including guidance measures or even directing them to other health environments.</td>
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<tr>
<td></td>
<td>A centralized system is proposed, which has a qualified clinical record system, with guaranteed confidentiality of information and, at the same time, availability in real time to the Ministry of Health of data and information on the temporal and geographic distribution of care in order to quickly guide the decision to allocate physical, human and financial resources in order to contain the epidemic in a country of continental dimensions.</td>
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<tr>
<td></td>
<td>AI-based chatbots are updated -Through search and study of evidence and, if applicable, pointing out possible changes in the algorithm. There is also a curatorial process to check for possible flaws in the algorithms.</td>
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<tr>
<th>See also</th>
<th>Infrastructure</th>
<th>Usability and availability</th>
<th>Governance</th>
<th>Vaccine Mgt</th>
<th>Contact Tracing</th>
<th>Training</th>
<th>Standards</th>
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<tbody>
<tr>
<td>Disease Surveillance</td>
<td>Data Pooling</td>
<td>Information &amp; Triage</td>
<td>Policy and regulations</td>
<td>Call Center</td>
<td>Testing</td>
<td>TeleHealth</td>
<td>Quarantine monitoring</td>
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| Canada April 2020 | Three priority areas at this time are assessment/triage, accelerating virtual care to allow for remote encounters and mental health offerings to help people deal with the pandemic. |
| See also | Standards | Disease Surveillance | Data Pooling | Information & Triage | Psychological Support | TeleHealth | Infrastructure |

| Germany Oct 2020 | • Digital Tools to support symptom checking and testing date management and service at KBV https://www.116117.de/de/coronavirus.php |
| See also | Disease Surveillance | Information & Triage | Contact Tracing | Facility Manager | Disease Research |

<p>| India Sept 2020 | • All information regarding COVID is made available through the Government website <a href="https://mohfw.gov.in">https://mohfw.gov.in</a> |
| See also | Disease Surveillance | Information &amp; Triage | Contact Tracing | Facility Manager | Disease Research |
| The Govt provides the most up to date guidelines, advisories, FAQs, helpline numbers, resources for IEC of COVID for general public awareness and other relevant information on the Ministry of Health and Family Welfare website. |
| The Aarogya setu open source mobile app is also leveraged to inform citizens about Dos and Don’ts on COVID. The Aarogya setu application is an open-source cross-platform CoVID-19 “Contact tracing, Syndromic mapping and Self-assessment” digital service, primarily a mobile app. This app augments the initiatives of the Department of Health to contain COVID-19 and shares best practices and advisories. Learn more: eSanjeevani |</p>
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<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
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<td>TeleHealth</td>
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<td>Testing</td>
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<td>Carolities</td>
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<td>Italy April 2020</td>
<td>COVID-19 symptom self-assessment, Triage</td>
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<td>In Italy to open calls to assess the state of both telemedicine solutions and mobile apps for contact tracing have been launched and completed. The candidate solutions have been selected by specific expert groups within a Governmental COVID-19 Task force. The selected five solutions of mobile apps for telemedicine will be suggested to be adopted by Regions.</td>
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<td></td>
<td>In the meantime, in Italy, several Regions have already activated eHealth tools for the management of the COVID-19 pandemic and telemedicine solution (symptom checker, triage, quarantine monitoring). These are not open source/free solutions but there are both solutions whose source code is owned by a public body (for example in Region Lazio) and market solutions (for example in Region Puglia, Lombardia and Trento).</td>
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<td>Following the issue of the European “Commission Recommendation of April 8th, 2020 on a common Union toolbox for the use of technology and data to combat and exit from the COVID-19 crisis, in particular concerning mobile applications and the use of anonymised mobility data”, Italy is actively participating at European level in the work of the eHealth Network for a pan-European approach for the use of mobile applications supporting the fight against COVID-19 pandemic to define a Toolbox for Member States for “Mobile applications to support contact tracing and warning in the EU’s fight against COVID-19” with the following purposes:</td>
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<td>- empowering citizens to take effective social distancing measures</td>
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<td>- for warning, preventing and contact tracing</td>
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<td></td>
<td>- methodology for monitoring and sharing assessments of effectiveness of these applications</td>
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<td>- interoperability and cross-border implications</td>
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<td></td>
<td>- respect for privacy and data protection</td>
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<tr>
<td></td>
<td>And to define a “Guidance on privacy and data protection for APPS supporting the fight against COVID-19 &quot;</td>
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<td>See also</td>
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<td>Standards</td>
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<tr>
<td>The Netherlands April 2020</td>
<td>COVID-19 symptom self-assessment</td>
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<tr>
<td></td>
<td>Several symptom checkers and self-tests that help determine whether the citizen is at risk of being infected with COVID-19 and trusted information about what to do if this is the case.</td>
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<td></td>
<td>For symptom checker and infection tracking &amp; tracing we are looking at frameworks like DP-3T, PEPP-PT and PACT (MIT), that have cross-border implications as well. The European Commission and the WHO are very active in this area as well, supporting member states.</td>
</tr>
<tr>
<td></td>
<td>• PEPP-PT <a href="https://pepp-pt.org">https://pepp-pt.org</a></td>
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<td>• DP-3T <a href="https://pepp-pt.org">DP-3T/documents: Decentralized Privacy-Preserving Proximity Tracing -- Documents</a></td>
</tr>
<tr>
<td></td>
<td>• PACT (MIT): PACT: Private Automatic Contract Tracing</td>
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<tr>
<td></td>
<td>See also</td>
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<td></td>
<td>Standards</td>
</tr>
<tr>
<td>Poland April 2020</td>
<td>COVID-19 symptom self-assessment</td>
</tr>
<tr>
<td></td>
<td>Symptom checker – online tool</td>
</tr>
<tr>
<td></td>
<td>Online tool serving informational purposes, guiding the patient how to react when disease symptoms appear: whether to report to the appropriate medical point or just follow general sanitary rules. <a href="https://pacjent.gov.pl/koronawirus/sprawdz-objawy">https://pacjent.gov.pl/koronawirus/sprawdz-objawy</a></td>
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<tr>
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<td>Chatbot on COVID-19. It is an online tool responding to the most common questions on coronavirus - Information regarding i.e. symptoms of infection,</td>
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<tr>
<td>Country/IO</td>
<td>Description - COVID-19 public Information and online triage</td>
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<tr>
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<td>prevention measures, rules of quarantine, other measures imposed by the government presented as FAQs with a possibility to write down a unique question.</td>
</tr>
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<td></td>
<td><a href="https://pacjent.gov.pl/">https://pacjent.gov.pl/</a></td>
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<td>The virtual assistant is updated frequently by the Ministry of Health, the Chief Sanitary Inspectorate and the National Health Fund.</td>
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<td>See also Standards Data Pooling Information &amp; Triage Health Contact Tracing TeleHealth Quarantine monitoring</td>
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<td>Portugal April 2020</td>
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<tr>
<td></td>
<td>COVID-19 symptom self-assessment and Public Information</td>
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<td>Systems for the Citizen:</td>
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<tr>
<td></td>
<td>• Informative: website and informational cards for the app released with information about COVID-19</td>
</tr>
<tr>
<td></td>
<td>• Self-triage: functionality in the Citizen Portal which allows the citizen to answer a questionnaire, which then suggests a set of actions</td>
</tr>
<tr>
<td></td>
<td>• Self-report: functionality that allows the citizen to report their symptoms for doctors monitoring</td>
</tr>
<tr>
<td></td>
<td>Citizens will have on their disposal other digital tools, such as Symptom checker or self-monitoring functionalities in the healthcare citizens portal. PT currently isn’t focusing on development of tracing app but on promotion, monitoring and Self-care. Interoperability between existing system will be guarantee in the mApp, symptom checker (this functionality will be used in the app as well), connected with “TRACE COVID-19 System” (Surveillance and Monitoring) and NHS24 referral system</td>
</tr>
<tr>
<td></td>
<td>In production, we have an informative CHAT/phone bot in use at NHS24 (mandatory single national contact point - national phoneline for 1st triage) for advice by phone citizens without symptoms that support relatives with positive case; However, we are developing an informative CHAT bot to connect citizens with available resources in the Citizens portal and NHS24 content.</td>
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<td></td>
<td>See also Standards Disease Surveillance Data Pooling Information &amp; Triage Health Call Center Contact Tracing TeleHealth Quarantine monitoring</td>
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<td>Russian Federation Oct 2020</td>
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<td></td>
<td>Public Information and online triage tools</td>
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<td>Governmental information resource: <a href="https://%D1%81%D1%82%D0%BE%D0%BF%D0%BA%D0%BE%D1%80%D0%BE%D0%BD%D0%B0%D0%B2%D0%B8%D1%80%D1%83%D1%81.%D1%80%D1%84">https://стопкоронавирус.рф</a> or <a href="https://xn--80aesfpebaqmfblc0a.xn--plai/">https://xn--80aesfpebaqmfblc0a.xn--plai/</a></td>
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<td></td>
<td>See also Governance, Policy and regulations Disease Research Investment Strategy Psychological support</td>
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<tr>
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<td>Training Standards Disease Surveillance Data Pooling Information &amp; Triage Health Call Center Contact Tracing TeleHealth Quarantine monitoring</td>
</tr>
<tr>
<td></td>
<td>Saudi Arabia Sept 2020</td>
</tr>
<tr>
<td></td>
<td>COVID-19 symptom self-assessment, Triage</td>
</tr>
</tbody>
</table>
|                            | The cornerstone of the COVID-19 digital health tools available to our citizens and residents are “Mawid/SeHHA” which are electronic services provided by Saudi Ministry of Health, enhanced with an artificial intelligence enabled COVID-19 survey which helps to self-assess the symptoms of COVID-19 for individuals and their relatives, and then provides the correct guidance for their condition. If a face to face appointment is required, it can enable the patient to book their virtual appointment across a number of certified Ministry of Health physicians for consultation for free. The SeHHA application has seen a fivefold increase in usage during the pandemic, at peak times providing over 10,000 virtual consultations a day. The application has been vital to allow follow-up of suspected cases identified from the Mawid COVID-19 self-assessment survey to be verified and monitored by doctors. The SeHHA application also includes an artificial intelligence feature “Smart SEHHA” to make it easier for the user to understand any symptoms, including COVID-19, or health
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
</tr>
</thead>
</table>
| Singapore Sept 2020 | **Singapore COVID-19 Symptom Checker**  
|                   | The number of COVID-19 cases in Singapore community started to increase rapidly in the beginning of April 2020. The public's fear and confusion about COVID-19 in Singapore led to the development of a symptom checker ([https://sgcovidcheck.gov.sg/](https://sgcovidcheck.gov.sg/)) to advise people their course of action if they had any concerning symptoms. This checker was tailored for local needs and structure of healthcare systems and provided guidance to the people when and where should they seek care. As the COVID situation changed rapidly, so did the guidelines from MOH (Ministry of Health). The symptom checker also evolved quickly in response and was maintained up to date with the most recent guidelines about risk factors, care centres and SASH (swab and send home) facilities. The checker could also be used to locate services such as testing, care and masks. The data collected from surveys showed that most of the people intended to follow the recommendation given to them by the checker. It has now been used by a considerable portion of the Singapore population, and continues to be used in September 2020 despite there being a very low level of community transmission. |
| Sweden April 2020  | Chatbots have been implemented however we are unsure of the level of AI, if any used. |
| Turkey Sept 2020   | **COVID-19 symptom self-assessment**  
|                   | We use Telemedicine solutions, RUHSAD (psychological support system for health professionals) a e-Prescription, e-Nabiz PHR system and HES (Hayat Eve Sığar – Life Fits Into Home) mobile app enables people to check the risk status of their own and their families (upon permission). Besides, users can also access the risk status map of their city. as digital health tools to support Pandemic Management. Besides, a local clinical decision support system, an isolation tracking system (FITAS), COVID-19 evaluation system for individuals (Korona Onlem website and mobile app as a symptom checker,) and a gaming platform for children have also been developed. |
| UAE Sept 2020      | **COVID-19 symptom self-assessment, Triage**  
|                   | UAE immediate response to the pandemic was utilizing the currently implemented digital health technologies like public health solutions, EMR, AI enabled solutions, in addition to deploy new digital health tools like telehealth, virtual clinic, triage, chatbot. central remote consultation call center, contacts tracking, geofencing, and tracking and monitoring of positive cases and quarantine patients.  
|                   | These solutions are not open source solutions, but offered from the technology companies as a contribution to the pandemic management  
|                   | **Chatbot**  
|                   | We have a team of specialized physicians using these AI enabled solutions and they }
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - COVID-19 public Information and online triage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNICEF</strong></td>
<td>Chatbots &lt;br&gt;In February, UNICEF developed and launched the U-Report COVID-19 Information Chatbot for initial use by the 68 countries with active U-Report initiatives. It quickly reached more than 2 million young people and continues to accelerate. It has been deployed in 43 countries to date. Responding to interest from countries without U-Report, UNICEF have since collaborated to develop a &quot;white labelled&quot; or generic, non-U-Report version of the COVID-19 Information Chatbot, so that all countries with access to RapidPro infrastructure can take advantage immediately of the investments already made to develop the messages, flows and other assets.</td>
</tr>
<tr>
<td><strong>United Kingdom</strong></td>
<td><strong>NHS website health content</strong> – The NHS website provides free health information with up to date COVID–19 content that is available for free. There are also other products including a coronavirus status checker. Access to the content is shared with a number of countries free of charge. <strong>COVID-19 symptom self-assessment</strong> – During the COVID–19 pandemic, a request was received from WHO to share the COVID–19 clinical diagnostic algorithm that is used routinely by the NHS 111 Pathways and 111 online services, to support developing countries. This algorithm was shared by NHS Digital. Further information is available on NHS Digital’s COVID–19 support to health and social care in England to respond to the Pandemic <a href="https://digital.nhs.uk/coronavirus/nhs-digital-coronavirus-programme-updates/programme-updates-29-july-2020">https://digital.nhs.uk/coronavirus/nhs-digital-coronavirus-programme-updates/programme-updates-29-july-2020</a> This report is updated on a regular basis please check the NHS Digital Website Corona for the most up to date information. <a href="https://digital.nhs.uk/coronavirus">https://digital.nhs.uk/coronavirus</a></td>
</tr>
<tr>
<td><strong>Uruguay</strong></td>
<td><strong>Public Information</strong> boards with the objective of communicate the population about the pandemic, including confirmed cases, tests performed, recovered and deceased people and Health personnel available. <strong>COVID-19 symptom self-assessment</strong> We are carrying out a unified digital strategy, (link to the news). This strategy includes several digital health tools, which are created under a public and private sector agreement. Until now, there are no definitions whether the assets are listed as open source. Therefore, we cannot release the source codes. <strong>Chatbots</strong> The bots used respond to the epidemiological questionnaire created by Health Ministry and are effectively modified when new health indications emerge. We are using AI to a risk classification, and the algorithm is still in the testing phase. It belongs to a private company.</td>
</tr>
<tr>
<td><strong>USA</strong></td>
<td>Private-sector has a number of COVID-19 symptom checkers potentially based on CDC guidelines.</td>
</tr>
<tr>
<td><strong>WHO</strong></td>
<td><strong>COVID-19 symptom self-assessment</strong> WHO MyHealth App for individuals globally operating on Android and iOS, available in 6 WHO languages with offline capabilities. Users will have information and services available on the mobile app to help contain and mitigate COVID-19 including symptom checking functionality. Algorithm for symptom checker and chat Bot can be shared internationally. WHO chatbots are being updated and enhanced.</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - COVID-19 public Information and online triage</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>WHO Health Alert Bot.</td>
<td>The WHO Health Alert bot provides official information on topics such as how to protect yourself from infection, travel advice, and debunking Coronavirus myths. The Bot serves government decision-makers by providing the latest numbers and situation reports.</td>
</tr>
</tbody>
</table>

See also
- Infrastructure
- Standards
- Governance, Policy and regulations
- Disease Surveillance
- Data Pooling
- Information & Triage
- Contact Tracing
- TeleHealth

### 2.3. Call Center, SMS and automated telephone triage

The emergency response in many countries includes a call/communications center that manages incoming and outgoing telephone calls with individual (health care professionals, disease data collectors and the public). Interaction with the public can be initiated by multiple access channels commencing with:

- an automated telephone triage system (a clinical decision support system (CDSS)) supporting the remote assessment of callers to urgent and emergency services.
- An online symptom check (with or without chatbot) (see COVID-19 public Information and online triage)
- Direct contact with non-clinical resource with follow up call from a nurse or physician when appropriate.
- Direct contact with clinical resource

Depending on the situation the objective of the call may include one or more of the following:

- Triage patient
  - find out what local service is required
  - be connected to a nurse, pharmacist or GP
- Organize if needed:
  - a face-to-face appointment
  - a referral
  - ambulance
  - burial services
- Provide telemedicine consult (see TeleHealth / Telemedicine solutions) which may also include:
  - ePrescription (see ePrescribing)
  - Sick Leave (see eSickLeave)
- Provide self-care advice
- Provide health professional advice
- Collect case data

In addition to the many relevant actions in the planning stage should be implemented especially:

### 36. Action

Operationalize the relevant Digital Health Foundations.

