




## Risk Communication in Early Containment of COVID-19 Pandemic in Iran: Implementation of the World Health Organization Strategic Preparedness and Response Plan (WHO–SPRP)

Nima Azh<sup>1</sup>, Tayebeh Najafimoghadam<sup>2</sup>, Nogol Motamed Gorji<sup>1</sup>, Jalil Koohpayehzadeh<sup>3</sup>, Mohsen Asadi Lari<sup>4</sup>, Nader Tavakoli<sup>5</sup>, Seyed Mohsen Zahraei<sup>6</sup>, Massomeh Goshtae<sup>2</sup>, Babak Eshrati<sup>7</sup>, Mehdi Moghtadaei<sup>8</sup>, Seyed Abbas Motevalian<sup>4</sup>, Hamid Reza Baradaran<sup>4\*</sup> 

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### Abstract

**Background:** Health systems must have functional and efficient preparedness and response plans to manage pandemics. Moreover, it is essential to adjust to changing circumstances and the dynamic character of pandemics. The World Health Organization (WHO) introduced the Strategic Preparedness and Response Plan (SPRP), emphasizing 144 measures across 10 pillars, helping governments prepare and respond to the coronavirus disease 2019 (COVID-19) pandemic. This study aimed to determine how the Iranian health system, based on the WHO–SPRP, addresses strategic preparedness and response plan in the COVID-19 pandemic at the national level.

**Methods:** The WHO–SPRP was adopted and translated into Persian by 2 bilingual natives. The chief of the health office requested that authorized officers complete the SPRP. Then, a meeting was held by officers of related units involved in COVID-19 management to address the SPRP at regional and national levels.

**Results:** Our findings suggest that up to August 2020, effective risk communication and community engagement were not fully established. Our response plan lacked evidence-based information and educational messaging to consistently shape public opinion and impression of a respiratory pandemic.

**Conclusion:** The Iranian health care system and services were almost able to address the SPRP and perform the major indicators that the WHO had proposed. However, special attention should be paid to risk communication and community engagement to empower informed decision-making by individuals and communities.

**Keywords:** Response Plan, Risk Communication, Coronavirus Disease 2019, Pandemic

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### Introduction

The World Health Organization (WHO) introduced the Strategic Preparedness and Response Plan (SPRP) for coronavirus disease 2019 (COVID-19) on February 2, 2020.

On February 12, 2022, an operational guideline was drafted and several strategic pillars were introduced to help

**Corresponding author:** Dr Hamid Reza Baradaran, [Baradaran.HR@iums.ac.ir](mailto:Baradaran.HR@iums.ac.ir)

<sup>1</sup> School of Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Deputy of Healthcare, Iran University of Medical Sciences, Tehran, Iran

<sup>3</sup> Department of Community Medicine, Preventive Medicine & Public Health Research Center, Iran University of Medical Sciences, Tehran, Iran

<sup>4</sup> Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran

<sup>5</sup> Emergency Medicine Department, Trauma and Injury Research Center, Iran University of Medical Sciences, Tehran, Iran

<sup>6</sup> Ministry of Health and Medical Education, Tehran, Iran

<sup>7</sup> Center for Preventive Medicine, Department of Social Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>8</sup> International Affairs Department, Iran University of Medical Sciences, Tehran, Iran

#### ↑What is “already known” in this topic:

COVID-19 is a great example of how vital it is for Health systems to have functional and efficient strategic preparedness and response plans (SPRP) to withstand pandemics. WHO introduced 144 measures across 10 pillars to help governments prepare and respond to this respiratory pandemic.

#### →What this article adds:

Our study revealed that risk communication and community engagement were missed in our program until August 2020, and shortly after, we witnessed the emergence of the second peak of COVID-19 in Iran. Thus, we recommend regular evaluation of health system actions using the WHO–SPRP.

strengthen national and international preparedness and response to the COVID-19 outbreak. The SPRP has undergone multiple updates and includes 144 measures distributed across ten pillars, the most recent update adding vaccination and maintenance of key health services (1).

Health systems must be well-prepared for pandemics and have effective response strategies. Additionally, it is essential to be flexible and adjust to new circumstances and the dynamic character of pandemics. As of early February 2020, emergency response teams were primarily established in Iran; however, the management structure underwent significant changes due to frequent revisions. Numerous organizations have been involved directly or indirectly in managing this pandemic and thus understanding the capacity and role of each of these organizations is of paramount importance.

The objective of this study was to determine how the Iranian health system responds strategically to the COVID-19 pandemic at the national level based on the WHO—SPRP.

### Methods

To assist nations in preparing for and combating the COVID-19 pandemic, the WHO developed the SPRP, highlighting 144 actions across ten pillars. In pillar 1, national-level coordination, planning, and monitoring investigate multisectoral actions, plans, and the continuous review of resources and capacities. Next, risk communication and community engagement focus on the implementation of a communication plan, the identification of key populations, and the behavioral change approach. Case definition, active surveillance and monitoring, and development of a program for analysis of cases are included in surveillance, rapid response teams, and case investigation pillar. Points of entry discusses travelers' safety and border restrictions. Real-time reverse transcription-polymerase chain reaction (RT-PCR) testing is required by national laboratory standards. The topic of infection prevention and control (IPC) includes contact tracing and the distribution of personal protective equipment among healthcare professionals as well as the development and use of IPC guidelines at both the healthcare facility and community levels. Case management methods include evaluations of intensive care units, treatment protocols, and the distribution of the local healthcare burden. Pillar 8 evaluates supply chain management, operational support and logistics, and human resources management. In pillar 9, maintaining crucial health services and systems is extensively covered, and lastly, the development of vaccination is explained in pillar 10.

A qualitative study using the Delphi model was conducted. The WHO—SPRP was adopted and translated into Persian by two bilingual natives. Based on their position and experience, authorized officers in pertinent health units within the Ministry of Health were interviewed and asked to complete the SPRP. The interview transcripts and responses to SPRP checklists were reviewed. Data collection and analysis were done simultaneously. Transcripts were reviewed several times to ensure a holistic perception. The SPRP guideline topics were used to achieve second-level deductive coding, and pillars were filled according to per-

ceived codes and themes. The findings were verified in separate interviews with the respondents. At this stage, a meeting was held by officers of related units involved in managing the COVID-19 pandemic to address the SPRP at both regional and national levels.