**Implementation resources**

- **USA:** Suggestions for Operationalization from USAID page 86 (1):
  - Having all the necessary shortcodes ready to be operationalized
  - A rapid assessment of communications infrastructure can be done quickly at the onset of a crisis to enable quick fixes and planning to mitigate weaknesses, as necessary.
  - Governments should negotiate with mobile network operators for crisis-related shortcode messages to be prioritized in messaging queues.
  - All actors should have low tech and nondigital back-up options for relaying critical information in cases in which mobile networks are overwhelmed or inoperable.
  - It is critical to understand how user behavior will affect the design and requirements of a digital system. In this case, health workers (as with others) frequently used more than one SIM card and phone number. To design for this variability, mechanisms that gather health worker phone numbers must
establish a process—ideally an automated one—to regularly update those numbers.

- Short codes should have reverse billing capacity, so that charges for messages sent over the system are borne by a government or other specialized agency, not the individuals receiving and sending responses.

**37. Action**

Access to Communications tools specifically targeted to communication in health settings in support of the emergency response such as Call Center, SMS and automated telephone triage.

**Implementation resources**

- **mHero** is a two-way, mobile phone-based communication system that connects ministries of health and health workers using iHRIS and RapidPro. mHero brings together existing health information systems with locally popular communication platforms to facilitate the exchange of important health information [https://www.mhero.org/](https://www.mhero.org/) (55)

- **RapidPro** collects data via short message service (SMS) and other communication channels (e.g. voice; social media channels, such as Facebook Messenger, Telegram, WhatsApp) to enable real-time data collection and mass-communication with target end-users, including beneficiaries and frontline workers [https://www.unicef.org/innovation/rapidpro](https://www.unicef.org/innovation/rapidpro) (13)


**38. Action**

Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Call Center, SMS and automated telephone tools as part of the emergency response. In addition to the Actions above on Privacy and Security. Privacy and Security statement should be reviewed to ensure changes on any changes relevant to the pandemic are enabled such as the collection, use, disclosure and storage of personal information. It is anticipated the Privacy and Security statement will incorporate:

- What information is collected and held
- Data uses and disclosures
- Data Sharing
- Data Security
- User rights.

**NOTE:** this may also need to be reviewed once the pandemic.

**Implementation resources**

- **Examples of privacy statement** (which are subject local privacy legislation and regulations): [https://111.nhs.uk/Help/Privacy](https://111.nhs.uk/Help/Privacy) NHS UK (56) and [https://www.healthdirect.gov.au/privacy-statement](https://www.healthdirect.gov.au/privacy-statement) Healthdirect Australia (57)


**39. Action**

Development of a post-pandemic policy (for example disposal of sensitive data, review of privacy and security policies).
Recommendation

- A template **post-pandemic policy** be developed for inclusion as an appendix for this report.

### Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Call Center, SMS and automated telephone triage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria October 2020</td>
<td>Through the national helpline 1450, the Austrian Ministry of Health offers its citizens a first mobile touchpoint for all kinds of health concerns. It also serves the purpose of telephone triage based on callers' symptoms, offering them crucial information for testing services, and 1450 staff can add their information into Austria's central shared epidemic reporting database EMS. Further, if necessary, mobile testing teams can be sent directly to the caller. The whole organizational unit works in close cooperation with AGES, Austria's Agency for Health and Food Security.</td>
</tr>
</tbody>
</table>

| Brazil April 2020 | Please find the Flow of the Pre-Clinical Care System Integrated with the National Health Data Network (RNDS) being utilized in Brazil in Appendix 3. For greater access to health services and to establish alternatives for face-to-face care, the Ministry of Health of Brazil is working aiming mainly at three strategies:

1. the broad clarification of the population about COVID-19 and when to seek health services, helping the correct use of face-to-face services, including primary care,
2. the isolation of the population that is potentially contaminated or at greater risk but does not have signs of seriousness,
3. avoiding the exhaustion of on-site health services as much as possible, whether through home isolation or assistance with remote monitoring through other technologies, or by avoiding contamination by health professionals.

The channels of entry to the proposed health services are the 1) **ChatBot Service**, 2) the **Audible Recognition Unit Service** (URA), the 3) **Pre-clinical Service (SAPC)** and 4) **remote monitoring**. |

2) **Audible Recognition Unit Service** (active search): From a recorded conversation, the citizen is guided through a menu that directs him to the existing possibilities. Telephone calls are been made to all people at greatest risk in order to identify signs / symptoms that may lead to the suspicion of the case for COVID-19. If discarded, basic guidance on the importance of isolation and adherence to a special diet is given. |

### India July 2020

- In India, all states and Unions Territories have established a 24*7 control room at state and districts level. This is accomplished to ensure seamless operations of manufacturing, processing, transportation, distribution storage, trade and logistics related to all services.

- The union Ministry of Health has also launched a 24x7 toll-free national helpline - '1075'. All phone calls on '1075' are managed and closely monitored by the National Health Authority's (NHA) call center based in Hyderabad, Bengaluru, Kolkata and Delhi. |

- Caller tune has also been set through all mobile operators so that someone hears when making a call is updated information on COVID self-awareness and management |

| Portugal April 2020 | **ITU activities in response to COVID-19** See Appendix 5 for details including:

1. Leverage on the “Be Healthy, Be Mobile” (BHBM) joint ITU-WHO initiative. |

2. By default, NHS24 (national phoneline for 1st triage) is the mandatory single national contact point for COVID-19 patients. The contact or referral can be done in multi-
### Call Center, SMS and automated telephone triage

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description</th>
<th>See also</th>
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<tbody>
<tr>
<td>Russian Federation</td>
<td>Call Center, tools</td>
<td>Standards</td>
</tr>
<tr>
<td>Oct 2020</td>
<td>Call Center, tools</td>
<td></td>
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<tr>
<td></td>
<td>Unified hotline 8-800-2000-112</td>
<td>Training</td>
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<td>Russian Federation: Unified hotline 8-800-2000-112</td>
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<td>Call Center, tools</td>
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<tr>
<td>Saudi Arabia</td>
<td>Contact Center 937.</td>
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<tr>
<td>Sept 2020</td>
<td>Contact Center 937.</td>
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<tr>
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<td>The Centre is one of the Ministry of Health support Functional systems; it</td>
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<td>represents the first point of contact between citizens/residents/ visitors/</td>
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<td></td>
<td>etc. and the Ministry of Health around the clock. Reached from all parts of</td>
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<td></td>
<td>the country by any means of communication, 937: supported by a chatbot</td>
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<tr>
<td></td>
<td>unifies the mechanism of receiving and handling complaints and requests for</td>
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<tr>
<td></td>
<td>treatment.</td>
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<tr>
<td>Singapore</td>
<td>The Ministry of Health (MOH)’s Emergency Hotline handles general public</td>
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<tr>
<td>Sept 2020</td>
<td>enquiries relating to a public health incident of national concern, i.e.</td>
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<td>COVID-19, with information on the outbreak, symptoms, precautionary measures</td>
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<td>to be taken etc.</td>
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<td>A separate hotline is used by healthcare professionals, healthcare</td>
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<td>institutions and government agencies to provide case management for suspect</td>
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<td></td>
<td>and confirmed COVID-19 cases. This includes (i) isolation based on test</td>
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<td>results, (ii) provision of medical support in hospital/care facilities,</td>
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<td>(iii) management of cases with lab discrepant results, and (iv) discharge</td>
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<td>from isolation facilities. To complement hotline operations and the reduce</td>
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<td>risk of information loss with multiple handoffs across various stakeholders,</td>
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<td></td>
<td>Tracking Response and Conveyance Monitoring System (TRACOMS) is being</td>
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<td>developed to provide a centralised platform for operators to access clinical</td>
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<td>information (e.g. test results) and patient demographic data to assess,</td>
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<td></td>
<td>plan and execute the next course of action to prevent secondary outbreaks.</td>
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<tr>
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<td>To ensure accuracy of data, the system will pull information from key</td>
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<td>databases designated as Single Sources of Truth.</td>
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### UAE immediate response to the pandemic

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description</th>
<th>See also</th>
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<tbody>
<tr>
<td>UAE Sept 2020</td>
<td>UAE immediate response to the pandemic was utilizing the currently</td>
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<td>Available from</td>
<td>implemented digital health technologies like public health solutions, EMR,</td>
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<tr>
<td>technology partners</td>
<td>AI enabled solutions, in addition to deploy new digital health tools like</td>
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<td></td>
<td>telehealth, virtual clinic, triage, chatbot,</td>
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<tr>
<td></td>
<td>central remote consultation call center, contacts tracing, geofencing,</td>
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<tr>
<td></td>
<td>and tracking and monitoring of positive cases and quarantine of patients.</td>
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<tr>
<td></td>
<td>These solutions are not open source solutions but offered from the technology</td>
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<td>companies as a contribution to the</td>
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</table>
2.4. Psychological support

During this current pandemic response, the level of anxiety within the community increased especially as restrictions were put in place by governments to actively manage the spread of the disease. We have also seen a major impact of the pandemic on the mental health of health professionals. In addition to changes we have seen in the delivery of mental health services (covered under telemedicine) the availability of information is been provided by countries.

40. Action
Access to tools to support Psychological support.

Implementation resources

41. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Psychological support tools as part of the emergency response. In addition to the actions above on Privacy and Security

Implementation resources
- EU Guidance on privacy and data protection for APPS supporting the fight against COVID-19. European Commission has published guidance on the development of new apps that support the fight against coronavirus in relation to data protection. [https://ec.europa.eu/commission/presscorner/detail/en/ip_20_669] Italy (18)

42. Action
Development of a post-pandemic policy (for example disposal of sensitive data).

Implementation resources
- Turkey: Outputs and lessons learned from Turkish MoH’s RUHSAD (Mental Health Support System) system, which is a psychological support system for health professionals can be used for post-pandemic policy development activities. Data regarding the usage of the system, user count, difficulties regarding providing the service can be valuable for a permanent healthcare professionals support system that can be installed in the post-pandemic period. Turkey Sept 2020 (7)

Recommendation
- A template post-pandemic policy be developed for inclusion as an appendix for this report.
## Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Psychological support</th>
</tr>
</thead>
</table>
| **Canada April 2020** | Three priority areas at this time are assessment/triage, accelerating virtual care to allow for remote encounters and **mental health offerings** to help people deal with the pandemic.  
See also Standards Disease Surveillance Data Pooling Information & Triage Psychological Support TeleHealth Infrastructure |
| **India Sept 2020** | • India has initiated Toll Free number for Psychosocial issues – Citizens and Health service providers.  
• Designed Short Video on behavioral health - psycho-social support for Health professionals and citizens like  
  - Addressing Psychosocial Concerns of Healthcare Workers,  
  - addressing the Stigma around #COVID-19  
  - Stress management etc.  
• Launched integrated Government Online Training (iGoT) e-platform to train doctors, nurses, paramedics, govt. officers, police officers etc. to combat COVID-19. Integrated Government Online Training (iGoT)  
For more detail, please refer [https://www.mohfw.gov.in/](https://www.mohfw.gov.in/)  
See also Training Standards Disease Surveillance Data Pooling Information & Triage Psychological Support Call Center Psychological support Contact Training TeleHealth Contact Tracing Testing |
| **Russian Federation Oct 2020** | Psychological support tools  
Unified hotline 8-800-2000-112 +7 (495) 150-54-45 - Psychological support services in Moscow free.  
See also Governance, Policy and regulations Privacy & Security Disease Research Investment Strategy Psychological support  
Training Standards Disease Surveillance Data Pooling Information & Triage Psychological Support Call Center Psychological support Contact Training Testing |
| **Turkey Sept 2020** | We use **RUHSAD (psychological support system for health professionals)** to mentally support healthcare professionals.  
See also Standards Disease Surveillance Data Pooling Information & Triage Psychological Support Contact Training Testing Quarantine monitoring |
| **Turkey Sept 2020** | We use **RUHSAD (psychological support system for health professionals)** to mentally support healthcare professionals.  
See also Standards Disease Surveillance Data Pooling Information & Triage Psychological Support Contact Training Testing Quarantine monitoring |
3. Track, tracing and testing

3.1. Contact Tracing, Geofencing, Isolation Tracing

Contact tracing is an essential public health measure and a critical component of comprehensive strategies to control the spread of COVID-19. Contact tracing breaks the chains of human-to-human transmission by identifying people exposed to confirmed cases, quarantining them, following up with them to ensure rapid isolation, and testing and treatment in case they develop symptoms. When implemented systematically and effectively, these actions can ensure that the number of new cases generated by each confirmed case is maintained below one. WHO (58) This paper classifies digital tools for contact tracing and key considerations into and discusses considerations for implementation, opportunities and challenges including:

- Outbreak response tools
- Proximity tracing tools
- Symptom tracking tools

43. Action

Access to digital health tools to support contact tracing Geofencing and Isolation Tracing.

Implementation resources

- **WHO:** Contact tracing in the context of COVID-19 (includes Tools section) https://www.who.int/publications/i/item/contact-tracing-in-the-context-of-covid-19 Page 5 & 7 (59)
- **Go.Data:** a data collection platform focusing on case data (including lab, hospitalization and other variables though case investigation form) and contact data (including contact follow-up). Main outputs from the Go.Data platform are contact follow-up lists and chains of transmission. The tool supports multiple languages and includes usage of the optional mobile app for iOS and Android. The mobile app is focused on case and contact data collection and contact follow-up. WHO (13)
- **CommCare:** a data collection platform by Dimagi to support organizations and governments with their ongoing COVID-19 response efforts, Dimagi is providing free resources for our open source digital health platform, https://confluence.dimagi.com/display/commcarepublic/CommCare+for+COVID-19 Global Fund (11) (60)
- **USA:** CDC contact tracing information can be found at https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/digital-contact-tracing-tools.html:
- **Germany:** Corona Warn App https://github.com/corona-warn-app (see case studies) (61)
- **India:** AarogyaSetu application, an open-source cross-platform CoVID-19 (3)
- **Italy:** National contact tracing App IMMUNI www.immuni.italia.it (18)
- **Canada:** COVID Alert app exposure notification app code is open source https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/covid-alert.html#a2 (62)

44. Action
Operationalize the additional digital health foundations necessary to support Contact Tracing, Geofencing, and Isolation Tracing as part of the emergency response.

Implementation resources

45. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support contact tracing Geofencing and Isolation Tracing as part of the emergency response. In addition to the actions above on Privacy and Security.

Privacy and Security statement should be reviewed to ensure changes on any changes relevant to the pandemic are enabled such as the collection, use, disclosure and storage of personal information. It is anticipated the Privacy and Security statement will incorporate:
- What information is collected and held
- Data uses and disclosures
- Data Sharing
- Data Security
- User rights.

Implementation resources
• WHO: Ethical considerations to guide the use of digital proximity tracking technologies for COVID-19 contact tracing [https://www.who.int/publications/i/item/WHO-2019-nCoV-Ethics_Contact_tracing_apps-2020.1] (63)
• OECD: Tracking and tracing COVID: Protecting privacy and data while using apps and biometrics [https://read.oecd-ilibrary.org/view/?ref=129_129655-7db0lu7dto&title=Tracking-and-Tracing-COVID-Protecting-privacy-and-data-while-using] (64)
• UNICEF & GOVLAB: Responsible Data for Children (RD4C): guidance, tools and leadership to support the responsible handling of data for and about children. [https://rd4c.org/files/rd4c-report-final.pdf] (23)
• EU: Guidance on privacy and data protection for APPS supporting the fight
against COVID-19. European Commission has published guidance on the
development of new apps that support the fight against coronavirus in relation
data protection.
https://ec.europa.eu/commission/presscorner/detail/en/ip_20_669 Italy (18)

- Italy: National law to allow the use of contact tracing APP Decree n.28 on April 30,
2020 article 6 https://www.gazzettaufficiale.it/eli/id/2020/04/30/20G00046/sq Italy
(18)

46. Action
Development of a post-pandemic policy (for example disposal of sensitive data).
Recommendation
- A template post-pandemic policy be developed for inclusion as an appendix for this report.

Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Contact Tracing, Geofencing, Isolation Tracing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia Oct 2020</td>
<td>The COVIDSafe App assists state and territory health officials to contact people who have come into close proximity with other App users who have been diagnosed with COVID-19. The App is voluntary to use, and no geo-location is collected. Australia’s Privacy Act Amendment (Public Health Contact Information) Act 2020 supports the COVIDSafe App and provides strong ongoing privacy protections. See also Standards, Data Pooling, Information &amp; Triage. Further information regarding Australia’s digital health response to COVID-19 is available online at <a href="https://covid-19.digitalhealth.gov.au/">https://covid-19.digitalhealth.gov.au/</a></td>
</tr>
<tr>
<td>Austria Oct 2020</td>
<td>At all steps, contact tracing of epidemic cases is supported and facilitated by Austria’s centralized Epidemic Reporting System EMS. It acts as a single real-time and synchronized source of truth for all organizations involved, while providing standardized interfaces for data exchange in line with the HL7 convention and Clinical Document Architecture CDA. Around these interfaces, local and national tracing bodies built custom solutions according to their specific needs and covering the whole process end-to-end. A designated mobile app for tracing called “Stopp Corona” was developed in cooperation with the Austrian Red Cross. See also Standards, Disease Surveillance, Data Pooling, Information &amp; Triage, Call Center, Contact Tracing, Testing, ePrescribing, EHR.</td>
</tr>
<tr>
<td>Brazil Sept 2020</td>
<td>The Ministry of Health has made available the application “Corona Virus SUS”, which has a mechanism for monitoring contact with exposure notification (Contact tracing). This mechanism was developed through a partnership between Google and Apple to assist governments and the global community in combating the COVID-19 pandemic, with the purpose of reducing the spread of the virus. It is a secure mechanism, without exposure of citizen data, in which the citizen download the application and share the result of his positive test, through bluetooth, another citizen who also has access to the application can receive a notification if it is close to a person already infected. Corona virus SUS app. The application “Corona Virus SUS” was developed for the citizen to access general information about COVID-19. There are information that is easy to understand, presented in a simple and didactic way, so that it can reach the population in general. The essential information is: guidelines on corona virus, symptoms, ways of transmission, means of prevention, use of masks, surveillance and notification of cases in Brazil, diagnosis, vaccine, medication, treatment, information for travelers and Fake News. In addition to the essential information is also available updated news in real time, all published through the Ministry of Health. The application can be accessed on the <a href="http://www.coronavirus.saude.gov.br">http://www.coronavirus.saude.gov.br</a> and at the app stores.</td>
</tr>
</tbody>
</table>

See also Infrastructure, Usability and availability, Governance, Policy and regulations, Call Center, Testing, TeleHealth, Quarantine.
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Contact Tracing, Geofencing, Isolation Tracing</th>
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</thead>
<tbody>
<tr>
<td>Global Fund April 2020</td>
<td>The Global Fund coordinates closely with WHO and other international public health actors to support tools development globally and in country. Some of the global good players that developed strong tools during Ebola (<a href="https://www.commcare.org">CommCare</a>, <a href="https://www.medicmobile.org">MedicMobile</a>, <a href="https://mhero.org">mHERO</a>, <a href="https://www.somas.org">SOMAS</a>) have been quick to pivot for COVID-19. Our private sector partners have also offered access to tools that support system interoperability, teleworking, cyber security assessment and data analysis (Microsoft, Google, Zenysis, Mastercard).</td>
</tr>
<tr>
<td>India July 2020</td>
<td>Contact Tracing and Isolation Tracing India has developed an AarogyaSetu application, an open-source cross-platform CoVID-19 &quot;Contact tracing, Syndromic mapping and Self-assessment&quot; digital service, primarily a mobile app. The app reached 100 million installs in 40 days. Currently, more than 120 million India are using AaogyaSetu App It is a tracking app which uses the smartphone's GPS and Bluetooth features to track the coronavirus infection. With Bluetooth, it tries to determine the risk if one has been near (within six feet of) a COVID-19 - infected person, by scanning through a database of known cases across India. Using location information, it determines whether the location one is in belongs to one of the infected areas based on the data available. In 2 months, more than 120 million downloads have done. The AarogyaSetu app developed for the citizens is also capable of tracking isolation of the confirmed cases based on geo location of the individual. Learn more: <a href="https://esanjeevani.gov.in">eSanjeevani</a></td>
</tr>
<tr>
<td>Italy April 2020</td>
<td>Contact Tracing In Italy two open calls to assess the state of both telemedicine solutions and mobile apps for contact tracing have been launched and completed. The selected two solutions of mobile apps for contact tracing, are currently at the</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Contact Tracing, Geofencing, Isolation Tracing</td>
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<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Italy Sept 2020</td>
<td>Contact tracing app now available with free number service to support the contact tracing app (for citizens and health professional) (<a href="https://www.immuni.italia.it">https://www.immuni.italia.it</a>)</td>
</tr>
<tr>
<td>The Netherlands April 2020</td>
<td>Contact Tracing Several apps that collect volunteer data on adherence to social distancing norms, possible contacts (numbers only) and health status to monitor the containment measures effects. For symptom checker and infection tracking &amp; tracing we are looking at frameworks like DP-3T, PEPP-PT and PACT (MIT), that have cross-border implications as well. The European Commission and the WHO are very active in this area as well, supporting member states.  • PEPP-PT <a href="https://pepp-pt.org">https://pepp-pt.org</a>  • DP-3T <a href="https://dp-3t.org">https://dp-3t.org</a>  • PACT (MIT): <a href="https://pact.cscs.ch">PACT: Private Automatic Contract Tracing</a></td>
</tr>
<tr>
<td>Poland Oct 2020</td>
<td>Contact Tracing, Geofencing, Isolation Tracing  The application ProteGO app -contact-tracing app is in use as of June 2020. The application is voluntary (open source) and based on a decentralized model and Apple&amp;Google API. By using Bluetooth, it allows i.a for contact-tracing and inform users (and health authorities) of exposure to an infected person. Moreover, the app provides users with verified medical advice as well as a risk-assessment. This tool is helpful in epidemiological analysis and in taking decisions which people should be subject to home quarantine. <a href="https://www.gov.pl/web/protegosafe">https://www.gov.pl/web/protegosafe</a>  Entry Registration System – a system collecting information on persons entering Poland, developed as of March 2020, enabling collection and sharing of information on persons under obligatory quarantine. The system also comprises a tool to process tests for COVID-19 and their results.</td>
</tr>
<tr>
<td>Portugal April 2020</td>
<td>Contact Tracing In terms of mobile approach and tracing, PT currently isn’t focusing on development of tracing app but on promotion, monitoring and Self-care. “Contact Tracing App”, under assessment if proven efficiency vs impact in privacy. Interoperability between existing system will be guarantee in the mApp, symptom checker (this functionality will be used in the app as well), connected with “TRACE COVID-19 System” (Surveillance and Monitoring) and NHS24 referral system.</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Contact Tracing, Geofencing, Isolation Tracing</td>
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<td>---------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Contact Tracing, Geofencing</td>
</tr>
<tr>
<td>Sept 2020</td>
<td>MoH has deployed a tracking application and an application for monitoring, test results sharing and educating cases referred to quarantine.</td>
</tr>
<tr>
<td></td>
<td>See also Standards, Disease Surveillance, Data Pooling, Information, Call Center, Contact Tracing, Testing, TeleHealth, Quarantine monitoring, ePrescribing, Sick Leave, EMR, Facility Manager, Supply chain, Vaccine Mgt</td>
</tr>
<tr>
<td>Singapore</td>
<td>Safe Entry - a national digital check-in system developed by the Government Technology Agency (GovTech), which logs an individual's entry into a venue.</td>
</tr>
<tr>
<td>Sept 2020</td>
<td>There are three methods of SafeEntry:</td>
</tr>
<tr>
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<td>- SafeEntry QR – users can easily scan the QR code at locations that require SafeEntry check-ins. From there, they will be redirected to a browser page to key in their personal particulars and complete their check-in.</td>
</tr>
<tr>
<td></td>
<td>- SafeEntry with SingPass Mobile (SPM) – integrated into the widely-used national identity SPM app as a means to streamline the check-in process. When authenticating through SingPass (national identity authentication), users need not enter their details manually. Users have the option of scanning the QR code via the in-app scanner or selecting from a list of nearby locations to complete the check-in process.</td>
</tr>
<tr>
<td></td>
<td>- SafeEntry NRIC – An alternative technological solution to include the elderly and young without smartphones in contact tracing efforts. Users can simply opt to have their identification cards scanned at the entrances of locations. A digital barcode is also available on both the SingPass Mobile and TraceTogether apps for scanning.</td>
</tr>
<tr>
<td></td>
<td>Should there be a confirmed case at any location, contact tracing can be sped up using information from SafeEntry, which in turn helps prevent new COVID-19 clusters from forming.</td>
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<td></td>
<td>TraceTogether - The TraceTogether Program uses Bluetooth technology to identify people who have been in close proximity with the infected person; users can either use a smartphone app or a standalone Token.</td>
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<tr>
<td></td>
<td>See also Standards, Disease Surveillance, Data Pooling, Information, Call Center, Contact Tracing, Testing, TeleHealth, Quarantine monitoring, EMR, Facility Manager</td>
</tr>
<tr>
<td>Turkey</td>
<td>Isolation tracking</td>
</tr>
<tr>
<td>Sept 2020</td>
<td>Turkey actively utilizes HES (Hayat Eve Sığar – Life Fits Into Home) mobile app for disease surveillance and FITAS (Filiation and Isolation Tracking System) for isolation tracking and HSYS (Public Health Management System) for managing regarding data flows. Users generate HES Codes for interurban travels and their risk status is evaluated with these codes and contact tracking is realized, when necessary.</td>
</tr>
<tr>
<td></td>
<td>See also Standards, Disease Surveillance, Data Pooling, Information, Psychology Support, Call Center, Contact Tracing, Testing, TeleHealth, Quarantine monitoring</td>
</tr>
<tr>
<td>UAE</td>
<td>Contact Tracing, Geofencing, Isolation Tracing</td>
</tr>
<tr>
<td>Sept 2020</td>
<td>UAE immediate response to the pandemic was utilizing the currently implemented digital health technologies like public health solutions, EMR, AI enabled solutions, in addition to deploy new digital health tools like telehealth, virtual clinic, triage, chatbot, central remote consultation call center, contacts tracing, geofencing, and tracking and monitoring of positive cases and quarantine of patients.</td>
</tr>
<tr>
<td>USA</td>
<td>Contact Tracing</td>
</tr>
<tr>
<td>April 2020</td>
<td>USAID created the Digital Square co-investment mechanism to enable</td>
</tr>
</tbody>
</table>
### 3.2. Testing and Results communications

Testing in some form is being used by all countries during the current emergency response. In addition to the current Laboratory Information Systems additional elements of the testing lifecycle in an emergency are being implemented including:

- Listing testing sites on public information systems are as part of the online triaging (see public Information and online triage)
- Post-test communications including:
  - Outlining the timing and process for receiving the results, and what to do while waiting for results
  - Advising the patient of results and next steps
  - Enabling a pathway to ensure test results transition to healthcare providers, the relevant public health official and to EMRs

#### 47. Action

Access to laboratory information systems and post-test communications systems.

**Implementation resources**


#### 48. Action

Operationalize the additional digital health foundations necessary to support test reporting and post-test communications as part of the emergency response. In addition to the actions above on 1.1.1 Digital Health foundations.

**Implementation resources**

- **Turkey’s experience** can be a good example to follow in this respect. Test results are directly sent to the patient’s e-Nabiz PHR account via LBYS (Lab Information Management System) and HSYS (Public Health Management System). All the data flow regarding case tracking, contact tracking, filiation process, home isolation process, treatment details, testing process are administered through these systems. Operational information on additional infrastructure needs can be specified and provided with these systems Turkey Sept 2020 (7).
- **Brazil: COVID-19 test results interoperability specification** The information exchange messages from the laboratories of public and private clinical analyses the individualized information and sent to National Health Data Network (RNDS)
to have been implemented with the HL7 FIHR standard, and the corresponding
documentation is available at
https://simplifier.net/RedeNacionaldeDadosemSade/ Brazil (17)

49. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support test reporting and post-test communications as part of the emergency response. In addition to the actions above on Privacy and Security.

Implementation resources
• Brazil: Protocol for notification of COVID-19 test results This document outlines the necessary laboratory changes required for the National Health Data Network (RNDS) to receive directly from the laboratories of public and private clinical analyses the individualized information of the examinations performed and their respective results. Laboratories must request their accreditation from RNDS to DATASUS, which has provided technical documentation and accreditation system for laboratories, available in the Services Portal (https://servicos-datasus.saude.gov.br/home), based on best practices and interoperability standards. The accreditation flow can be found at: https://rnds.saude.gov.br/wp-content/uploads/2020/07/Infogr%C3%A7ico-acesso-RNDS-via-Portal-de-Servi%C3%A7os.pdf. The information exchange messages about the test results have been implemented with the HL7 FIHR standard, and the corresponding documentation is available at https://simplifier.net/RedeNacionaldeDadosemSade/ (17)

50. Action
Development of a post-pandemic policy (for example disposal of sensitive data).

Recommendation
• A template post-pandemic policy be developed for inclusion as an appendix for this report.

Case Studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria October 2020</td>
<td>Certified testing laboratories are integrated via HL7 interfaces with Austria’s epidemic reporting system EMS. The communication of test results is available in several ways. Communication of negative test results is performed via SMS, email, physical letter or several of these in parallel. For positive test results, in addition, the tested person is called by phone. Moreover, a web portal is provided through which citizens – after appropriate authentication - can look up their individual test result, read in-real-time from a centralized and synchronized database.</td>
</tr>
<tr>
<td>Brazil Sept 2020</td>
<td>Laboratories must request their accreditation from RNDS to DATASUS, which has provided technical documentation and accreditation system for laboratories, available in the Services Portal (<a href="https://servicos-datasus.saude.gov.br/home">https://servicos-datasus.saude.gov.br/home</a>), based on best practices and interoperability standards. The accreditation flow can be found at: <a href="https://rnds.saude.gov.br/wp-content/uploads/2020/07/Infogr%C3%A7ico-acesso-RNDS-via-Portal-de-Servi%C3%A7os.pdf">https://rnds.saude.gov.br/wp-content/uploads/2020/07/Infogr%C3%A7ico-acesso-RNDS-via-Portal-de-Servi%C3%A7os.pdf</a>. The information exchange messages about the test results have been implemented with the HL7 FIHR standard, and the corresponding documentation is available at <a href="https://simplifier.net/RedeNacionaldeDadosemSade/">https://simplifier.net/RedeNacionaldeDadosemSade/</a>. The results of COVID-19 tests from public and private laboratories connected to RNDS are available to citizens and health professionals through the CONECTE-SUS Portal. (<a href="https://conectesus.saude.gov.br/home">https://conectesus.saude.gov.br/home</a>).</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Testing</td>
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<tr>
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</tr>
<tr>
<td>India July 2020</td>
<td>Government of India also launched national mobile I-Lab (Infectious disease diagnostic lab) for COVID-19 testing for last mile testing access. It may be deployed in remote, interior and inaccessible parts of the country and have capability to perform 25 COVID-19 RT-PCR tests/day, 300 ELISA tests/day, additional tests for TB, HIV etc. as per CGHS rates.</td>
</tr>
<tr>
<td></td>
<td><a href="https://pib.gov.in/newsite/bulletinn.aspx">https://pib.gov.in/newsite/bulletinn.aspx</a></td>
</tr>
<tr>
<td>Russian Federation Oct 2020</td>
<td>Testing tools through Information Resource “COVID-19” – lab tests in Unified State Health Information System. (see Governance and Disease Surveillance tools)</td>
</tr>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>Mass testing drive and results communications</td>
</tr>
<tr>
<td>Singapore Sept 2020</td>
<td>Testing Operations Centre Command and Control (TOC C2)</td>
</tr>
</tbody>
</table>
| Turkey Sept 2020                                                                                                                                     | Turkish Government announced that 223 national labs (public and private) were authorized COVID-19 Diagnosis Labs for citizens to apply for COVID-19 testing. Full lab list can be accessed via https://covid19.saglik.gov.tr/TR-68720/covid-19-yetkilendirilms-tani-laboratuvarlarlari-listesi.html
4. Treatment

4.1. TeleHealth / Telemedicine solutions

Telehealth during the current emergency response is being used by many countries to:

- Triage suspected cases of COVID-19 or patients at risk
- Treat mild cases of COVID-19 in the home
- Using health workers who are quarantined
- Supplementing health workforces
- Delivering non-COVID-19 medical and ancillary care remotely

This is reflected in a recent OECD recent report that Telehealth has many potential benefits in the context of COVID-19, as people with mild symptoms can consult from their homes – avoiding potentially infecting others, including much needed health workers, or even themselves if they do not have the virus – and reserving physical capacity in health care units for critical cases and people with serious health conditions unrelated to the outbreak. (40)

The OECD also reported, while the use of telemedicine in the OECD is currently low (OECD [67]), France, England, Japan and the United States are relaxing regulatory barriers (see Figure 8 OECD), and senior government officials and health care leaders are actively urging its use in the current context. For example, restrictions on reimbursement have been lifted in France and the United States so that patients can now consult remotely with any doctor that uses telemedicine, whether or not they have consulted that doctor face-to-face in the past, and the United States Department of Health and Human Services has now waived certain requirements for use of telemedicine under Medicare. Yet, some barriers to wider use, like access to broadband, will be difficult to tackle in the short-term, highlighting the need to strengthen health care provision in rural and low-resource settings.

ITU News, reported on the opportunities and challenges of telemedicine during COVID-19 – and longer term, in India highlighting resource constraints also drive frugal innovations. One example is facilitated teleconsultations led by community healthcare workers. They follow a checklist-based initial assessment and then contact a clinician to provide a real-time consultation. The challenges around ownership of mobile phones and functional literacy required for a self-initiated teleconsultation is easily overcome through this approach. In regions where telecom infrastructure constraints exist, this model could be delivered over feature phones as an interactive voice service.

51. Action

Access to TeleHealth /Telemedicine tools/platforms.

Implementation resources

- WHO: Digital health clearing house: https://innovate.who.int/ (13)
- India: National Teleconsultation Service Tool https://esanjeevaniopd.in/ (3)

Recommendation

- The potential of sharing telemedicine tools and platforms for free / open source during a state of emergency. (Lead by: WHO).

52. Action

Operationalize the additional digital health foundations necessary to support TeleHealth as part of the emergency response. In addition to the actions above on 1.1.1 Digital Health foundations.

Implementation resources

- Recommend the need to have a clear funding/payment approval process. (12)
- WHO: COVID-19 and telemedicine Tool for assessing the maturity level of health Institutions to implement telemedicine services.
53. Action
Establish Guidelines, Training and change management to support the adoption and rollout of TeleHealth.

Implementation resources
- Canada Royal College: Telemedicine and virtual care guidelines
  http://www.royalcollege.ca/rcsite/documents/about/covid-19-resources-telemedicine-virtual-care-e (68)
- Canadian Medical Protective Association (CMPA): Telehealth and virtual care
- Federation of Medical Regulatory Authorities of Canada (FMRAC): Framework on Telemedicine
- Canadian Medical Association: Virtual Care playbook
- India: Telemedicine Practice Guidelines Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine
  https://www.mohfw.gov.in/pdf/Telemedicine.pdf (69)
- Italy: Interim provisions for Telemedicine healthcare services during COVID-19 health Emergency
  https://www.iss.it/documents/20126/0/Rapporto+ISS+COVID-19+n.+12+EN.pdf/14756ac0-5160-a3d8-b832-8551646ac8c7?t=1591951830300 (18)
- Poland: Telemedicine Guidelines for doctors and patients
  http://telemedycyna-poradnik.pl/ (4)
- Singapore: Medical Association, Leveraging on Telemedicine during an Infectious Disease Outbreak
  https://www.sma.org.sg/UploadedImg/files/ncov2019/LeveragingTelemedicineInfectiousDiseaseOutbreak20200212.pdf (70)
- USA: Getting Started (TeleHealth) https://telehealth.hhs.gov/providers/getting-started/ (71)
- USA: CDC, Using Telehealth to Expand Access to Essential Health Services during the COVID-19 Pandemic
- USA: CDC, Framework for Healthcare Systems Providing Non-COVID-19 Clinical Care During the COVID-19 Pandemic
- UK: British Medical Association, COVID-19: video consultations and homeworking
- UK: NHS, Using online consultations in primary care: implementation toolkit
- UK: NHS, Clinical guide for the management of remote consultations and remote working in secondary care during the coronavirus pandemic
  https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf?ua=1 (13)
- WHO: Digital Implementation Investment Guide
  https://www.who.int/publications/i/item/who-digital-implementation-investment-guide (16)

54. Action
Ensure the necessary policies, regulation and legislation are in place including operationalize the relevant additional Privacy and Security necessary to support TeleHealth as part of the emergency response. In addition to the actions above on Privacy and Security.
Implementation resources

- **Australia:** Privacy Checklist for Telehealth Services

- **Brazil:**
  Federal LAW NO. 13,989, OF APRIL 15, 2020
  [https://www.in.gov.br/en/web/dou/-/lei-n-13.989-de-15-de-abril-de-2020-252726328#:~:text=Art.%203%2Cu2013Entende%20por%20telemedicina,lesoes%20e%20promo%C3%A7%C3%A3o%20de%20sa%C3%BAde](https://www.in.gov.br/en/web/dou/-/lei-n-13.989-de-15-de-abril-de-2020-252726328#:~:text=Art.%203%2Cu2013Entende%20por%20telemedicina,lesoes%20e%20promo%C3%A7%C3%A3o%20de%20sa%C3%BAde) (17)

- **EU:**
  Guidance on privacy and data protection for APPS supporting the fight against COVID-19.
  European Commission has published guidance on the development of new apps that support the fight against coronavirus in relation to data protection.

- **Russia:**
  Legislation for telemedicine consultation with a special recommendation for COVID-19 (30)

- **Saudi Arabia:**
  Telemedicine Regulations in the Kingdom of Saudi Arabia

- **Singapore:**
  Health Science Authority, Regulatory Guideline for Telehealth Products

- **Turkey:**
  Telemedicine and Teleradiology Circular.

- **USA:**
  Policy changes during the COVID-19 Public Health Emergency. This includes the Centers for Medicare & Medicaid Services rules and policies to encourage telemedicine visits noted above under section 4 Treatment

- **USA:**
  The Office for Civil Rights at the U.S. Department of Health and Human Services, Announces Notification of Enforcement Discretion for Telehealth Remote Communications During the COVID-19 Nationwide Public Health Emergency

55. Action

Development of a post-pandemic roadmap.
As reported by the World Economic Forum Beyond the pandemic, governments, insurers and healthcare providers need to work together to ensure that the innovation sparked by this crisis endures and accelerates. Post-crisis, telehealth can still help alleviate the pressures posed by healthcare resource shortages, the growing elderly population and issues with healthcare accessibility. However, we need to take steps to ensure that the drawbacks and risks of telehealth can be mitigated. For example, we need to review government regulations to protect patient data privacy and ensure IT network security. Clinical protocols and workflows should be revisited to ensure that remote care is used only for suitable conditions, and that the doctor-patient relationship is not compromised. Proper training needs to be provided for clinical staff as they change their way of working. Very importantly, we need to ensure that our medical insurance systems offer the right incentives to use telehealth (82).

Additionally, some areas may require new initiatives to minimize the risk of fraud and/or inappropriate usage of telehealth services, addressing the potential digital divide to support telehealth adoption in vulnerable communities. The role of personal devices, device integration, methods to support the flow/interoperability of data to enable the integration of care will be important part of the ongoing roadmaps which may not be available during the current emergency response.

Recommendation

- A template post-pandemic policy be developed for inclusion as an appendix for this report.
## Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argentina</strong>&lt;br&gt;April 2020</td>
<td>The Ministry of Health of the Nation has a national telehealth plan. The same has the purpose of developing a national and federal telehealth policy through the use of information and communication technologies, under standards of interoperability, security and privacy of information, that promote safe and quality practices centered on the person. Synchronous and asynchronous telehealth plays a fundamental role in the integration and strengthening of health networks and in improving access to public health. The plan includes addressing the regulatory, economic, health, and technical aspects of Telehealth in Argentina.</td>
</tr>
<tr>
<td><strong>Australia</strong>&lt;br&gt;Oct 2020</td>
<td>In response to the coronavirus pandemic Medicare-subsidised telehealth services for all Australians were introduced to provide continued access to essential primary health services. Australians can access support in their own home using their telephone, or video conferencing features like FaceTime to connect with GP services, mental health treatment, chronic disease management, Aboriginal and Torres Strait Islander health assessments, services to people with eating disorders, pregnancy support counselling, services to patients in aged care facilities, children with autism, after-hours consultations and nurse practitioners. To 30 September 2020, more than 32.8 million telehealth services have been delivered, with a total investment of more than $2.4 billion. The Government has committed to extend the telehealth services for a further six months while the long-term design is developed in conjunction with medical groups and the community. Telehealth for specialists and allied health has also been extended.</td>
</tr>
<tr>
<td><strong>Brazil</strong>&lt;br&gt;April 2020</td>
<td>Please find the Flow of the Pre-Clinical Care System Integrated with the National Health Data Network (RNDS) being utilized in Brazil in Appendix 3. For greater access to health services and to establish alternatives for face-to-face care, the Ministry of Health of Brazil is working aiming mainly at three strategies: 1) the broad clarification of the population about COVID-19 and when to seek health services, helping the correct use of face-to-face services, including primary care, 2) the isolation of the population that is potentially contaminated or at greater risk but does not have signs of seriousness, 3) avoiding the exhaustion of on-site health services as much as possible, whether through home isolation or assistance with remote monitoring through other technologies, or by avoiding contamination by health professionals. The channels of entry to the proposed health services are the 1) ChatBot Service, 2) the Audible Recognition Unit Service (URA), the 3) Pre-clinical Service (SAPC) and 4) remote monitoring. <strong>3) Pre-clinical care service:</strong> The pre-clinical care service reinforces PHC’s assistance capacity by offering remote assistance to the population remotely by nursing technicians, nurses and doctors, to the clinical signs and symptoms of flu-like syndrome and suspected infection by SARS-COV-2 presented, implementing responses based on scientific evidence and clinical algorithms. Among the possible responses and behaviors are: the implementation of measures of pharmacological comfort and home isolation in mild cases, with the sending of a prescription and certificate issued by a doctor at a distance; the timely referral for face-to-face care in a basic health unit or emergency services in cases that require it; and telemonitoring of people in home isolation,</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - TeleHealth</td>
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<td>including post-discharge. Telemonitoring can be associated with the measure of isolation of all residents of the household in which a symptomatic individual was treated, providing the most effective and least harmful home isolation format for the economy. In addition, Flu Syndrome notification can be performed in all cases that meet the notification requirements.</td>
</tr>
<tr>
<td>Canada Oct 2020</td>
<td>The Government of Canada has taken action to help adapt the Canadian health system to the realities of COVID-19. It is investing $200 million to help provinces and territories increase the availability of virtually delivered care so that Canadians can continue to engage safely and securely with their health care providers. Priorities for this funding include: • secure messaging, file transfer and videoconferencing, • remote patient monitoring, • patient online access to test results; and, • needed infrastructure for existing digital systems in this regard In addition, in the work that the federal government is currently doing with provinces and territories on virtual care, an important component has been the development of technical standards for new digital tools.</td>
</tr>
<tr>
<td>Hong Kong Oct 2020</td>
<td>In the Hospital Authority telehealth capabilities have been built into both the unified patient app (HA Go) and the electronic medical record system (CMS). This allows simple and standardised access to Telehealth for both patients and clinicians. It also provides data integration between the patient app and the EMR. Remote monitoring devices are used in the community treatment facilities for COVID-19.</td>
</tr>
</tbody>
</table>
| India July 2020 | eSanjeevani Online OPD: National Teleconsultation Service of Ministry of Health and Family Welfare is first of its kind onlineOPD service offered by a country government to its citizens. National Teleconsultation Service aims to provide healthcare services to patients in their homes. Safe & structured video based clinical consultations between a doctor in a hospital and a patient in the confines of his home are being enabled. More than 10000 Online consultation have been completed on last three Month Salient features of this citizen friendly web-based National Teleconsultation Service (eSanjeevaniOPD) are: • Patient registration • Token Generation • Queue Management • Audio-Video Consultation with a Doctor • ePrescription • SMS/Email Notifications • Serviced by State's Doctors • Free Service • Fully configurable (no. of daily slots, no. of doctors/clinics, waiting room slots, consultation time limit etc.). Learn more: https://esanjeevaniopd.in/ The service is free of cost to all citizens. It has capabilities of doctor to patient as well as doctor to doctor consultations. The Indian Government has published Telemedicine Practice Guidelines ("Telemedicine Guidelines") on March 25, 2020. It is now perfectly legal to provide teleconsultation by registered medical practitioners (M.B.B.S and above) in line with the requirements of the Telemedicine Guidelines. Doctors in India can provide consultation to patients located in any State remotely
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Italy April 2020</strong></td>
<td>In Italy to open calls to assess the state of both telemedicine solutions and mobile apps for contact tracing have been launched and completed. The candidate solutions have been selected by specific expert groups within a Governmental COVID-19 Task force. The selected five solutions of mobile apps for telemedicine will be suggested to be adopted by Regions. In the meantime, in Italy, several Regions have already activated eHealth tools for the management of the COVID-19 pandemic and telemedicine solution (symptom checker, triage, quarantine monitoring). These are not open source/free solutions but there are both solutions whose source code is owned by a public body (for example in Region Lazio) and market solutions (for example in Region Puglia, Lombardia and Trento).</td>
</tr>
<tr>
<td><strong>The Netherlands April 2020</strong></td>
<td>For patient transfer to foreign hospitals (in case of transfer of Dutch patients to German ICU’s) is based on local agreements and tooling.</td>
</tr>
<tr>
<td><strong>OECD May 2020</strong></td>
<td>Use of telemedicine in OECD countries was limited at the onset of the pandemic. Some countries have relaxed restrictions on reimbursement for teleconsultations as well as other legal and policy barriers to the provision of teleconsultations. Other barriers, such as access to broadband internet in rural areas and ICT infrastructure and interoperability problems would be difficult to surmount quickly. <a href="https://www.oecd-ilibrary.org/social-issues-migration-health/bringing-health-care-to-the-patient_be56ede7-en">https://www.oecd-ilibrary.org/social-issues-migration-health/bringing-health-care-to-the-patient_be56ede7-en</a> Further, there are barriers to cross-border collaboration involving exchanges of personal health data that the OECD Council Recommendation on Health Data Governance seeks to address. The Recommendation addresses weaknesses in health information systems’ capacity to meet the needs of a global health emergency, such as data timeliness, quality, suitability for dataset linkages and accessibility; ensuring public transparency of data collection, use and protection; developing efficient exchange and interoperability of health data, including global health data standards; and eliminating unnecessary barriers to public-private and cross-border data sharing and research collaborations. All countries are encouraged to develop a national health data governance framework that adheres to this Recommendation. <a href="https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0433">https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0433</a></td>
</tr>
<tr>
<td><strong>Poland Oct 2020</strong></td>
<td>Poland, as a member of EU actively participates in the eHealth Network – a political body responsible i.a. for shaping the cross-border digital health services. Poland follows advice of European Commission in this regard. The Ministry of Health and the Foundation of Telemedicine Working Group have developed a manual for doctors and patients, which contains basic principles of telemedicine health services provision. These guidelines are available at: <a href="http://telemedycyna-poradnik.pl/">http://telemedycyna-poradnik.pl/</a> The number of teleconsultations in primary healthcare has risen to 80% during the pandemic.</td>
</tr>
<tr>
<td><strong>Portugal April 2020</strong></td>
<td>In terms of TeleHealth there is place only National/regional and local implementation of such technologies.</td>
</tr>
</tbody>
</table>

See also Standards, Disease Surveillance, Data Pooling, Information & Triage, ePrescribing, eSick Leave, EMR, Call Center, TeleHealth, Quarantine, Contact Tracing, Supply Chain Management, Psychological Support, Facility Management.
### Country/IO: Russian Federation
#### Description - TeleHealth

<table>
<thead>
<tr>
<th>Surveillance</th>
<th>A&amp;I</th>
<th>Tracing</th>
<th>Monitoring</th>
</tr>
</thead>
</table>

**See also**
- Governance, Privacy & Security
- Disease Surveillance
- Data Pooling
- Information Management
- Call Center
- Contact Tracing
- Testing

**Training Standards**
- TeleHealth
- Quarantine monitoring
- ePrescribing
- eSick Leave

**TeleHealth**
- EMR
- Facility Manager

**All TeleHealth Services are compliant with the National TeleHealth Policy.**

### Country/IO: Saudi Arabia
#### Description - TeleHealth

Digital technology has enabled people to stay connected during the crisis. Similarly, digital health technologies enable virtual healthcare services to be provided to reduce the demand on face to face healthcare services fighting the pandemic. The option of virtual care has been an especially important tool to protect our most vulnerable and/or chronically ill patients. The Ministry’s suite of virtual healthcare tools includes the Sehhaty application which enable individuals to continue receiving health and preventive care at their homes and to enjoy audio-video medical consultations electronically from their physicians. Virtual Care was complimented with electronic prescriptions and medication was delivered to patients’ homes. Saudi is using other tele approaches including:

- Virtual Clinic allows patient to be monitored in their homes from both the primary health care, hospital providers and Specialized Centers.
- Tele-ICU that provide partially now some of ICUs, and expansion is under progress.
- The National Tele-Radiology platform that provide remote diagnostic services

Additionally, robots have also been utilized in our isolation wards in hospitals.

**All TeleHealth Services are compliant with the National TeleHealth Policy.**

### Country/IO: Singapore
#### Description - TeleHealth

As part of the Government’s COVID-19 response, the Ministry of Health (MOH) explored the expansion of telehealth services to ensure accessibility of healthcare to limit the spread and exposure to the virus.

Notable ongoing initiatives are:

(A) **Temporary extension of video-consultation subsidies for select chronic conditions** seen by private medical clinics;

(B) **Centralised teleconsultations** and accompanying medication delivery for those whose movement has been restricted due to COVID-19 (e.g. those under quarantine order).

(C) **Deployment of tele-kiosks** and accompanying vital signs monitoring equipment to facilitate one-click teleconsultation access across a number of residential locations, to further boost residents’ access to care.

(D) **Deployment of mobile nursing teams supported by Telemedicine doctors.** as an additional measure to medical force multipliers to ensure that those whose movement has been restricted due to COVID-19 are able to receive timely and good quality medical support.