### Results

The adopted and adjusted strategies—the health system's responses and plans—are presented with details in [Appendix](#) and summarized in 10 pillars as follows:

#### ***Pillar 1. Country-Level Coordination, Planning, and Monitoring:***

- To ensure coordination among authorities, seven sessions were held for the clarification of jurisdictions and discussions over plans from February 2020 to August 2020, contributing to the SPRP evaluation summary.

- Following the pandemic in early April 2020, the first COVID-19 task force was established; consequently, the national COVID-19 headquarters was established in early May 2020.

- In response to the COVID-19 pandemic, the Iranian Ministry of Health developed a unique program at the Centers for Disease Control—a program quite similar to the influenza control program.

#### ***Pillar 2. Risk Communication and Community Engagement:***

- Based on the findings of this study, effective risk communication was not established until August 2020, as public attitude and perception toward a respiratory epidemic were not systematically formed by knowledge translation and educational messages. Anecdotal evidence indicates that by the time this article was written, the situation had improved. Through the use of social media, which was previously reserved for public announcements, we were able to reach important influential populations in our programs, such as students. To deliver a unified, scientifically sound message, the capacity of other key influencing populations, such as public figures, was not put to use early.

#### ***Pillar 3. Surveillance, Rapid Response Teams, and Case Investigation:***

- Early adoption of the National Electronic Health Recording System and ongoing data collection were very beneficial for disease surveillance at the COVID-19 observatory facility.

- Modification of previously performed programs for high-risk populations ensured sustainable service despite the pandemic.

#### ***Pillar 4. Points of Entry:***

- Regulations governing the containment of suspected cases and travel bans were only implemented four months into the epidemic, mainly to limit its spread and allow time for logistical preparation.

- Step-2 work and environmental health regulations for airports and terminals went into effect in late March 2020.

- Regarding community engagement for travel safety, no

plans were sought by August 2020.

- Later, plans for community empowerment and monitoring of public transportation were offered by the municipality, the provincial governor's office, and the Islamic Republic of Iran Broadcasting.

#### **Pillar 5. National Laboratories:**

- The Pasteur Institute of Iran has been designated as a reference and the international focal contact laboratory for COVID-19 in Iran.

- Although designated hospitals for patients with COVID-19 could perform RT-PCR testing safely, there were no active plans for genetic sequencing.

#### **Pillar 6. Infection Prevention and Control:**

- The Center for Communicable Disease Management has developed multiple guidelines for COVID-19 prevention and control and has kept updating them since March 2020.

- The National IPC program was implemented and evaluated at the national level in the health care system; however, evaluating the IPC capabilities in public areas proved to be a challenging task. There was no unified IPC training program; therefore, several local training approaches were developed at specified sites.

#### **Pillar 7. Case Management:**

- National guidelines for case definition and management are continuously updated based on recent evidence by a panel of experts formed on February 24, 2020, and Version 7.2 is currently in use (2).

- Hotlines, including medical advice and referral, diet, quarantine, and grief counseling, were dedicated to COVID-19 patients.

- Special care was provided for vulnerable populations, including pregnant women, newborns, children, the elderly, and immunocompromised patients

#### **Pillar 8. Operational Support and Logistics:**

- Critical infrastructures have already been identified and health protocols for their sustainability are introduced. The deputy of food and drug is in charge of supply and demand and the deputy of treatment is in charge of staff distribution.

#### **Pillar 9. Maintaining Essential Health Services and Systems:**

- Numerous health services are modified according to the COVID-19 precautions. These timely changes have led to safe and uninterrupted delivery of other care programs to high-risk populations.

- Our assessments suggest that we could reorganize our human resources in a responsive and timely manner to address the dynamic nature of COVID-19; however, health care professionals have suffered from burnout due to several peaks of COVID-19 in Iran.

#### **Pillar 10. Vaccination**

- Iran's Ministry of Health released the 11-chapter national vaccination document on January 19, 2021 (3). This

national program was arranged in 4 steps.

- The first step continued throughout the winter with medical professionals interacting with patients, the elderly, and the disabled in hospitals and care facilities. The second step included the general elderly and at-risk populations. The third step included those living in camps and nursing homes, military personnel in barracks, addicted patients, refugees in camps, and prisoners. Finally, in the fourth step, vaccination was carried out for the general public.

- The scientific committee of the national COVID-19 management headquarters is in charge of the evaluation and accreditation of vaccines. Vaccine-related events are reported to the vaccination office of the communicable diseases unit of the vice-chancellor for health and then to the scientific committee.

#### **DISCUSSION:**

The WHO-SPRP includes 144 measures to be considered by health systems, which have been successfully implemented by the eastern Mediterranean, European, north African, and Central American regions to help manage the COVID-19 pandemic (4-9).

#### **Lessons Learned and Implications to the Stakeholders:**

1. Our study found that, until August 8, 2020, there was a strategic gap in "risk communication." Thus, special attention should be paid to risk communication and community engagement to empower informed decision-making by individuals and communities. Risk communication is a core public health intervention in any disease outbreak and health emergency and refers to the real-time exchange of information, advice, and opinions between experts, officials, and people who face a threat to their well-being to enable informed decision-making and adopt protective behavior. Public behavior change is essential in the effective control of the pandemic. Persuading the community to avoid social contact and the use of face masks requires active community engagement, which is highly dependent on effective communication with trusted information sources. Therefore, behavior change plays a major role in controlling the pandemic (10, 11). A modeling study by Teslya et al suggests that mandated social distancing by authorities can only delay an epidemic. Therefore, mobilization of public self-imposed measures is essential in preventing secondary peaks (12).

2. Data mining of social media is a novel method to understand public concerns at different time points about the news and epidemiological features of COVID-19. During the first months of the epidemic, transmission routes and prevention methods were the top searched themes on Chinese social media (13, 14). Three separate studies on Twitter and other sources concluded that even though medical articles and sound information would eventually leak into social media, they cannot replace the role of effective communication with public health officials. Social media analysis may also be used to slow the spread of false information, or the so-called "infodemic" (5, 15-17).

3. The development of 2-way channels to address public concerns and foster confidence still needed to be carefully

planned. Public attitude assessment, dissemination of evidence-based messages, and rapid training of officials for risk communication were rather absent until August 2020. On January 19, 2021, a thorough chapter was developed in the national vaccination document to counter the infodemic around vaccination and to address proper risk communication (3). A systematic review of national documents for COVID-19 could not find any risk communication plans in the first 6 months of the epidemic for Tunisia and France. However, the early involvement of the Ministry of Information and Broadcasting and the requirement to disseminate health information across numerous channels assisted early risk communication in Germany and Pakistan (7, 8).

#### As for other pillars:

4. First-line care providers are at greater risk for exhaustion. Some reports suggest that almost 80% of physicians feared infecting their family members (18). Therefore, addressing the insecurity and burnout of health workers is a challenge for all authorities in human resources.

5. The early establishment of regional COVID-19 laboratories and refinement of previous care services were strengths of our response plan.

6. The early establishment of an observatory for COVID-19 helped monitor the disease burden on different hospitals. The information given aided in the modeling and cost-benefit analyses of lockdown and its social and economic repercussions, which are only achievable with active monitoring systems (19).

7. Contact tracing, quarantine, and further investigation of passengers with symptoms are measures to slow down the transmission (20, 21). Border restrictions by the Chinese government in the first 3.5 weeks have been an effective measure, reducing the exportation of cases by a mean of 81.3% (95% CI, 80.5%-82.1%), helping public health authorities to better prepare themselves (22). The Australian government also used the opportunity to impose a travel ban on mainland China and later other high-risk departure ports (9 days after the pandemic was declared) (23). By August 2020, tailored guidelines for containment and quarantine were drafted; however, there was a gap of 4 months into the pandemic and the efficacy of this measure is heavily time-dependent (10).

#### Conclusion

Our study shows that risk communication and community engagement were not almost entirely prioritized in our program until August 2020, and shortly after, we witnessed the emergence of the second peak of COVID-19 in Iran. Thus, we recommend regularly evaluating health system activities using the WHO—SPRP. Moreover, by highlighting jurisdictions and responsibilities, authorities can operate more effectively and avoid public disappointment and confusion.

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#### Authors' contributions

T.N., B.E., J.K., M.A.L., and N.T. provided the interview

results. T.N. gathered the results. N.A. and N.M.G. translated, coded, and analyzed the data. N.A. and H.R.B. drafted the manuscript. All authors read and approved the final manuscript.

#### Conflict of Interests

The authors declare that they have no competing interests.

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Appendix. Study results: SPRP of Pillars 1 to 8 in August 2020 and Pillars 9 and 10 in February 2022<sup>a</sup>

Pillar 1. Country-level Coordination, Planning, and Monitoring

Step	Actions to Be Taken	Responses and Plans
1	1 Activate multi-sectoral and multi-partner coordination mechanisms to support preparedness and response	National COVID-19 management HQ was established in early May 2020.
	2 Engage with national authorities and key partners to develop a country-specific operational plan with an estimated resource Requirements for COVID-19 preparedness and response, or preferably adapt, where available, an existing Influenza Pandemic Preparedness Plan	-A new program for COVID-19 was drafted by the office of disease control -Human resources management was applied through repositioning the health system and rapid recruitments.
	3 Conduct initial capacity assessment and risk analysis, including mapping of vulnerable populations	Based on previous national guidelines of the Ministry of Health (MoH <sup>b</sup> ), at-risk populations were defined readily.
	4 Begin establishing metrics and monitoring and evaluation systems to assess the effectiveness and impact of planned measures	- The Communicable Diseases Unit continuously received data through the SIB <sup>c</sup> online platform. - Daily Excel forms from primary health centers were being gathered in regional Communicable Diseases Units
2	5 Establish an incident management team, including rapid deployment of designated staff from national and partner organizations, within a public health emergency operation center (PHEOC) or equivalent, if available	In late April 2020, a national task force for COVID-19 was formed, but later on, with the formation of COVID-19 management headquarters as of early May 2020 task force was disbanded.
	6 Identify, train, and designate spokespeople	Changes were made as of June 2020 by the introduction of the official COVID-19 spokesperson for MoH <sup>b</sup> . Previously the public affairs chairman of the MoH handled announcements.
	7 Engage with local donors and existing programs to mobilize/allocate resources and capacities to implement an operational plan	Basij forces were arranged to help speed up the screenings.
	8 Review regulatory requirements and legal basis of all potential public health measures	The Governor's Office, the Provincial Governor, the Municipality, the and Iranian Medical Council performed a review.
	9 Monitor implementation of the CPRP based on key performance indicators in the SPRP and produce regular situation report	Seven sessions were held until August 2020.
	10 Conduct regular operational reviews to assess implementation success and epidemiological situation and adjust operational plans as necessary	Epidemiological monitoring of the pandemic took place in the COVID-19 management HQ on a national level based on daily observatory reports.
	11 Conduct after-action reviews in accordance with international health regulations (IHR-2005) as required	Checklists were developed although they were not strictly based on IHR.
3	12 Use the COVID-19 outbreak to test/learn from existing plans, systems, and lesson-learning exercises to inform future preparedness and response activities	We implemented learned lessons from the Influenza program and a COVID-19 re-evaluation for secondary waves preparedness was also drafted.

<sup>a</sup>HQ, headquarters; COVID-19, coronavirus disease-2019; IHR, international health regulations; SPRP, Strategic Preparedness and Response Plan, NGO, nongovernmental organization, WHO, World Health Organization; MOH, Ministry of Health; HSE, health, safety, and environment; RT-PCR, real-time reverse transcription-polymerase chain reaction; IUMS, Iran University of Medical Sciences; IPC, infection prevention control; PPE, personal protective equipment; DIC, drop-in center; DCP, disease commodity package, SOP, standard operating procedure; ToRs, term of references; AEFI, adverse events following immunization; AVSS, active vaccine safety surveillance; UNICEF, United Nations International Children's Emergency Fund; NITAG, a national coordinating committee at country, provincial, and regional levels; RITAG, regional immunization technical advisory groups; NCC, national development plan; NDVP, national development, and vaccination plan; HR, human resource; UN, united nation; DIC, drop-in center; ID, identity.

<sup>b</sup>MoH, Ministry of Health; NRA, national regulatory authority EPI, expanded programme on immunization; MAH, marketing authorization holder.

<sup>c</sup>SIB, an acronym that translates to [Uniform Health Platform]—an online patient history platform used in primary care.

<sup>d</sup>Akhavan Center (Article 16) are rehabilitation centers for addiction.

<sup>e</sup>Drop in centers are organized shelters for the homeless.