Deployment of these initiatives was possible in part due to the Regulatory Sandbox, which was put in place in 2018 to better understand the risks associated with telemedicine and co-create regulations for the service with the landscape. Going forward, for Singapore’s continued COVID-19 response and beyond, the Government will continue to work closely with professional bodies, industry players, as well as consumers, to realise the full potential of telehealth while continuing to ensure patient safety and welfare.

**See also**
- Training Standards
- Call Center
- Contact Tracing

**Testing**
- TeleHealth
- Quarantine monitoring
- EMR
- Facility Manager

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<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden April 2020</td>
<td>Yes, efforts are being made to implement e-prescriptions and cross border Electronic Health Records EHRs.</td>
</tr>
<tr>
<td>Turkey April 2020</td>
<td>We use extensive Telemedicine infrastructure, which is the largest radiological archive in the world. For triage management, system development and improvement efforts are still ongoing.</td>
</tr>
<tr>
<td>UAE Sept 2020</td>
<td>UAE immediate response to the pandemic was utilizing the currently implemented digital health technologies like public health solutions, EMR, AI enabled solutions, in addition to deploy new digital health tools like telehealth, virtual clinic, triage, chatbot, central remote consultation call center, contacts tracing, geofencing, and tracking and monitoring of positive cases and quarantine of patients. These solutions are not open source solutions, but offered from the technology companies as a contribution to the pandemic management. UAE published recently two laws to regulate the telehealth services and the use of ICT in the healthcare fields. These laws cover the cross-borders sharing of data.</td>
</tr>
<tr>
<td>United Kingdom April 2020</td>
<td>We have offered MS Teams to all NHS mail users. This is a secure communication tool to allow instant messaging and audio and video calling in healthcare settings. We have offered PSTN licenses for MS Teams free of charge. We are involved in a number of cross border initiatives to support patient movement within the UK. Also Attend Anywhere is used in England and Scotland. Further information is available on NHS Digitals COVID-19 support to health and social care in England to respond to the Pandemic <a href="https://digital.nhs.uk/coronavirus/nhs-digital-coronavirus-programme-updates/programme-updates-29-july-2020">https://digital.nhs.uk/coronavirus/nhs-digital-coronavirus-programme-updates/programme-updates-29-july-2020</a> This report is updated on a regular basis please check the NHS Digital Website Corona for the most up to date information. <a href="https://digital.nhs.uk/coronavirus">https://digital.nhs.uk/coronavirus</a></td>
</tr>
<tr>
<td>Uruguay April 2020</td>
<td>Provide a technological tool allowing patients and health professionals interact in a way that patients remain in their homes and professional avoid contact with them, making possible for all of them taking care of their health. Within the health digital strategy teleconsultation and telemedicine tools are being used. Also, we implemented an AI algorithm to classify the patient’s risk by a questionnaire in order to perform population screening. We are not using resources outside the country, the only exception are the expert medical panel in Latin America and Caribbean (LATAM) given through the ECHO project.</td>
</tr>
<tr>
<td>USA April 2020</td>
<td>USAID has invested in a number of telehealth solutions, such as through the Digital Regional East Africa Community Health Initiative (Digital REACH), Sub-Saharan Africa's first regional digital health strategy that includes Telemedicine Networks for East African Tertiary Healthcare Services (NEAT), and the use of cloud computing for health data warehousing. USAID also has invested in telemedicine in the context of past disease outbreaks, such as in connecting Spanish-speaking experts from the American Academy of</td>
</tr>
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</table>
### 4.2. Quarantine monitoring

Quarantine monitoring incorporates:

- Compliance with isolation orders
- Patients and carers can conduct online tracking of symptoms and request ongoing guidance
- TeleHealth and Telemonitoring instead of acute care and post-acute care (see 4.1 above) - [OECD](https://www.oecd.org/officialdocuments/publicdisplaydocumentdata/78eb27f3-dea7-4a71-942d-c2f637449ed2-en.pdf) in a recent report highlighted that Telehealth has been used to monitor the health and wellbeing of people who have been diagnosed with COVID-19, both less severe patients who are able to stay at home and more critical cases who need to be hospitalized. With tele-monitoring already being used to follow mostly chronic patients in at least 14 OECD countries ([OECD](https://www.oecd.org/officialdocuments/publicdisplaydocumentdata/78eb27f3-dea7-4a71-942d-c2f637449ed2-en.pdf)), Korea, Israel and Hong Kong China are using wearables and communication technologies to remotely monitor patients with COVID-19 at home, catching signs of possible deterioration, and adding to health researchers’ understanding of how the disease develops. (40)

56. **Action**
   - Access to quarantine monitoring tools.

**Implementation resources**


57. **Action**
   - Operationalize the additional digital health foundations necessary to support quarantine monitoring as part of the emergency response. In addition to the actions above on 1.1.1 Digital Health foundations this may include the distribution of devices where required.

**Implementation resources**

- **Turkey** - EU-financed ProEmpower H2020 project aims to develop mHealth solutions for online tracking of people with diabetes mellitus and ProEmpower, just like the Korea, Israel and Hong Kong examples, can be a source of additional infrastructure with its multi-national formation and also adds private sector in the game. Apart from that, as a notion, mHealth is a very important aspect of TeleHealth and Telemonitoring. For more information: [https://proempower-pcp.eu/](https://proempower-pcp.eu/) Sept 2020 (7)

58. **Action**
   - Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support Quarantine monitoring as part of the
emergency response. In addition to the actions above on Privacy and Security and TeleHealth.

**Implementation resources**

- **Canada**: Lessons learned from other tools such as the Canada COVID-19 app, the COVID Alert app, and Wellness Together Canada, could also be shared with G20 partners, particularly with respect to considerations around privacy and the importance of public confidence therein.

**Recommendation**

- International collaboration to develop a template for a quarantine management policy that finds a balance between privacy and the national good.

59. **Action**

**Development of a post-pandemic policy** (for example disposal of sensitive data).

**Recommendation**

- A template post-pandemic policy be developed for inclusion as an appendix for this report.

**Case studies**

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Quarantine monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argentina</strong> April 2020</td>
<td>From the Ministry of Health page <a href="https://www.argentina.gob.ar/coronavirus/app">https://www.argentina.gob.ar/coronavirus/app</a> it is possible to download an app designed so that people can carry out a COVID-19 symptom self-assessment -19. The next step is to incorporate new features into it, so that it becomes a communication tool and population monitoring. In this way, it will allow anticipating actions to be taken in the situation of a person with symptoms, receiving recommendations for action. Another feature includes information about the day of quarantine being fulfilled, and a symptom log that will be saved in the Ministry's database. The data provided through the Using the app, they will allow you to generate statistics and geolocation analysis of infected people who are in quarantine.</td>
</tr>
</tbody>
</table>
| **Brazil** April 2020 | Please find the Flow of the Remote Monitoring Integrated with the National Health Data Network (RNDS) being utilized in Brazil in Appendix 3. For greater access to health services and to establish alternatives for face-to-face care, the Ministry of Health of Brazil is working aiming mainly at three strategies: 1) the broad clarification of the population about COVID-19 and when to seek health services, helping the correct use of face-to-face services, including primary care; 2) the isolation of the population that is potentially contaminated or at greater risk but does not have signs of seriousness; 3) avoiding the exhaustion of on-site health services as much as possible, whether through home isolation or assistance with remote monitoring through other technologies, or by avoiding contamination by health professionals. The channels of entry to the proposed health services are the 1) ChatBot Service, 2) the Audible Recognition Unit Service (URA), the 3) Pre-clinical Service (SAPC) and 4) remote monitoring. **Remote monitoring**: Remote monitoring will take place for all reported cases (suspicious or confirmed) in order to check and identify the worsening of the condition, carrying out the search guidance for the nearest health service or use of the Pre-clinical care service (SAPC). This monitoring will be done preferably by the Audible Recognition Unit Service, with options for the citizen to inform, in a simplified way, the stability, improvement or worsening of their general health situation, with the possibility of triggering the Pre-clinical care service or guidance on the nearest health unit in cases of aggravation. The attendants/health professionals are organized by response levels, the first level being made up of nursing technicians and the second level, by nurses, both being guided by medical professionals. Such professionals, supported by a technological structure that makes contact possible within 20 seconds of the moment of contact with the health professional, have their conduct guided by scientific evidence, responding remotely, and in a safe way, to the health needs.
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Quarantine monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>India July 2020</td>
<td>The AarogyaSetu app as discussed above, helps people in home quarantine. It also helps uninfected people identify their risk levels when they are in the vicinity of people who have been tested positive and are quarantined, so that they can take appropriate security measures and stay home to reduce chances of infection.</td>
</tr>
<tr>
<td>Italy April 2020</td>
<td>Several Regions have already activated eHealth tools for the management of the COVID-19 pandemic and telemedicine solution (symptom checker, triage, quarantine monitoring)</td>
</tr>
<tr>
<td>The Netherlands April 2020</td>
<td>Regionally there are COVID-19 patient self-management support apps that link home-quarantined patients to care professionals and trusted information sources. Also monitors disease development and symptom development.</td>
</tr>
<tr>
<td>Poland April 2020</td>
<td>Home quarantine app - a mandatory tool to monitor isolated persons: Each person qualified for home quarantine is required to download an app on their mobile device to enable authorities to remotely monitor whether the isolated person obeys the quarantine order or not. It’s also a basic assessment of her/ his health and direct reporting of danger.</td>
</tr>
</tbody>
</table>
| Portugal April 2020        | Systems for the Citizen:  
  - Self-report: functionality that allows the citizen to report their symptoms for doctors monitorization                                                                                                    |
<p>| Russian Federation Oct 2020| Quarantine monitoring tools through personal transport cards and through mobile phone with geo-location                                                                                                                                  |</p>
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - Quarantine monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>KSA have leveraged quarantine monitoring tools to streamline the quarantine and ensure the safety of our citizens. Tataman/Tawakalna applications coupled with bracelets was used to monitor patients’ health and symptoms during their quarantine period where human interaction was limited to on-demand or cases needing immediate intervention. Additionally, an exposure notification application “Tabaud” was utilized to notify individuals of their exposure to COVID-19 where they can be eventually provided with proper management.</td>
</tr>
<tr>
<td>Singapore Sept 2020</td>
<td>The Homer App is a mobile application developed by the Government Technology Agency (GovTech) and implemented for Persons Under Quarantine (PUQs) in April 2020, to enhance PUQ surveillance.  • This APP allows health reporting and constant monitoring of PUQ via GPS location acquired from PUQ's smartphone.  • Currently PUQ with smartphone, will receive SMS notification on the Homer App’s download, and are required to download Homer APP for health and location violation monitoring.  • The Homer APP serves a supplement to the existing quarantine tracking systems, to monitor and control the community spread of Covid-19.</td>
</tr>
<tr>
<td>Turkey Sept 2020</td>
<td>Turkish MoH has already put HES (Hayat Eve Sığar – Life Fits Into Home) and FITAS (Filiation and Isolation Tracking System) into service.</td>
</tr>
</tbody>
</table>

4.3. ePrescribing

60. Action
Access to e Prescribing tools.

Implementation resources
- India: National Teleconsultation Service Tool [https://esanjeevaniopd.in/](https://esanjeevaniopd.in/) includes ePrescribing (3)

61. Action
Operationalize the additional digital health foundations necessary to support ePrescribing as part of the emergency response. In addition to the actions above on 1.1.1 Digital Health foundations. This may include the distribution of devices where required.

Implementation resources
- With the use of existing communication channels like SMS and email (see infrastructure implementation resources)
- Austria: Standards-based architecture and Interoperability Specifications for nation-wide e-Prescribing/e-Dispensing infrastructure, fully operational as part of the Austrian National eHealth Infrastructure (ELGA), [http://www.elga.gv.at](http://www.elga.gv.at) (31)

62. Action
Ensure the necessary policies, regulation and legislation are in place to support ePrescribing including operationalize the additional Privacy and Security necessary to support ePrescribing as
part of the emergency response.

Implementation resources

- **Australia:** Prescriptions via telehealth – state and territory rules  

- **Italy:** ePrescription legislation to digitalize therapeutic plans and ePrescription summary  
  Decree March 25th, 2020  
  [https://www.gazzettaufficiale.it/eli/id/2020/03/31/20A01881/sq](https://www.gazzettaufficiale.it/eli/id/2020/03/31/20A01881/sq) (18)

- **Turkey:** ePrescription service, related Circular,  
  [https://titck.gov.tr/storage/legislation/ere%C3%A7ete%20genelge%202018-2.pdf](https://titck.gov.tr/storage/legislation/ere%C3%A7ete%20genelge%202018-2.pdf)  
  Turkey Sept 2020 (7)

- **England:** NHS, Electronic Prescription Service (EPS): GDPR information  

63. Action

Development of a post-pandemic policy (review of policies, privacy & security).

Recommendation

- A template **post-pandemic policy** be developed for inclusion as an appendix for this report.

### Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - ePrescribing</th>
</tr>
</thead>
</table>
| Australia Oct 2020 | Currently there are a number of initiatives being led by the Australian Digital Health Agency (the Agency) utilising digital technologies during COVID-19 to support Australians manage their own health needs, including ePrescribing.  
  The Department of Health and the Agency fast tracked the final implementation and approach to electronic prescribing adoption during COVID-19. This work focused on providing assistance to software developers to expedite the changes required to allow uptake of electronic prescribing by health professionals and dispensing by pharmacists.  
  Electronic prescriptions have now been tested through communities of interest across Australia. Implementation of electronic prescribing is focusing on COVID-19 hot spot areas with a national rollout to occur over the coming months  
| Austria October 2020 | As response to the COVID-19 crisis, ePrescribing has been introduced to reduce patient/physician contacts.  
  The “e-Medication” service is an eHealth application operated on the Austrian National eHealth Infrastructure (ELGA). This is a nation-wide, fully deployed and operational service, available to all citizens for documenting the patient’s prescriptions and dispenses in order to provide the patient’s medication list. It’s supposed to be used by physicians and pharmacists for “clinical purposes” to support prescribing, avoid double-prescriptions, medication interaction checking, etc.  
  As response to the COVID-19 crisis, this system is now used additionally to electronically prescribe medication without physical presence of the patient at the prescriber to reduce the physical contact to physicians in cases appropriate, such as telephone order of permanent medication, prescribing to fulfill medication treatment plans of well-known patients, etc. The patient may get its medication in the pharmacy with the electronic prescription online available.  
  Link: [http://www.elga.gv.at](http://www.elga.gv.at)  |
<p>| India July 2020    | eSanjeevani Online OPD is first of its kind onlineOPD service offered by a country government to its citizens. National Teleconsultation Service aims to provide  |</p>
<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description - ePrescribing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland Sept 2020</td>
<td>The e-prescription in Poland has been deployed as a national service, available countrywide. From the beginning of 2019, the e-prescription is accepted in all pharmacies across Poland. In turn, from beginning of 2020, there is an obligation to issue prescriptions in an electronic version. The share of e-prescription increased to 95.7% in June this year, while in February just before the pandemic it was 88.2%. e-Prescription is one of a key elements of the COVID-19 response and healthcare sector resilience building.</td>
</tr>
<tr>
<td>Russian Federation Oct 2020</td>
<td>ePrescribing tool are part of Unified State Health Information System (see Governance and Disease Surveillance tools)</td>
</tr>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>Electronic prescriptions are utilized at point of care and quarantine locations where they are delivered to patient’s homes. A physician can transmit an electronic prescription to a retail pharmacy directly from the point of care (primary care centers, 937, SeHHA, Anat applications). Patients receive a message and can dispense medication from the nearest retail pharmacy.</td>
</tr>
<tr>
<td>Turkey Sept 2020</td>
<td>We use e-Prescription solution for over two years as the sole prescribing method all around the country. MEDULA, the reimbursement system is also linked with ePrescription service, therefore Ministry of Labour and Social Security and Ministry of Health has been cooperating accordingly.</td>
</tr>
</tbody>
</table>

### 4.4. eSick Leave

<table>
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<tr>
<th>64. Action</th>
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</table>

Access to eSick Leave tools.

#### Implementation resources
## Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description- eSick Leave</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>India July 2020</strong></td>
<td>India has developed and implemented <strong>eOffice System</strong> which aims to support governance by ushering in more effective and transparent inter and intra-government processes. Learn more: <a href="https://eoffice.gov.in/about_us.php">https://eoffice.gov.in/about_us.php</a></td>
</tr>
<tr>
<td><strong>Poland Sept 2020</strong></td>
<td>The Patient's Internet Account (IKP) is Poland's digital health services platform. Following a secured logging in, every citizen has access to their personal health data including e-sick leaves. From the beginning of 2018, patients receive only electronic leaves. The process is fully digitalized and automatized, it allows for granting e-sick leaves remotely to individual patients and its distribution to relevant institutions i.a. employers. <a href="https://www.zus.pl/ezla">https://www.zus.pl/ezla</a></td>
</tr>
<tr>
<td><strong>Russian Federation Oct 2020</strong></td>
<td>eSick Leave Facility is provided by special governmental tool on-line.</td>
</tr>
<tr>
<td><strong>Saudi Arabia Sept 2020</strong></td>
<td>eSick leave service allows each patient, his/her companion, and their employer to access the sick leave electronically. This service aims to issue electronic sick leaves, by means of linking the relevant bodies, namely: the Ministry of Health (MOH), the Ministry Interior (MOI), the Saudi Commission for Health Specialties, and the Ministry of Civil Service (MCS). The service automates the procedures among these bodies in an integrated manner through e-connectivity; thus, enabling the health service provider to issue such sick leaves and share them with beneficiaries electronically. The sick leave report can be shared electronically with MCS, as well as the ultimate beneficiary via SMS, in addition to the ability to print the report from the Portal.</td>
</tr>
</tbody>
</table>

### 4.5. Electronic Medical Records/ Patient Management

#### 65. Action

Access to Medical record tools and interoperability platforms.