<i>Pillar 2. Risk Communication and Community Engagement</i>		
Step	Actions to Be Taken	Responses and Plans
1	1 Implement the national risk communication and community engagement plan for COVID-19, including details of anticipated public health measures (use the existing procedures for the influenza pandemic, if available)	The Municipality, the Governor's Office, and the Islamic Republic of Iran Broadcasting reported no program foreseen until August 2020
	2 Conduct rapid behavior assessment to understand the key target audience, perceptions, concerns, influencers, and preferred communication channels	None
	3 Prepare local messages and pretest through a participatory process, specifically targeting key stakeholders and at-risk groups	None
	4 Identify trusted community groups (local influencers such as community leaders, religious leaders, health workers, and community volunteers) and local networks (women's groups, youth groups, business groups, traditional healers, etc.)	None
2	5 Establish and utilize clearance processes for timely dissemination of messages and materials in local languages and adopt relevant communication channels	None
	6 Engage with existing public health and community-based networks, media, local NGOs, schools, local governments, and other sectors, such as health care service providers, education sector, business, travel, and food/agriculture sectors using a consistent mechanism of communication	Based on the successful experience of social media channels for different health services for different populations, new channels were specially introduced for COVID-19 communication, mostly based on social media groups.
	7 Utilize 2-way channels for community and public information sharing such as hotlines (text and talk), responsive social media such as U-Report where available, and radio shows, with systems to detect and rapidly respond to and counter misinformation	None
	8 Establish large-scale community engagement for social and behavior change approaches to ensure preventive community and individual health and hygiene practices in line with the national public health containment recommendations	None
3	9 Systematically establish community information and feedback mechanisms through social media monitoring, community perceptions, knowledge, attitude, and practice surveys, and direct dialogues and consultations	None
	10 Ensure changes to community engagement approaches based on evidence and needs, and ensure all engagement is culturally appropriate and empathetic.	None
	11 Document lessons learned to inform future preparedness and response activities	National documentation of regional experiences is in progress by regional health deputies.

**Pillar 3. Surveillance, Rapid Response Teams, and Case Investigation**

Steps	Actions to Be Taken	Responses and Plans
1	1 Disseminate case definition in line with the WHO guidance and investigation protocols to health care workers (public and private sectors)	All protocols were sent to treatment teams by regional deputies of health care, drafted by the center for communicable disease control and were publicly available via the website of MoH <sup>b</sup>
	2 Activate case finding and event-based surveillance for influenza-like illness, and severe acute respiratory infection	Regional communicable disease units were in charge of active surveillance in their respective regional deputy of health care
	3 Assess gaps in active case finding and event-based surveillance systems	Data from primary and secondary health centers could not be merged in the SIB <sup>c</sup> platform as secondary centers used individual hospital information systems. Thus, observatories were settled by regional health deputies. Currently performed through the SIB <sup>c</sup> portal, the SALAMAT.IR portal, and reports of 16-hour primary health centers gathered in observatories.
	4 Enhance existing surveillance systems to enable monitoring of COVID-19 transmission and adapt tools and protocols for contact tracing and monitoring COVID-19	24-hour reports were continuously drafted.
	5 Undertake case-based reporting to the WHO within 24 hours under IHR (2005)	Care services for different populations were revised as follows: Pregnant women: - Daily follow-up of definitive COVID-19 cases of pregnant women for 14 days, follow-up of suspected pregnant cases - Identifying high-risk mothers and observing them - Determining pregnancy termination date based on care service indications (macrosomia, diabetic mothers, repetitive Cesarean-section, etc.)
	6 Actively monitor and report disease trends, impacts, and population perspective to global laboratory/epidemiology systems, including anonymized clinical data, case fatality ratio, high-risk groups (pregnant women, immunocompromised), and children	Infants, children, and breastfeeding: - Follow-up of newborns of suspected, probable, and definite COVID-19 cases. - Active follow-up of definitive pediatric COVID-19 cases - Arrangements for sufficient supply and distribution of formula milk in drug stores according to increased demand and financial burden of the pandemic  The Ministry of Education offices, the Special Needs Education Organization, the Sports and Youth Office, barracks, universities and faculties, and seminars provided access to some key populations as follows:  Adolescent group: - Nearly 2.2 million people in this population were covered by the Youth and Adolescent Health Unit in Tehran province. Connection with this population was established through the office of Physical Education and Health in the Ministry of Education. Parents and staff were mainly addressed for health education. This office supported healthy behavior with its branches in all urban and rural regions of the province. - More directly, student health ambassadors and staff health officers were stationed inside schools. - Health officers were also connected with students through social media to continue the pandemic education. - During late February 2020, a virtual group named "Prevention of Corona at schools" was established through which all educational contents and protocols were provided to representatives of the Health Office in the Ministry of Education.  Youth group: - Almost 1.2 million people in Tehran province attend universities, seminars, gyms, and barracks. These focal points were identified in the covered region and their representatives were introduced. - All these gathering points were shut down as of the beginning of the pandemic. Their representatives were gathered in a virtual group provided with educational content to avoid loss of contact.  Governor's Office, Provincial Governor, Municipality, Iranian Medical Council, Ministry of Education: - Continuous reports from the SIB <sup>c</sup> system and monitoring primary health centers
2	7 Train and equip rapid-response teams to investigate cases and clusters early in the outbreak and conduct contact tracing within 24 hours	Rapid response teams were present; yet, not operating based on the disaster management unit's protocols in August 2020.
	8 Provide robust and timely epidemiological and social science data analysis to continuously inform risk assessment and support operational decision-making for the response	24-hour data collection was in progress.
	9 Test the existing system and plan through experience and/or table-top or simulation exercises and document findings to inform future preparedness and response activities	Not performed
	10 Produce weekly epidemiological and social science reports and disseminate them to all levels and international partners	Epidemiological monitoring of the pandemic took place in COVID-19 management HQ on a national level based on daily observatory reports.



<i>Pillar 4. Points of Entry</i>			
Steps	Actions to Be Taken	Responses and Plans	
1	1	Develop and implement a point of entry public health emergency plan	<p>Multisectoral guidelines led to an environmental health program focusing on the following issues:</p> <ul style="list-style-type: none"> <li>- Disinfection of airport, metro stations, and bus terminals</li> <li>- Fever measurement and personnel health check upon entry to work were advised to all covered units and primary health HSE officers were used to enforce this.</li> </ul>
2	2	Disseminate the latest disease information on, standard operating procedures, and equip and train staff in appropriate actions to manage ill passengers	Work and environmental health step 2 guidelines for terminal staff were introduced and applied in August 2020.
	3	Prepare rapid health assessment/isolation facilities to manage ill passengers and safely transport them to designated health facilities	Passengers and students were quarantined on several occasions in hotels by August 2020.
3	4	Communicate information about COVID-19 to travelers	None
	5	Regularly monitor and evaluate the effectiveness of readiness and response measures at points of entry, and adjust readiness and response plans as appropriate	<ul style="list-style-type: none"> <li>- Continuous inspections of MehrAbad airport and Tehran West Terminal as domestic passenger entry points</li> <li>- Incoming international passengers were monitored and quarantined in several provinces.</li> </ul>
<i>Pillar 5. National Laboratories</i>			
Step	Actions to Be Taken	Responses and Plans	
1	1	Establish access to a designated international COVID-19 reference laboratory	<ul style="list-style-type: none"> <li>- Pasteur Institute of Iran</li> <li>- West health center laboratory for IUMS 16-hour and 24-hour health centers</li> </ul>
	2	Adopt and disseminate standard operating procedures as part of disease outbreak investigation protocols for specimen collection, management, and transportation for COVID-19 diagnostic testing	Sampling, storage, and transfer guide for the COVID-19 Health Reference Lab. was introduced.
	3	Identify hazards and perform a biosafety risk assessment at participating laboratories  use appropriate biosafety measures to mitigate risks	Performed by regional deputies of treatment
	4	Adopt standardized systems for molecular testing, supported by assured access to reagents and kits	Performed in selected COVID-19 hospital laboratories
2	5	Ensure specimen collection, management, and referral network, and ensure procedures are functional	Specimen collections were monitored daily
	6	Share genetic sequence data and virus materials according to established protocols for COVID-19	None
	7	Develop and implement plans to link laboratory data with key epidemiological data for timely data analysis	Data were transferred to the MoH <sup>b</sup> portal and the SIB <sup>c</sup> platform daily
	8	Develop and implement surge plans to manage increased demand for testing, and consider conservation of lab resources in anticipation of potential widespread COVID-19 transmission	Supply and demand were estimated every week based on the national Communicable Disease Office guidelines.
3	9	Monitor and evaluate diagnostics, data quality, and staff performance, incorporate findings into the strategic review of the national laboratory plan, and share lessons learned	This was performed by the Technical Officer of each laboratory
	10	Develop a quality assurance mechanism for point-of-care testing, including quality indicators	RT-PCR point of care quality testing was not performed.
Additional	11	Collaborating organizations	Pasteur Institute of Iran, Health Reference Laboratory of Ministry of Health

*Pillar 6. Infection Prevention and Control*

Steps	Actions to Be Taken	Responses and Plans
1	1 Assess IPC capacity at all levels of the health care system, including public, private, traditional practices, and pharmacies. Minimum requirements include a functional triage system and isolation rooms, trained staff (for early detection and standard principles for IPC); and sufficient IPC materials, including PPE and WASH services/hand hygiene stations	The Governor's Office, the Provincial Governor, the Municipality, and the Iranian Medical Council reported assessing IPC capacities but did not publish any reports by August 2020.
	2 Assess IPC capacity in public places and community spaces where the risk of community transmission is considered high	None
	3 Review and update existing national IPC guidance: health guidance should include a defined patient-referral pathway, including an IPC focal point, in collaboration with case management. Community guidance should include specific recommendations on IPC measures and referral systems for public places such as schools, markets, and public transport as well as community, household, and family practices	For COVID-19 prevention and control, the National Communicable Disease Office has created several guidelines and is constantly updating them. Also, 14 work-related guidelines and 7 dietary guidelines have been developed through August 2020.
	4 Develop and implement a plan for monitoring health care personnel exposed to confirmed cases of COVID-19 for respiratory illness	Online self-declaration websites for staff were launched by regional deputies of treatment.
	5 Develop a national plan to manage PPE supply (stockpile, distribution) and identify IPC surge capacity (numbers and competence)	Governor's Office, Provincial Governor, Municipality, Iranian Medical Council, and the MoH <sup>b</sup> deputy of food and drug reported daily planning
2	6 Engage trained staff with authority and technical expertise to implement IPC activities, prioritizing based on risk assessment and local care-seeking patterns	16-hour and 24-hour centers for COVID-19 received full available PPE from The deputy of food and drug.
	7 Record, report, and investigate all cases of healthcare-associated infections	Data gathered from observatories are presented in the MASK application through colors, representing required levels of alert and precautions in different provinces.
	8 Disseminate IPC guidance for home and community care providers	Guidelines for public use were available via the "1569" hotline in 9 categories since late March 2020.
	9 Implement triage, early detection, and infectious-source controls, administrative controls, and engineering controls; implement visual alerts (educational material in the appropriate language) for family members and patients to inform triage personnel of respiratory symptoms and to practice respiratory etiquette	Currently active in 16-hour primary health centers.
	10 Support access to water and sanitation for health (WASH) services in public places and community spaces most at risk	<ul style="list-style-type: none"> <li>- As described in the first and second steps of COVID-19 reopening of business protocols, sanitary water and health products are mandatory for reopening.</li> <li>- Mandatory use of PPE and other guidelines were uploaded online and notifications were sent to all covered work units.</li> <li>- Implementation of guidelines was enforced through HSE officers of primary health centers.</li> <li>- Water distribution systems are repeatedly inspected and water sanitation is controlled via chlorometry</li> <li>- Hospitals infections prevention and control units follow the second step of reopening guidelines, matching WHO guidelines.</li> </ul>
3	11 Monitor IPC and WASH implementation in selected healthcare facilities and public spaces using the Infection Prevention and Control Assessment Framework, the Hand Hygiene Self-Assessment Framework, hand hygiene compliance observation tools, and the WASH Facilities Improvement Tool	Health facility managers were notified based on guidelines.
	12 Provide prioritized tailored support to health facilities based on IPC risk assessment and local care-seeking patterns for supplies, human resources, and training	
	13 Carry out training to address any skills and performance deficits	None