**Implementation resources**

- **OpenMRS** [https://openmrs.org/](https://openmrs.org/) is a collaborative open-source project to develop software to support the delivery of health care in developing countries. During the current emergency response the OpenMRS community’s goal is to support extension of current functionality that will make it easier for 5,500 existing implementations to a) screen, test, and manage patients and b) report data out efficiently to DHIS2 for public health surveillance (85). (86) USA (12)

- **OpenSRP** [https://smartregister.org/](https://smartregister.org/) is a software system designed for Ministries of Health to transition from paper registers to digital patient systems, to empower health providers to manage the health of their populations with decision-support and data monitoring in-line with WHO recommendations. OpenSRP is an open-source and standards-based community health information software system that complements and adds value to other “global good” digital health information systems, including medical records systems (OpenMRS), health management information systems (DHIS2), logistics information systems
(OpenLMIS), and messaging platforms (RapidPro) that are often deployed at scale. OpenSRP modernizes the ubiquitous paper client registers and logbooks, enabling health workers to account for services and track the health of their patient population. (85) (87) (88) USA (12)

- Community Health Toolkit by Medic Mobile [https://medicmobile.org/] - open-source software that supports health workers delivering equitable care that reaches everyone. Medic Mobile serves as the technical lead and a core contributor to the Community Health Toolkit, which helps health workers ensure safe deliveries, track outbreaks faster, treat illnesses door-to-door, keep stock of essential medicines, communicate about emergencies, and more. (89) Global Fund (11)

- CommCare is a data collection platform by Dimagi to support community health workers to register, diagnose, treat and track clients and to share data with the health management information systems. [https://confluence.dimagi.com/display/commcarepublic/CommCare+for+COVID-19 (16)]


66. Action

Ensure the necessary policies, regulation and legislation are in place to support electronic medical records as part of the emergency response.

Implementation resources

- Turkey: modification to allow health professionals to access the patients’ medical history in e-Nabız (7)

- England: NHS Summary Care Record additional information included at point of care for 54 million patients [https://digital.nhs.uk/services/summary-care-records-scr (9)]

Recommendation

- Recommend national governments develop policies necessary to support the emergency response (such as additional data rand interoperability requirements, privacy and security, staff information support etc.).

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description- Electronic Medical Records/ Patient Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia April 2020 Health Records</td>
<td>Currently there are a number of initiatives being led by the Australian Digital Health Agency (the Agency) utilising digital technologies to support Australians manage their own health needs. For example, patients in self isolation or vulnerable patients who need to contact a pharmacist can utilise features of the My Health Record to confirm their medication history, allergies and diagnoses to help with their health management. There may be situations where patients are unable to meet their healthcare provider face-to-face due to quarantine. Without access to this information, this puts the patient at risk of medication misadventure or not adhering to a pharmaceutical healthcare plan. The features they may be used include: Shared Health Summaries, medicines information and confirmation of vaccination status. See also Standards Data Information Contact Tracing TeleHealth ePrescribing EMR Further information regarding Australia’s digital health response to COVID-19 is available online at <a href="https://covid-19.digitalhealth.gov.au/">https://covid-19.digitalhealth.gov.au/</a></td>
</tr>
<tr>
<td>Austria October 2020</td>
<td>ELGA - the Austrian system of electronic medical records – provides a network with standardized interfaces based on the international HL7 convention and Clinical Records Architecture CDA, facilitating communication and exchange of health data between all organizations operating within Austria’s health domain. It does not store any data on its own but connects locally stored documents provided to ELGA</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description - Electronic Medical Records/ Patient Management</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>by hospitals, doctors, pharmacies and medical insurances. Access to the system is coupled to “e-card”, the national identity card for medical insurance. Both was developed complying with European GDPR and national DSGVO, which provide rules and regulations upon individuals’ data and privacy.</td>
</tr>
<tr>
<td></td>
<td>See also Standards, Disease Surveillance, Data Pooling, Information &amp; Triage, Call Center, Contact Tracking, Testing, ePrescribing.</td>
</tr>
<tr>
<td>Global Fund April 2020</td>
<td>The Global Fund coordinates closely with WHO and other international public health actors to support tools development globally and in country. Some of the global good players that developed strong tools during Ebola (CommCare, MedicMobile, mHERO, SOMAS) have been quick to pivot for COVID-19. Our private sector partners have also offered access to tools that support system interoperability, teleworking, cyber security assessment and data analysis (Microsoft, Google, Zenysis, Mastercard).</td>
</tr>
<tr>
<td></td>
<td>See also Standards, Contact Tracking, Disease Surveillance, Data Pooling, EMR.</td>
</tr>
<tr>
<td>Hong Kong Oct 2020</td>
<td>All COVID-19 patients are managed within the Hospital Authority, where the CMS (the integrated electronic medical record system) documents all care and clinical details. This information is made available to all other healthcare providers on a need to know basis via the EHRSS.</td>
</tr>
<tr>
<td></td>
<td>See also Training, Standards, Disease Surveillance, TeleHealth, EMR.</td>
</tr>
<tr>
<td>India July 2020</td>
<td>Many Health Facilities have been upgraded as Dedicated CoVID-19 care facilities and information about these facilities also captured digitally through Central CoVID Dashboard which is called the Special Surveillance System (S3) for COVID. This Dashboard is capable of collecting data from all states and generating dashboards which are used for:</td>
</tr>
<tr>
<td></td>
<td>• Disease tracking by geography (including confirmed cases, deaths and recoveries)</td>
</tr>
<tr>
<td></td>
<td>• Inventory tracking for essential items like drugs, PPEs and ventilators and predicting demand at National, State and district level based on case loads</td>
</tr>
<tr>
<td></td>
<td>• Infrastructure tracking for COVID specific hospital beds, quarantine beds, ICU beds etc.</td>
</tr>
<tr>
<td></td>
<td>• Consolidation of Best Practices adopted for CoVID-19 Management</td>
</tr>
<tr>
<td></td>
<td>See also Training, Standards, Disease Surveillance, TeleHealth, EMR.</td>
</tr>
<tr>
<td>Japan Oct 2020</td>
<td>We have started to manage the information on persons infected with COVID-19 centrally. This information is shared with related parties such as medical institutions, health centers, and prefectures, while taking into account privacy protection.</td>
</tr>
<tr>
<td></td>
<td>See also Disease Surveillance, EMR.</td>
</tr>
<tr>
<td>The Netherlands April 2020</td>
<td>Due to the decentralized design of the Dutch healthcare system, there are many local, regional and topical systems in use to support Pandemic Management. Temporary National health data exchange platform. To support transfer of patients to other hospitals -to reduce the pressure on the healthcare system by spreading the demand for beds- we temporarily have set up a national portal to exchange patient data. All participating hospitals have connected to that portal. Based on Philips Forcare technology and IHE profiles.</td>
</tr>
<tr>
<td></td>
<td>See also Standards, Data Pooling, Information &amp; Triage, Contact Tracking, TeleHealth, Quarantine monitoring, EMR, Facility Manager.</td>
</tr>
<tr>
<td>Poland Sept 2020</td>
<td>Testing of the exchange of electronic medical records and reporting of medical events started in August 2020 and should conclude in April 2021. The service will provide access to the collection of information about the patient's contacts with health services, information about the procedures provided, disease entities, as well</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description- Electronic Medical Records/ Patient Management</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Russian Federation</strong>&lt;br&gt;OCT 2020</td>
<td>Electronic Medical Records tools are part of Unified State Health Information System (see Governance and Disease Surveillance tools)</td>
</tr>
<tr>
<td><strong>Saudi Arabia</strong>&lt;br&gt;SEPT 2020</td>
<td>Available Hospital Information systems and Primary care Information systems have been upgraded to support COVID-19 management. The use of the virtual care tools above has the added benefit of supporting the safety of our healthcare professionals. In addition, the Saudi Arabian Ministry of Health updated their electronic medical records (hospital and primary care), medical imaging and laboratory systems to support COVID-19 safe best practice and ensure that quality data is available to monitor the pandemic. Robots and Tele-health were utilized when possible to reduce healthcare providers’ exposure in hospitals ensuring safer environment and faster response.</td>
</tr>
<tr>
<td><strong>Singapore</strong>&lt;br&gt;SEPT 2020</td>
<td>The National Electronic Health Records (NEHR) System captures the demographic, clinical and epidemiological information of confirmed COVID-19 cases, which the Contact Tracing Centre then uses to support case management and prompt contact tracing. The Covid Test Result viewer, which is incorporated in NEHR, facilitates the checking of COVID-19 test results without having to switch multiple platforms, especially for laboratories that are not integrated with the Laboratory Information Systems (LIS). This allows the Ministry of Health (MOH) to have a holistic view of lab tests done on the COVID patients at different laboratories and perform the appropriate public health action promptly.</td>
</tr>
<tr>
<td><strong>Turkey</strong>&lt;br&gt;SEPT 2020</td>
<td>e-Nabiz, Turkey’s PHR system with more than 25 million active users all around the country. People can manage their own health with this system and share their data when necessary. During COVID-19, Turkish MoH enabled health professionals to access the patients’ medical history for providing better treatment services. e-Nabiz has already been integrated into Telemedicine and Public Health Management Systems which provide comprehensive data flow and better management for patients.</td>
</tr>
<tr>
<td><strong>UAE</strong>&lt;br&gt;SEPT 2020</td>
<td>UAE immediate response to the pandemic was utilizing the currently implemented digital health technologies like public health solutions, EMR, AI enabled solutions, in addition to deploy new digital health tools like telehealth, virtual clinic, triage, chatbot, central remote consultation call center, contacts tracing, geofencing, and tracking and monitoring of positive cases and quarantine of patients. These solutions are not open source solutions, but offered from the technology companies as a contribution to the pandemic management.</td>
</tr>
</tbody>
</table>
4.6. Resource availability for monitoring and Facility manager

67. Action
Access to Resource availability for monitoring and Facility manager tools.

Implementation resources
- **Global Open Facility Registry (GOFR)** / [https://www.facilitymatch.net/](https://www.facilitymatch.net/) Facility Match. Health information system managers can use Facility Match to analyze, de-duplicate, and manage master lists of facilities. It’s helped health officials develop registries of all unique health facilities in a country by reconciling data sets maintained by multiple sources. USA (12)

68. Action
Operationalize the additional digital health foundations necessary to support resource availability for monitoring and facility manager as part of the emergency response.

Implementation resources
- **HL7**: **SANER project** specifically addresses availability of facilities (beds, meds, equipment, supplies) for public health emergencies [http://build.fhir.org/ig/HL7/fhir-saner/overview.html](http://build.fhir.org/ig/HL7/fhir-saner/overview.html) (12).

69. Action
Ensure the necessary policies, regulation and legislation are in place to support resource availability for monitoring and facility manager as part of the emergency response.

Recommendation
Recommend national governments develop policies necessary to support the emergency response (such as additional data rand interoperability requirements).

Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Resource monitoring Facility Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>This is a web application called &quot;Critical Resource Monitoring System&quot;, which provides consolidated information on the management of resources such as beds or respirators, from all health care institutions of the country, centrally and grouped. It consists of a mechanism for updating data, which captures the status of each institution and displays it on a board. The information is displayed on maps, which allow identifying the location of health facilities, and analyzing the geographical distribution, as well as the level of saturation, identifying the areas with greater or lesser capacity.</td>
</tr>
<tr>
<td>Germany Oct 2020</td>
<td>DIVI - Digital Register for Intensive Care Capacities for CV-19-patients <a href="https://www.intensivregister.de/#/index">https://www.intensivregister.de/#/index</a></td>
</tr>
<tr>
<td>India Sept</td>
<td>For internal administrative purpose, India has developed a Central CoVID-19</td>
</tr>
<tr>
<td>Country/IO</td>
<td>Description – Resource monitoring Facility Manager</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------</td>
</tr>
</tbody>
</table>
| 2020              | Portal for COVID. This Dashboard collects data from all states and generates dashboard which are used for:  
|                   | • Disease tracking by geography (including confirmed cases, deaths and recoveries)  
|                   | • Inventory tracking for essential items like drugs, PPEs and ventilators and predicting demand at National, State and district level based on case loads  
|                   | • Infrastructure tracking for COVID specific hospital beds, quarantine beds, ICU beds etc.  
|                   | • Collating best practices adopted for CoVID-19 Management  
|                   | The dashboard also provides a case and infrastructure forecasting tools which allows the states to predict number of cases in forthcoming days (based on historical growth rate) and forecast the infrastructure (beds, ventilators etc.) required to manage the predicted caseload.  
|                   | • Covid Facility App launched by Union Heath Ministry, which keeps a track on patents status on critical parameters such as symptoms, underlying conditions, bed type occupied (oxygen support, ventilator support) length of hospitalization etc. The App also records the inventory at each facility to track utilization rate, stock of drugs and stock of PPEs, N95 masks etc.  
| The Netherlands   | National ICU-capacity monitoring. Three systems that report on the available ICU-capacity, to spread the load of COVID-19 patients  
| April 2020        | See also Training - Standards - Disease Surveillance - Data Pooling - Information & Triage - ePrescribing - eSick Leave - EMR - M&D - Facility Manager  
| Russian Federation| Resource Facility Monitoring tools are part of Unified State Health Information System  
| Oct 2020          | Each medical facility obligatory must send information about number of beds which can be used for COVID-19 patients, including intensive beds and number of ventilators to Information Resource “COVID-19”. Information Resource “COVID-19” collect, analyze and aggregate information from local to federal level. Authorities at each level have daily actual information about situation with beds and ventilators and percent of their occupation. This database together with patient’s database give possibility to assess needs in beds, beds of intensive care and ventilators - Artificial Intelligence. (see Governance and Disease Surveillance tools)  
| See also          | Governance - Policy and regulations - Standards - Disease Surveillance - Data Pooling - Information & Triage - ePrescribing - eSick Leave - EMR - Facility Manager  
| Saudi Arabia      | Saudi Arabia applied a web application and a portal called "Taahob", which provides consolidated information on the management of resources such as hospital beds, quarantine locations or respirators, from all health care institutions of the country, centrally and grouped.  
| Sept 2020         | See also Standards - Disease Surveillance - Data Pooling - Information & Triage - ePrescribing - eSick Leave - EMR - Facility Manager  
| Singapore         | A resource management dashboard was developed to enable real-time analysis of the consumption of Personal Protective Equipment (PPE) and scenario-based forecasts of stocks at the national-level. The dashboard helps the resource management team make informed decisions and maintain a healthy inventory level of PPEs to manage the pandemic in Singapore.  
| Sept 2020         | See also Standards - Disease Surveillance - Data Pooling - Information & Triage - ePrescribing - eSick Leave - EMR - Facility Manager  

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### Country/IO | Description – Resource monitoring Facility Manager
---|---
**Uruguay April 2020** | Tools that allow to monitor the availability of sanitary resources (beds of the different type of hospitalization: common, moderate and intensive care, as well as the fans and other medical supplies required)

See also Standards, Disease Surveillance, Data Pooling, Information & Triage, TeleHealth, Facility Manager

**USA April 2020 free and open source tools** | USAID created the Digital Square co-investment mechanism to enable pooled funding in support of software global goods that can be adapted and re-used to meet multiple priority health needs. A number of these free and open source tools now have COVID-19-specific modules, including: Global Open Facility Registry (GOFR)


See also Standards, Disease Surveillance, Data Pooling, Information & Triage, Contact, Triage, Supply chain

| 4.7. Supply Chain Management |

#### 70. Action
Access to Supply Management tools.

**Implementation resources**

- **OpenLMIS** [https://openlmis.org/](https://openlmis.org/) is a powerful, open source, cloud-based electronic logistics management information system (LMIS) purpose-built to manage health commodity supply chains. OpenLMIS is responding by supporting during this current emergency response by OpenLMIS countries to optimize their use of the software to encourage good supply chain management of COVID supplies. A separate, simplified OpenLMIS instance has been launched called OpenLMIS COVID-19 Edition, which is a lighter weight and quicker start up tool to help countries get started right away to manage COVID-related commodities (based on the WHO product list). (90) USA (12)


#### 71. Action
Ensure the necessary policies, regulation and legislation are in place to support supply chain management as part of the emergency response.