Pillar 7. Case Management		
Step	Actions to Be Taken	Responses and Plans
1	1 Map vulnerable populations and public and private health facilities (including traditional healers, pharmacies, and other providers) and identify alternative facilities that may be used to provide treatment	The family health care unit and the environmental health unit of the deputy of health care identified vulnerable populations based on prior health services and programs.
	2 Identify intensive care unit capacity	Available in the MoH <sup>b</sup> deputy of treatment observatory.
	3 Continuously assess the burden on the local health system, and as the less capacity to safely deliver primary health care services	Patients are directed to 16-hour and 24-hour centers for outpatient assessment and their SIB <sup>c</sup> profile is updated accordingly, thus a load of patients is observable in real-time.
	4 Ensure that guidance is made available for the self-care of patients with mild COVID-19 symptoms, including guidance on when referral to health care facilities is recommended	Protocols on patient education are introduced to health care providers by the deputy of health care.
2	5 Disseminate regularly updated information, train, and refresh medical/ambulatory teams in the management of severe acute respiratory infections and COVID-19-specific protocols based on international standards and WHO clinical guidance; set up triage and screening areas at all health care facilities	All local protocols were published by the MoH <sup>b</sup> deputy of treatment using expert teams.
	6 Establish dedicated and equipped teams and ambulances to transport suspected and confirmed cases, and referral mechanisms for severe cases with comorbidity	Regional treatment deputies planned this for all 16-hour primary health centers.
	7 Ensure comprehensive medical, nutritional, and psychosocial care for those with COVID-19	The following was organized by the Imam Khomeini Relief Foundation, the State Welfare Organization of Iran, the Ministry of Education, Farhangian University, Seminaries, and the Ministry of Agriculture: <ul style="list-style-type: none"> <li>- Phone diet counseling via the 4030 system</li> <li>- Phone diet tips and content via the automated 1569 system</li> <li>- Educational videos on diet and COVID-19 are made and shared on social media for the public.</li> <li>- Form support groups for medical professionals who have COVID-19 and offer them specialized dietary advice</li> <li>- Give food packages for the pregnant population and undernourished children, through charitable fund-raising events</li> <li>- Occupational health and geriatric program experts visit the covered nursing homes, providing diet education for their supervisors</li> <li>- Preserve one-third of the workforce in active duty during the control phase of the pandemic. Use of full capacity should continue after primary control of pandemics</li> </ul> Faculty of behavioral sciences, the deputy of treatment, Tehran and Shahid-Beheshti universities of medical sciences, <sup>d</sup> Akhavan centre (Article 16), <sup>e</sup> drop-in centers (DIC): <ul style="list-style-type: none"> <li>- Grief counseling was introduced as of April 15, 2020, for COVID-19 losses</li> <li>- Screening of DIC patients</li> <li>- Start the “4030” phone grief counselling system by reorganizing the mental health workforce in April 2020</li> </ul>
	8 Participate in clinical expert networks to aid in the clinical characterization of COVID-19 infection, address challenges in clinical care, and foster global collaboration (optional based on country capacity)	All are monitored by the Iranian Medical Council None

Pillar 7. Case Management		
Step	Actions to Be Taken	Responses and Plans
3	9	<p>Prepare to assess diagnostics, therapeutics, and vaccines for compassionate use, clinical trials, regulatory approval, market authorization, and/or post-market surveillance, as appropriate</p> <p>A national-level regulatory is in progress.</p>
	10	<p>Adopt international R&amp;D blueprint guidance and WHO protocols for special studies (companionate use, monitored emergency use of unregistered and investigational interventions) to investigate additional epidemiological, virologic, and clinical characteristics; designate a clinical trial or study sponsor</p> <p>The deputy of research and technology is active.</p>
	11	<p>Evaluate implementation and effectiveness of case management procedures and protocols (including for pregnant women, children, and immunocompromised individuals), and adjust guidance and/or address implementation gaps as necessary</p> <p>Monitored by the Iranian Medical Council</p> <ul style="list-style-type: none"> <li>- The Special Needs Education Organization, the Sports and Youth Office, the Barracks, universities and the covered faculties, and seminaries all performed the following actions:</li> <li>- In late February as schools were shut down, conditions for safe reopening and possible risks of early reopening were fully explained to the Ministry of Education.</li> <li>- The SALAMAT.IR web portal was introduced to the Ministry of Education, and the Chief Office of Education in Tehran province was asked to register the health records of students.</li> <li>- Arrangements were made with the Chief Office of Education in Tehran for foreign students in Tehran province so that students without a national code could register their health records in the SALAMAT.IR portal.</li> <li>- The MoH<sup>b</sup> Youth and Adolescent Health Office was asked to propose an expert opinion on the process of restoring target group services and missed cares through the pandemic.</li> <li>- The Youth National Campaign website was launched to involve children and teenagers in public health.</li> <li>- Covered schools were asked to provide a report from student health ambassadors during the pandemic.</li> </ul> <p>The following special care services were organized by the State Welfare Organization of Iran, marriage registration offices, midwifery offices, the Iranian Medical Council, and primary health centers:</p> <p>Pregnant women:</p> <ul style="list-style-type: none"> <li>- Triage order in the health sector in addition to the treatment sector for pregnant women</li> <li>- Reduction of maternal visits from 8 to 4 caused a loss of mental health screening visits in the 16<sup>th</sup>-20<sup>th</sup> weeks; therefore, mental health visits were arranged for pregnant women needing them.</li> <li>- Grouping hospitals for deliveries based on whether a woman is COVID-19-infected or healthy.</li> <li>- Proposal of virtual childbirth classes for funding and infrastructure.</li> </ul> <p>Newborns, Children, and Breast milk</p> <ul style="list-style-type: none"> <li>- Report of discrepancy in COVID-19 screening form of the SIB<sup>c</sup> health system with the MoH<sup>b</sup> standard service of "Child care" in primary health centers.</li> <li>- Recommendations on separation of general waiting halls in auxiliary primary health centers from patient waiting rooms</li> <li>- Follow-up of MANA (Integrated Care for Ill Children) health form to be uploaded to the SIB<sup>c</sup> health system for comprehensive patient management and case follow-up</li> <li>- Excel registry forms for pediatric patients were sent to covered primary health centers while the SIB<sup>c</sup> system was being updated for MANA forms.</li> <li>- Similar factors of the MANA health program were compared to a similar timeline of last year to investigate the pandemic effect on the pediatric population.</li> <li>- Due to the financial burden of the COVID-19 epidemic, subsidies are provided for formula milk to rural infants under the age of 1 to prevent them from being fed livestock milk.</li> <li>- Monitoring the implementation of baby-friendly hospital guidelines. planning for breastfeeding counselling using social media/phone lines.</li> </ul>

<i>Pillar 8. Operational Support and Logistics</i>			
Step	Actions to Be Taken	Responses and Plans	
1	1	Map available resources and supply systems in health and other sectors; conduct in-country inventory review of supplies based on the WHO's (a) DCP and (b) COVID-19 patient kit, and develop a central stock reserve for COVID-19 case management	The regional deputy of food and drug of each corresponding university in commission with the MoH <sup>b</sup> mapped regional resources.
2	2	Review supply chain control and management system (stockpiling, storage, security, transportation, and distribution arrangements) for medical and other essential supplies, including COVID-19 DCP, and patient kit reserve in-country	The Ministry of Education, Iranian Medical Council, Municipality, Governor's Office, and Provincial Governor were required to monitor daily supply and demand.
	3	Review procurement processes (including importation and customs) for medical and other essential supplies, and encourage local sourcing to ensure sustainability	None
	4	Assess the capacity of the local market to meet the increased demand for medical and other essential supplies, and coordinate international requests for supplies through regional and global procurement mechanisms	The Ministry of Education, Iranian Medical Council, Municipality, Governor's Office, and Provincial Governor were required to monitor daily supply and demand.
	5	Prepare staff surge capacity and deployment mechanisms; health advisories (guidelines and SOPs); pre- and post-deployment package (briefings, recommended/mandatory vaccinations, enhanced medical travel kits, and psychosocial and psychological support, including peer support groups) to ensure staff well-being	All educational resources and guidelines were accessible to health care providers through 6 channels: <ol style="list-style-type: none"> <li>1. National headquarters, including experts from the MoH<sup>b</sup> and Other experts on nationwide family health programs</li> <li>2. Regional deputy of health care experts</li> <li>3. Regional headquarters experts, primary health center supervisors, and technical officers</li> <li>4. Headquarters experts and 24-hour nursing home representatives</li> <li>5. Family health program experts in primary health centers, and urban community center representatives</li> <li>6. Health care providers and pregnant women</li> </ol> <p>Youth and teen health initiatives were implemented by Ministry of Education offices, Special Needs Education Organization, Sports and Youth Office, barracks, universities and the covered faculties, and seminaries, who collaborated with social media organizations to provide educational resources.</p> <p>- The deputy of health care created an educational social media channel designed for community revelation.</p> <p>Tehran and Shahid-Beheshti universities of medical sciences, faculty of behavioral sciences, deputy of treatment, Akhavan center (Article 16), and DIC: In cooperation, they have designed grief and loss counseling courses and protocols for mental health counselors. Additionally, there are accredited training seminars on "the treatment of frequent psychological responses during the COVID-19 epidemic." Rehearsals for "COVID-19 Stress Management" are held in the deputy for therapy. Managers at the DIC were also made aware of the psychological effects of the present pandemic.</p> <p>Iranian Medical Council, Municipality, Governor's Office, and Ministry of Education: Provision of guidelines and screening tools for suspected employees who exhibit symptoms on a regular basis.</p> <p>Psychological consultation for employees through hotlines and specific counseling facilities.</p>
3	6	Identify and support critical functions that must continue during a widespread outbreak of COVID-19 (eg, water and sanitation; fuel and energy; food; telecommunications/internet; finance; law and order; education; and transportation), necessary resources, and essential workforce	- With the support of the Ministry of Justice, the Islamic Revolutionary Guard Corps, the Municipality, the Chamber of Commerce, the Governor's office, the Provincial Governor, and the Basij Armed Forces: <p>Drinking water, food industries, and premises, fuel transfer, public transport and social communications were marked as a critical point during the COVID-19 pandemic.</p> <p>- Occupational health protocols for personnel are drafted and announced to unit managers. Health etiquettes, such as the use of PPE, daily sanitization of work perimeters, social distancing, and testing for fever, are enforced through occupational health officers.</p>

Pillar 9. Maintaining Essential Health Services and Systems				
step	Actions to Be Taken	Responses and Plans		
1	1	Establish (or adapt) simplified mechanisms and protocols to govern essential health service delivery in coordination with response protocols	In-person, health services were converted to teleservices where possible (eg, pregnancy education, diabetes consultations, etc.)	
	2	Establish triggers/thresholds that activate a prioritization process and phased reallocation of routine comprehensive service capacity toward essential services	Several criteria were developed by the Iranian MoH <sup>b</sup> for the virtual provision of health services. The main basic feature used for these criteria was the regional incidence of COVID-19.	
	3	Assess and monitor the ongoing delivery of essential health services to identify gaps and the potential need to dynamically remap referral pathways	There were several indicators used for the evaluation of the provision of the health care services. Also, there were regular meetings with the local primary health center managers to assess the stability of different health services and possible changing strategies.	
	4	Set up a coordination mechanism between finance and health authorities for financing essential health services (new May 2020)	A national executive committee was in charge, coordinating health, treatment, and food and drug deputies.	
	5	Introduce more flexible budget allocations and spending authority for frontline service providers (new May 2020)	According to the decisions made by the COVID-19 executive committee at the university level, all district health managers were authorized to use their budgets based on their assessments.	
	6	Suspend co-payments/user fees at the point of care for essential health services for all patients, regardless of insurance or citizenship status (new May 2020)	The advised COVID-19 testing was provided without charge. However, the 2 main national insurance programs—Social Security and "Salamat"—covered both inpatient and outpatient care.	
	7	Generate a country-specific list of essential services (based on context and supported by the WHO guidance and tools)	Each regional office of the deputies for health prioritized and listed their essential services.	
	8	Identify routine and elective services that can be delayed or relocated to nonaffected areas	Dental care and high-risk population care services and essential services were shifted to less crowded centers, fully devoting 16-hour and 24-hour centers to COVID-19 vaccination, screening, and treatment.	
	9	Create a roadmap for a progressive phased reduction of services	The list was drafted in late April 2020.	
	2	10	Conduct a functional mapping of health facilities, including those in public, private, and military systems (shared action with Pillar 7: Case Management)	The Basij military organization mapped strategic locations.
		11	Taking into account re-purposed facilities, concentrate 24-hour acute care services at designated first-level hospital emergency units (or similar) and ensure public awareness	COVID-19 triage centers were set up and active in all active emergency units.
		12	Redirect chronic disease management to focus on maintaining supply chains for medications and needed supplies, with a reduction in provider encounters	None
		13	Establish outreach mechanisms as needed to ensure delivery of essential services	This task was mainly performed by providing hotlines or training groups using the WhatsApp platform.
		14	Disseminate information to prepare the public for changes in service delivery platforms (including outreach) and guide safe care-seeking behavior (new May 2020)	Using websites, national TV, telephone, and mass short message service, changes in service delivery were constantly updated and broadcasted.
		15	Disseminate information to prepare the public and guide safe care-seeking behavior	Health care providers used their conventional guidelines as training materials in a virtual platform called the "Ambassador of Health" program.
		16	Establish screening of all patients on arrival and mechanisms for isolation at all sites using the most up-to-date COVID-19 guidance and case definitions	The latest guideline on point of care screening was the 11 <sup>th</sup> version of the COVID-19 management guideline provided by the Iranian MoH. <sup>b</sup>
		17	Ensure acuity-based triage at all sites providing acute care	The initial visit took place by emergency physicians to rule out COVID-19 as a requirement to proceed to other inpatient care
		18	Establish clear criteria and protocols for targeted referral (and counter-referral) pathways	The latest guideline on referral is the 11 <sup>th</sup> version of the COVID-19 management guideline provided by the Iranian MoH. <sup>b</sup>