**Recommendation**

Recommend national governments develop policies necessary to support the emergency response (such supply of protective equipment and medications).

| Country/IO | Description – Supply Chain |
---|---|
**India July 2020** | Government of India created and empowered group for logistics and supply chain management at national level to ensure availability of essential items (i.e. food and medicine) even during lockdown or restricted public movement. The group monitors key indicators and eases policy and implementation roadblocks in national supply chain and logistics.

- Kerala: Kerala Police Cyberdome launched a mobile and web-based application for door delivery of essential items to keep people indoor. 300 merchants from across the State were enlisted in the app. They also demarcate their respective areas of home delivery. [https://keralapolice.gov.in/covid/cyberdome-shop-app](https://keralapolice.gov.in/covid/cyberdome-shop-app)

See also Training, Standards, Disease Surveillance, Data Pooling, Information & Triage, Contact, Triage, eSick Leave, EMR, Psychological support, Call Center, Facility Manager, Supply chain
### 4.8. Vaccination management

With the potential of a viable vaccine now on the horizon many countries are looking at best practices and tools to enable:

- Prioritization of vaccine recipients
- Communication tools (reminders etc.)
- Vaccination records and tracking
- Electronic immunization records and registries
- Supply chain/cold storage management etc.
- Digital vaccine certificates
- Digital mapping of populations at risk

#### 72. Action

Access to vaccination management tools.

**Implementation resources**


#### 73. Action

Operationalize the additional digital health foundations necessary to support vaccination management as part of the emergency response

**Implementation resources**

- **WHO: Effective Vaccine Management (EVM) Initiative**

#### 74. Action

Ensure the necessary policies, regulation and legislation are in place including operationalize the additional Privacy and Security necessary to support vaccination management tools as part of the emergency response.

**Recommendation**

- Recommend national governments develop policies necessary to support the emergency response to support the vaccination management tools.
75. Action
Development of a post-pandemic policy (review of policies, privacy & security).
Recommendation
• A template post-pandemic policy be developed for inclusion as an appendix for this report.

Case studies

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Vaccine management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil Sept 2020</td>
<td>Vaccination against COVID-19 – planning of digital solutions</td>
</tr>
<tr>
<td></td>
<td>In Brazil, digital solutions are already being prepared to facilitate the recording of data on the application of the coronavirus vaccine in the population. The new vaccination process in campaigns will allow the individualized registration of each citizen who receives the vaccine, different from the current campaigns. To identify the priority groups for vaccination, there will be prior registration of the target population, and these citizens will receive a QR code through the CONECTE-SUS app to be presented on the day of vaccination, which can be previously scheduled to avoid agglomerations. The individual registration of the application of vaccines will allow the monitoring of possible adverse reactions, as well as inform all data related to the vaccine, such as batch, validity, laboratory, date of application, etc. Through the CONECTE-SUS app, the citizen can obtain a certificate to prove that he is already vaccinated against the coronavirus.</td>
</tr>
<tr>
<td>Russian Federation Oct 2020</td>
<td>Vaccine monitoring tools are part of Unified State Health Information System (see Governance and Disease Surveillance tools)</td>
</tr>
<tr>
<td>Saudi Arabia Sept 2020</td>
<td>In Saudi Arabia a digital platform is being prepared to facilitate the recording and monitoring of corona virus vaccine in the population and simulations are in progress. The platform will supplement the national registry of vaccination.</td>
</tr>
</tbody>
</table>

4.9. Disease research

As highlighted Outbreak responses require research. During the Ebola response (as with a number of other public health crises) it was essential for research to happen during, not only after the response—given the need to understand how the virus was mutating, how that affected chains of transmission, and the large numbers of unknowns related to the efficacy of medical countermeasures (treatment and vaccines) for Ebola. USAID Page 58 (1). See Disease surveillance.

76. Action
Access to Disease research tools.

Implementation resources

77. Action
Ensure the necessary policies, regulation and legislation are in place to support disease research as part of the emergency response.
Recommendation

- Recommend national governments to develop policies necessary to support disease research as part of the emergency response.

<table>
<thead>
<tr>
<th>Country/IO</th>
<th>Description – Disease Research tools</th>
</tr>
</thead>
</table>
| Germany Oct 2020 | - Lean Open Survey on SARS-CoV-2 infected patients (LEOSS) [https://leoss.net/](https://leoss.net/) Large European cohort study on CV-19-patients
                  - Network of all German University Clinics to coordinate the research activities [https://www.netzwerk-universitaetsmedizin.de/](https://www.netzwerk-universitaetsmedizin.de/)                                       |
| Russian Federation Oct 2020 | COVID-19 PREPRINTS is an open online archive and preprint service. It is organized and supported by RosNIPCHI "Microb" of Rospotrebnadzor. The goal of COVID-19 PREPRINTS is to increase the transparency and availability of specific research findings on COVID-19, enhance collaboration between researchers, document the origins of ideas, and communicate ongoing and planned research through more timely reporting of completed studies. By submitting preprints on COVID-19 PREPRINTS, authors have the opportunity to instantly familiarize the scientific community with the results of their research and receive feedback from colleagues before publication in the journal [https://covid19-preprints.microbe.ru/](https://covid19-preprints.microbe.ru/) |
5. Post-pandemic preparation

In addition to the post-pandemic roadmap and plans actions above.

5.1. Lessons learned

78. Action

Learn from this crisis and build resilience for the next outbreak
When the crisis abates, countries should draw lessons from COVID-19 to prepare for future outbreaks, as Korea did following the SARS epidemic of 2003 (Wang, Ng and Brook, 2020 (91)). Global health emergencies illuminate the importance of coherent, comparable and timely data across borders, within and between countries. The health system is woefully behind other sectors in developing a harmonised approach to data governance and global standards for health data terminology and exchange (OECD, 2019 (92)). In many countries, the consequence is that when data sharing and linkage are most needed, data are trapped in silos, difficult to exchange in their entirety and shared with significant delays. This is particularly pertinent to decentralised federated health systems, in which subnational areas have developed their own health information infrastructure and governance, typically not in alignment with other regions, and thus incapable of informing a unified response (Carinci, 2020 (93))

Health systems must be strengthened to become capable of providing national and global data that are useable and available in near real-time for surveillance and emergency response, across national and regional borders. Health data governance frameworks are also needed to safeguard privacy, including having systems for secure data exchange, automatic data extraction from clinical records, and secure data access mechanisms for research. As with any problem of the commons, it is unlikely that a few countries alone can tackle this issue, multilateral action is essential, for example to track spread across borders, share information on containment and treatment interventions that work, and make sure international supply chains of medical supplies keep going. OECD (40)

Implementation resources

• Separate and shared endeavors of countries on COVID-19 will shape the future together. In this respect, first step must be overcoming this pandemic with available resources and then, combining all the lessons learned in order to create a shared platform consisting of knowledge, collaboration, technology and common sense will come afterwards.

Recommendation

• Lessons learned be collated after the pandemic and be collated as an addendum to this report.

5.2. Operationalize Post-pandemic plan and Roadmaps

79. Action

Finalize all Post-pandemic plans for all tools (especially those not mentioned previously) and operationalize these plans and roadmaps.

Recommendation

• A draft template post-pandemic policy be developed for inclusion as an appendix for this report.
### Appendix 1 – Contact emails of contributing organizations

<table>
<thead>
<tr>
<th>Country</th>
<th>Organization/contact name</th>
<th>Email address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Dirección nacional de Gobernanza e integración del sistema de salud</td>
<td>Fernando Nuñez <a href="mailto:fernandonu@gmail.com">fernandonu@gmail.com</a> <a href="mailto:frnunez@msal.gov.ar">frnunez@msal.gov.ar</a></td>
</tr>
<tr>
<td>Austria</td>
<td>Federal Ministry of Social Affairs, Health, Care and Consumer Protection</td>
<td><a href="mailto:clemens.auer@gesundheitsministerium.gv.at">clemens.auer@gesundheitsministerium.gv.at</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regarding content: <a href="mailto:juergenbrandstatterl@gmail.com">juergenbrandstatterl@gmail.com</a> <a href="mailto:philipp.schardax@gesundheitsministerium.gv.at">philipp.schardax@gesundheitsministerium.gv.at</a></td>
</tr>
<tr>
<td>Brazil</td>
<td>Ministry of Health</td>
<td><a href="mailto:cqsds.datasus@saude.gov.br">cqsds.datasus@saude.gov.br</a></td>
</tr>
<tr>
<td>Canada</td>
<td>Canada Health Infoway</td>
<td>Michael Green <a href="mailto:mgreen@infoway-inforoute.ca">mgreen@infoway-inforoute.ca</a></td>
</tr>
<tr>
<td>Germany</td>
<td>Federal Ministry of Health</td>
<td>Johannes Roth <a href="mailto:johannes.roth@bmg.bund.de">johannes.roth@bmg.bund.de</a></td>
</tr>
<tr>
<td>GDHP</td>
<td>GDHP Secretariat</td>
<td><a href="mailto:sectt-gdhp@gov.in">sectt-gdhp@gov.in</a></td>
</tr>
<tr>
<td>Global Fund</td>
<td></td>
<td>Steve Ramsden <a href="mailto:steve.ramsden@theglobalfund.org">steve.ramsden@theglobalfund.org</a></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Food and Health Bureau</td>
<td><a href="mailto:jsmhyung@fhhb.gov.hk">jsmhyung@fhhb.gov.hk</a></td>
</tr>
<tr>
<td>India</td>
<td>Ministry of Health and Family Welfare</td>
<td>Lav Agarwal <a href="mailto:alav@ias.nic.in">alav@ias.nic.in</a></td>
</tr>
<tr>
<td>Italy</td>
<td>Ministry of health, Directorate General for the Digitalization, Health Information System and Statistics</td>
<td><a href="mailto:dqsi@postacert.sanita.it">dqsi@postacert.sanita.it</a> Serena Battilomo <a href="mailto:s.battilomo@sanita.it">s.battilomo@sanita.it</a></td>
</tr>
<tr>
<td>ITU</td>
<td></td>
<td>Monika Gehner <a href="mailto:monika.gehner@ituint">monika.gehner@ituint</a></td>
</tr>
<tr>
<td>Japan</td>
<td>Ministry of Health, Labour and Welfare</td>
<td>Hisayo Horiuchi <a href="mailto:horiiuhi-hisayo.ho8@mhlw.go.jp">horiiuhi-hisayo.ho8@mhlw.go.jp</a> Kenshin Shimizu <a href="mailto:shimizu-kenshin@mhlw.go.jp">shimizu-kenshin@mhlw.go.jp</a></td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Ministry of Health, Welfare and Sport</td>
<td>Herko Coomans <a href="mailto:h.coomans@minvws.nl">h.coomans@minvws.nl</a></td>
</tr>
<tr>
<td>OECD</td>
<td></td>
<td>Nick Tomlinson <a href="mailto:Nick.TOMLINSON@oecd.org">Nick.TOMLINSON@oecd.org</a></td>
</tr>
<tr>
<td>Poland</td>
<td>Ministry of Health</td>
<td><a href="mailto:dep-sys@mz.gov.pl">dep-sys@mz.gov.pl</a></td>
</tr>
<tr>
<td>Portugal</td>
<td>Shared Services of The Ministry of Health</td>
<td><a href="mailto:pedro.batista@spms.min-saude.pt">pedro.batista@spms.min-saude.pt</a></td>
</tr>
<tr>
<td>Russian Federation</td>
<td>Ministry of Health</td>
<td>Anna Korotkova <a href="mailto:korotkova_anna@mednet.ru">korotkova_anna@mednet.ru</a></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Ministry of Health</td>
<td>Mona AlMehaid <a href="mailto:malmehaid@moh.gov.sa">malmehaid@moh.gov.sa</a> Roa Mosaad AlFaiz <a href="mailto:rmalfaiz@moh.gov.sa">rmalfaiz@moh.gov.sa</a></td>
</tr>
<tr>
<td>Secretariat</td>
<td></td>
<td>Colleen Brooks <a href="mailto:colleen@digitalhealthtaskforce.org">colleen@digitalhealthtaskforce.org</a></td>
</tr>
<tr>
<td>Singapore</td>
<td>Ministry of Health</td>
<td><a href="mailto:International_Relations@moh.gov.sg">International_Relations@moh.gov.sg</a></td>
</tr>
<tr>
<td>Sweden</td>
<td>Swedish eHealth Agency</td>
<td><a href="mailto:ylva.wide@ehalsomyndighetens.se">ylva.wide@ehalsomyndighetens.se</a></td>
</tr>
<tr>
<td>Turkey</td>
<td>Turkish Ministry of Health, General Directorate of EU and Foreign Affairs</td>
<td><a href="mailto:disab.uk@saqlik.gov.tr">disab.uk@saqlik.gov.tr</a></td>
</tr>
<tr>
<td>UAE</td>
<td>Ministry of Health and Prevention</td>
<td>Dr. Abdulla Al Naqbi <a href="mailto:abdulla.alnaqbi@mohap.gov.ae">abdulla.alnaqbi@mohap.gov.ae</a></td>
</tr>
<tr>
<td>Uruguay</td>
<td>International Relations AGESIC</td>
<td><a href="mailto:internacional@agesic.qub.uy">internacional@agesic.qub.uy</a></td>
</tr>
<tr>
<td>UNICEF</td>
<td>UNICEF HQ/Programme Division-Health Section</td>
<td><a href="mailto:kkallander@unicef.org">kkallander@unicef.org</a></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>NHS Digital</td>
<td><a href="mailto:international@nhs.net">international@nhs.net</a></td>
</tr>
<tr>
<td>United States of America</td>
<td>Health and Human Services</td>
<td><a href="mailto:USC-G20DigitalHealthTaskforce@hhs.gov">USC-G20DigitalHealthTaskforce@hhs.gov</a></td>
</tr>
<tr>
<td>WHO</td>
<td></td>
<td>Bernardo Mariano <a href="mailto:bmariano@who.int">bmariano@who.int</a> Derrick Muneeene <a href="mailto:muneeneed@who.int">muneeneed@who.int</a></td>
</tr>
</tbody>
</table>
With the assessment by the WHO, COVID-19 can be characterized as a pandemic. The efforts of individual countries to implement their emergency preparedness plans is already well underway. It is becoming increasingly clear that even strong healthcare systems are under immense pressure. The virtual G20 Leaders’ Summit that was held on 26 March 2020 under the Saudi G20 Presidency, committed to delivering a joint G20 Action Plan in Response to COVID-19, which will outline the individual and collective actions that G20 has taken and will be taking to respond to the COVID-19 pandemic.

As time is of the essence, the Saudi G20 Presidency Health Working Group and the Digital Economy Task Force are aligning their efforts to seek to urgently collate COVID-19 Digital Health collaborative activities and are seeking G20, the Global Digital Health Partnership members’, and International Organizations’ voluntary contributions to support this effort. The aim is to quickly collate efforts on the following topics before the next G20 HWG (responses deadline by Wednesday, 15 April if possible):

<table>
<thead>
<tr>
<th></th>
<th>Yes/ No - Details if available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you have and actively use Digital Health Tools to support Pandemic Management that can be shared internationally (as illustrated in Appendix A)? Please clarify if these are free and/or open source.</td>
</tr>
<tr>
<td>2</td>
<td>Do you have and actively use tools such as policies (e.g. privacy, security) and applications to support cross-border TeleHealth solutions? This includes triage, quarantine management, teleradiology, TeleICU, etc</td>
</tr>
<tr>
<td>3</td>
<td>Are you using Artificial Intelligence in your response management? If so, please elaborate how.</td>
</tr>
<tr>
<td></td>
<td>- Can the algorithm being used be shared internationally?</td>
</tr>
<tr>
<td></td>
<td>- How are you updating AI-based chatbots as new information and symptoms are emerging?</td>
</tr>
<tr>
<td></td>
<td>- Do you have access to sufficient data to inform other AI application such as AI in Medical Imaging, predicting the evolution and potential mutations of viruses, or developing potential treatments and vaccines?</td>
</tr>
<tr>
<td>4</td>
<td>Are you currently pooling COVID-19 related data from multiple sources internationally? Do you see the need and benefit in pooling data internationally?</td>
</tr>
<tr>
<td>5</td>
<td>Quality Data - Are you using other International Data Standards than those mentioned in Appendix B to share data? If so, please list them</td>
</tr>
<tr>
<td>6</td>
<td>What are the key challenges faced when deploying digital technologies to respond to global pandemic such as COVID-19?</td>
</tr>
</tbody>
</table>
Data Collection Appendix A - Digital Health Tools and COVID-19

Digital Health & Covid-19 Legend:
- Prevention & Planning
- Triage/testing
- Track & Tracing
- Treatment
- Postcare management

Public Health
- Disease information & Protection guidelines
- Behavioural change
- Anxiety management

Community
- Triage via Chatbot & Video & Voice
- Quarantine
- Track & Trace Contacts
- Geofencing
- Track Patients

Hospital
- Inpatient (TeleMedicine & TeleRadiology)
- ICU (TeleICU, TeleRadiology, TeleCardiology)

Primary
- Triage
- Quarantine management
  - Telemedicine
  - ePrescription
  - Anxiety management
  - Remote device monitoring
- Discharge

Quality Data
- High Risk group definition
- COVID cases location & numbers
- Contacts management location & numbers
- Resource Management
- Performance Management
- Clinical Research
Data Collection Appendix B - International data Standards

Please Note as this information is being rapidly updated, can I suggest you always review the information from the sources (via the link). The text is provided for descriptive purposes only.

Data standards

<table>
<thead>
<tr>
<th></th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis Coding - COVID-19</td>
<td>ICD 10 WHO <a href="https://www.who.int/classifications/cd/covid19/en/">https://www.who.int/classifications/cd/covid19/en/</a></td>
</tr>
</tbody>
</table>

Other valuable resources

- SNOMED International is in the process of developing COVID-19 Data Coding using SNOMED CT. This implementation guide shows how SNOMED CT can be used to record, communicate and integrate clinical data related to COVID-19, for the purposes of frontline service delivery, pandemic surveillance, and retrospective data analysis. Data elements suitable for SNOMED CT coding are listed with example value set bindings.
Flow of the pre-clinical care system integrated to the National Health Data Network (RNDS)

Fluxo do Sistema de Atendimento Pré-Clinico Integrado à RNDS

Classification of the citizen

- Green: the citizen is released and informed on guidelines
- Yellow (mild symptoms): the citizen is monitored every 48 hours
- Orange (severe symptoms): the citizen is monitored every 24 hours

Classification criteria for citizens

- Green: No symptoms or mild symptoms (mild fever, cough, sore throat)
- Yellow: Severe symptoms (severe fever, respiratory difficulty)
- Orange: Critical symptoms (difficulty breathing, severe respiratory distress)

Pre-clinical care services

- COVID-19 helpline: 136
- Health units

Notifications

- e-Health
- WhatsApp
- SMS

Public and private laboratories

Data Analytics and AI

Visualization of the Citizen and the Health Professionals

- Data repositories
- Automated call service / dynamic active capture
- Classification algorithm
Appendix 4 – Portugal COVID-19 codes

Yes. Concerning the usage of international data standards for the registry of COVID-19 disease related information, Portugal is resorting to the usage, at a National level, of four terminologies: LOINC, ICD10, ICD10CM and ICPC-2.

Because almost 90% ICT systems in healthcare in Portugal are provided by the Government, through the National Agency for IT and eProcurement – SPMS, we are able to adopt in full scale these terminologies.

The definition of these codesets is governed by the National Body responsible for defining and maintaining healthcare related valuesets with national interest – the Clinical Terminology Center, in which SPMS is part of the board.

Given this context, we are currently resorting to the following valuesets for the following contexts, as follows:

Laboratory Setting:
The following tables refer to LOINC codes used to collect information at the point of care in Laboratory settings.

Tests related to the RT-PCR technique:
Terminology – LOINC

<table>
<thead>
<tr>
<th>Código LOINC Pedido</th>
<th>Código LOINC Pedido</th>
<th>PT description:</th>
<th>Unidades</th>
</tr>
</thead>
<tbody>
<tr>
<td>94531-1</td>
<td>94500-6</td>
<td>Pesquisa de RNA do vírus SARS-CoV-2 por RT-PCR em tempo real [Presença] em amostra respiratória (Expetoração, Lavado bronco-alveolar, Secreções brônquicas, Líquido pleural, Exsudado nasofaríngeo, Exsudado orofaríngeo, Aspirado nasofaríngeo, Lavado nasal)</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94660-8</td>
<td>94660-8</td>
<td>Pesquisa de RNA do vírus SARS-CoV-2 por RT-PCR em tempo real [Presença] em amostra de soro ou plasma</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94306-8</td>
<td>94309-2</td>
<td>Pesquisa de RNA do vírus SARS-CoV-2 por RT-PCR em tempo real [Presença] em amostra não especificada (Fezes, Urina, Tecido pulmonar ou traqueal)</td>
<td>Positivo/ Negativo</td>
</tr>
</tbody>
</table>
**Tests related to genomic sequencing:**

**Terminology – LOINC**

<table>
<thead>
<tr>
<th>Código LOINC Pedido</th>
<th>Código LOINC Resultado</th>
<th>PT description:</th>
<th>Unidades</th>
</tr>
</thead>
<tbody>
<tr>
<td>94316-7</td>
<td>94316-7</td>
<td>Identificação Gene N do vírus SARS-CoV-2 [Presença] em amostra não especificada</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94315-9</td>
<td>94315-9</td>
<td>Identificação Gene E do vírus SARS-CoV-2 [Presença] em amostra não especificada</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94641-8</td>
<td>94641-8</td>
<td>Identificação Gene S do vírus SARS-CoV-2 [Presença] em amostra não especificada</td>
<td>Positivo/ Negativo</td>
</tr>
</tbody>
</table>

**Quick tests:**

**Terminology – LOINC**

<table>
<thead>
<tr>
<th>Código LOINC Pedido</th>
<th>Código LOINC Resultado</th>
<th>PT description:</th>
<th>Unidades</th>
</tr>
</thead>
<tbody>
<tr>
<td>94558-4</td>
<td>94558-4</td>
<td>Teste Rápido (Imunoensaio) para a Detecção de Antigênio SARS-CoV-2 [Presença] em amostra respiratória</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94503-0</td>
<td>94507-1</td>
<td>Teste Rápido (Imunoensaio) para a Detecção de Anticorpos IgG para o vírus SARS-CoV-2 [Presença] em amostra de soro ou plasma</td>
<td>Positivo/ Negativo</td>
</tr>
<tr>
<td>94503-0</td>
<td>94508-9</td>
<td>Teste Rápido (Imunoensaio) para a Detecção de Anticorpos IgM para o vírus SARS-CoV-2 [Presença] em amostra de soro ou plasma</td>
<td>Positivo/ Negativo</td>
</tr>
</tbody>
</table>

**Hospital Setting**

The following tables refer to ICD10 and ICD10CM codes used to collect information at the point of care in Hospital settings.

**Registry at the point of care of diagnosis related information in hospitals (patient summary and discharge reports):**

**Terminology – ICD10**
Registry at the point of care of mobility related information in hospitals:
Terminology – ICD10CM

<table>
<thead>
<tr>
<th>Código ICD10CM</th>
<th>PT description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>U07.1</td>
<td>COVID-19, confirmado por testes laboratoriais</td>
</tr>
<tr>
<td>U07.2</td>
<td>COVID-19, confirmação laboratorial inconclusiva ou não disponível</td>
</tr>
</tbody>
</table>

Primary Care Setting
The following tables refer to ICPC-2 codes used to collect information at the point of care in Primary Care settings.

Registry at the point of clinical information on Primary Care sites:
Terminology – ICPC-2

<table>
<thead>
<tr>
<th>Nome da subrubrica</th>
<th>Código ICPC-2</th>
<th>Código ICPC-2 da rubrica &quot;pai&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infeção por COVID-19</td>
<td>A77.01</td>
<td>A77</td>
</tr>
<tr>
<td>Risco de infecção por COVID-19</td>
<td>A23.01</td>
<td>A23</td>
</tr>
<tr>
<td>Suspeita de infeção por COVID-19</td>
<td>R29.01</td>
<td>R29</td>
</tr>
<tr>
<td>Medo de infeção por COVID-19</td>
<td>R27.01</td>
<td>R27</td>
</tr>
</tbody>
</table>

Código ICD10 Long_Descp ICD-10-CM PT_versão Nov2019 (Longa) PT_versão Nov2019 (Curta)

<table>
<thead>
<tr>
<th>Código ICD10CM</th>
<th>Long_Descp ICD-10-CM</th>
<th>PT_versão Nov2019 (Longa)</th>
<th>PT_versão Nov2019 (Curta)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U071</td>
<td>COVID-19</td>
<td>COVID-19</td>
<td>COVID-19</td>
</tr>
</tbody>
</table>
Appendix 5 - ITU robust infrastructure activities in response to COVID-19

As at 05.05.2020

Please note this does not represent the full list of ITU activities. ITU has a dedicated COVID-19 Updates webpage to highlight all ITU initiatives, events and products related to COVID-19. All initiatives are presented by themes to ensure information is visible to consumers as well as users of ICT/telecommunication infrastructure. Additionally, other ITU resources and case studies have been included in the body of this report. ITU also works with WHO on Artificial Intelligence which have been excluded as being addressed as part of G20 DETF.

Introduction

The centrality of ICT/telecommunication in mitigating the impact of the COVID-19 crisis has come to the fore. ICT/telecommunication networks have emerged as one of the most critical infrastructure to enable people work from home, school going children to learn from their homes, companies and institutions to ensure business continuity, among other uses. Noting the heavy reliance on ICT/telecommunication networks, ITU has taken the initiative to help countries and industry cope with the increasing pressure facing global networks. ITU’s ongoing activities are listed below:

a. **Global Network Resiliency Platform (REG4COVID)**
   
   As one of the measures, on 23rd March 2020, the ITU Secretary General, Houlin Zhao, launched a Global Network Resiliency Platform, named #REG4COVID, to assist national policy-makers, regulators and industry stakeholders in ensuring that networks are kept resilient and telecommunication services are safe and available to all. The statement of the ITU Secretary General is available [here](https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/REG4COVID.aspx).
   
   Through this platform, policy makers, regulators, operators, civil society, international agencies are able to share best practices and initiatives which they have put in place, during the COVID-19 crisis, to ensure that their telecommunication networks and services continue to serve the needs in their respective countries and beyond. The overall goal is to have people remain connected and safe through the use of ICT/telecommunications services. The platform, located on the ITU website ([https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/REG4COVID.aspx](https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/REG4COVID.aspx)) is updated on a regular basis with information received from all parts of the world for this purpose.

b. **Addressing the response to COVID within the Broadband Commission**

   The Broadband Commission for Sustainable Development convened an emergency virtual meeting of held on 01 April 2020. The Commissioners adopted an Agenda for Action, outlining immediate measures that governments, industry, the international community and civil society can take to support digital networks, strengthen capacity at critical connectivity points like hospitals and transport hubs, and boost digital access and inclusivity. The overall aim is to strengthen collective response to the COVID-19 crisis now sweeping the world. The related press release issued is available [here](https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/REG4COVID.aspx).
   
   The agenda which is built around three pillars: Resilient Connectivity, Affordable Access, and Safe Use for Informed and Educated Societies, serves as a framework for the Commission’s 50+ Commissioners and their organizations to share their own initiatives, make new commitments, and foster collaboration and partnership.

c. **Guidelines for National Emergency Telecommunications Plans**


   The guidelines have been shared with policy makers, regulators and other national authorities to help them prepare the relevant policies and regulations that are primarily important in ensuring
resilience of telecommunication networks before, during and after a disaster. Due recognition is given to the fact ICT networks and services are pivotal in the response to the ongoing COVID-19 pandemic, other emergencies and in disaster management in the future. NETPs provide the framework for information sharing, and prioritization of response efforts to ultimately save lives.

ITU has also launched, in partnership with the Global Emergency Telecommunications Cluster (ETC), the Tabletop Emergency Simulation Guide which offers tools to test and refine NETPs using simulated scenarios. The ETC is a global network of organizations that work together to provide shared communications services in humanitarian emergencies.

d. Collaboration with International Partners

ITU is in conversation with a range of international partners generally on issues of digital inclusion but more specifically in the wake of this crisis moment of COVID-19, on how best to keep telecommunications networks and services affordable, available and accessible, as well as safe and resilient, with digital as the new norm.

Under the ongoing collaboration between the ITU, the World Bank Group, GSMA and the World Economic Forum, discussions are being held on how they can bring together their communities and leverage on each other’s activities to individually or jointly to support membership in their response to COVID-19.

Under the Speedboat initiative, the four institutions issued a ‘COVID-19 Crisis Response: Digital Development Joint Action Plan and Call for Action’.

e. Leveraging resources from ITU and Cybersecurity partners

The resources will help offer a platform for cybersecurity tools that stakeholders can access/utilize to secure their networks (these include tools for Member States and private sector – especially SMEs). On child online safety, there are possibilities of offering a platform for tools such as the COP Guidelines to equip children with necessary digital skills to surf safely online environment (these include tools for Member States and private sector).

f. ITU and USG Fabrizio Hochschild’s office Joint Webinars on “Digital Cooperation in the Crisis of COVID19”

The Webinar series jointly organized by the ITU and USG/Special Advisor Fabrizio Hochschild’s office, under the overall theme: “Digital Cooperation in the crisis of COVID19”, are assessing the current situation of connectivity in different regions, and direct focus to actions required particularly in response to the COVID-19 emergency and further reduction of the the digital gap in order to enhance stable and affordable access for people who remain unconnected. The webinars begun on 15 April 2020. More information can be found here: https://www.itu.int/en/ITU-D/Pages/seminars/2020/DigitalCooperation/default.aspx

g. United for Smart Sustainable Cities (U4SSC)

The United for Smart Sustainable Cities (U4SSC) is a UN initiative coordinated by ITU, UNECE and UN-Habitat, and supported by other 14 UN bodies to achieve Sustainable Development Goal 11: “Make cities and human settlements inclusive, safe, resilient and sustainable”. Within the Thematic Group on Smart City Platforms, a new workstream has been created on ‘Emergency Response of Cities to address the urban dimension of the response to COVID-19 pandemic’. This thematic group provides a platform to share solutions and best practices used in cities to address COVID-19. In addition, it will develop a framework on smart public health emergency management in cities.

h. WSIS TalkX

The WSIS Team at ITU hosts a weekly virtual WSIS TalkX for WSIS Stakeholders to interact, connect and collaborate. These virtual interactive talks highlight linkages with the WSIS Action Lines and SDGs all held as precursors to the WSIS Forum 2020. The webinars have focused on various topics touching on COVID including Cybersecurity: Online Educational Resources and Child Online Protection during COVID-19, Free Application and Scientific Resources to track COVID-19, among others. More information here: https://www.itu.int/net4/wsis/forum/2020/Home/WSISTalkX
i. **WSIS ICT Case Repository (part of stocktaking)**
   As a part of the WSIS Stocktaking ongoing efforts to promote the good use of ICTs in making social impact, and in order to provide useful, replicable and actionable information to all WSIS community and beyond, the **ICT Case Repository** is now available for collecting projects and activities on how ICTs are assisting stakeholders in their everyday life, work, and combating challenges caused by this extraordinary pandemic. The Coronavirus (COVID-19) Response – The projects shared in the repository will be reviewed and featured on the WSIS Stocktaking Platform, and also promoted through various channels including the WSIS Flash newsletter, WSIS TalkX and social media channels.

j. **Cybersecurity Resources for COVID-19 (CYB4COVID)**
   Outreach to member states to share information about initiatives, actions, resources and projects on cybersecurity that are designed to help ensure systems and networks remain connected safely and securely. The resources are available [here](#).

k. **The ITU Smart Villages platform in Niger**
   The ITU Smart Villages platform [https://www.itu.int/en/ITU-D/ICT-Applications/Pages/smart-village.aspx](https://www.itu.int/en/ITU-D/ICT-Applications/Pages/smart-village.aspx) is used to establish interactive voice service on COVID19 to everyone Niger. The service, created in collaboration with operators and Small and Medium Enterprises (SMEs), is available via the short code 701 in the five local languages in Niger. Through the service, citizens are able to access important messages from the Ministry of Health regarding prevention and diagnosis of COVID-19.

l. **Leverage on the “Be Healthy, Be Mobile” (BHBM) joint ITU-WHO initiative.**
   The joint ITU-WHO initiative [https://www.itu.int/en/ITU-D/ICT-Applications/Pages/mhealth-forned-behealthy-bemobile.aspx](https://www.itu.int/en/ITU-D/ICT-Applications/Pages/mhealth-forned-behealthy-bemobile.aspx) aims to re-use resources, platforms and solutions for COVID-19 response in countries where BHBM is active e.g., Sudan, Egypt, Philippines, Tunisia, Senegal, Burkina Faso, India, etc.

   ITU in collaboration and solidarity with the World Health Organization, and with support from UNICEF, is working with telecommunication companies to text people directly on their mobile phones with vital health messaging to help protect them from COVID-19. These text messages will reach billions of people that are not able to connect to the internet for information. The initiative objectives are reflected in the joint statement found [here](#).

m. **ITU-WHO Focus Group on AI for health (FG-AI4H).**
   The joint ITU-WHO Focus Group on Artificial Intelligence for Health (FG-AI4H, [https://www.itu.int/go/fgai4h](https://www.itu.int/go/fgai4h)) is developing a framework for benchmarking AI-based health solutions for assessing quality and clinical relevance of solutions. In response to the COVID-19 emergency, its [ad hoc group on digital health for the COVID-19 health emergency](https://www.itu.int/go/fgai4h) has collected best practices covering the use of AI and other digital technologies for the entire epidemic emergency cycle. The FG-AI4H also has an activity for collecting and developing relevant open source tools. Participation in the group is open to all interested expert.
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