<i>Pillar 9. Maintaining Essential Health Services and Systems</i>		
step	Actions to Be Taken	Responses and Plans
3	19 Maximize occupational health and staff safety measures in all categories listed in the associated guidance	The latest guideline on occupational health was the 11 <sup>th</sup> version of the COVID-19 management guideline provided by the Iranian MoH. <sup>b</sup>
	20 Map health worker requirements (including critical tasks and time expenditures) in the 4 COVID-19 transmission scenarios	None
	21 Create a roadmap for phased implementation and timely scale-up of a workforce redistribution strategy	None
	22 Allocate finances for timely payment of salaries, overtime, sick leave, and incentives or hazard pay, including for temporary workers	None
	23 Initiate rapid training mechanisms and job aids for key capacities, including diagnosis, triage, clinical management, and essential infection prevention and control	The clinical supervisors of the nursing and hospital staff, as well as the attending physicians, rapidly trained the medical professionals in their various fields.
	24 Map essential services list to resource requirements	Each office of the deputy for health prioritized and listed their essential services.
	25 Map public and private pharmacies and suppliers	According to the medicine shortage, this was made available at Red Crescent pharmacies in each province for remdesivir, favipiravir, and several other antivirals that were being used experimentally at the time.
	26 Create a platform for reporting inventory and stockouts, and for the coordination of redistribution of supplies	Inventory was maintained and reported using a regional food and drug deputy surveillance system.
<i>Pillar 10. Vaccination</i>		
Step	Actions to Be Taken	Responses and Plans
1	1 Establish an NCC or engage an existing committee for COVID-19 vaccine introduction with terms of reference, roles and responsibilities, and regular meetings, including relevant subtechnical working groups	The NCC for COVID-19 vaccination was established in late November 2020 along with the rest of the national covid management headquarters to supervise vaccination.
	2 Develop an NDVP or similar strategy documents with input from relevant bodies and in line with the WHO guidance and SAGE recommendations, including COVID-19 vaccine program costs (vaccine and supplies, operating costs, HR, and capital costs)	Accessible since January 19, 2021, in the 51 <sup>st</sup> meeting of national COVID management headquarters in the format of the national vaccination document for COVID-19.
	3 Identify and plan a national vaccine access/procurement approach (eg, COVAX facility, bilateral purchase agreement, procurement through UN agency, and self-procurement), ensuring that the procurement plan and purchasing strategy includes vaccines, ancillary supplies, and PPE	Available in the national vaccination document.
	4 Review epidemiological data and define target populations that will be prioritized for access to vaccines, estimate their numbers, and develop a delivery strategy for reaching these populations	A 4-stage vaccination approach was provisioned in the national vaccination document: Health care providers in direct contact with COVID-19 patients were the top priority, including the intensive care unit staff and emergency, internal medicine, and infectious disease wards. In the second stage, at-risk populations and the elderly residing in high-incidence provinces were prioritized.
	5 Confirm the existence of any expedited regulatory pathway for approval of COVID-19 vaccines (ie, emergency use authorization, and exceptional approval/approval mechanism based on reliance/recognition, abbreviated procedure, fast track, etc.), including timelines	The COVID-19 scientific committee of national headquarters was in charge of the approval and evaluation of vaccines.
	6 Assess dry storage and cold chain capacity and infrastructure needs at all levels regarding the characteristics of the COVID-19 vaccine and develop a plan to fill the identified supply and logistics gaps	A couple of months before the initiation of COVID-19 vaccination the whole cold chain of the health centers both at local and central levels was inspected and evaluated for any sort of gap. We requested help from other organizations, including Basij, municipalities, and so on to respond to the demand. We asked for vaccination locations, staff, and the logistics needed for the cold chain. We also advocated for several NGOs, including the Red Crescent.
	7 Ensure any necessary policies or mechanisms (including legislation) are updated or in place to enable the indemnification of vaccine manufacturers against any losses they may incur from the deployment and use of COVID-19 vaccines	Iran accepted related regulations on indemnification of vaccine manufacturers as included in the COVAX mechanism.
	8 Establish compensation schemes if there are unintended health consequences as a result of vaccines, including no-fault liability funds, and ensure that associated policies are in place	None
	9 Brief key ministries, NITAG, stakeholders, and partners about COVID-19 vaccine introduction and their expected roles. Inform regularly and disseminate global and regional guidance (ie, SAGE) with NITAGs & RITAGs and support NITAG working groups on COVID-19 vaccines	The coordination mechanism consists of the COVID-19 national coordinating committee at the country, provincial, and regional levels and NITAG and RITAG, medical university administrators, and their respective deputies for health were the direct executives of vaccination.
	10 Ensure NITAG and associated working groups, or the equivalent, are established and resourced to enable a policy recommendation/advice on the use of COVID-19 vaccines	NITAGs as a branch of national COVID-19 headquarters were in action.
	11 Ensure a safety coordinating committee is in place	Regular meetings took place.
	12 Include COVID vaccine program costs (vaccine, operating costs, HR, and capital costs) in government budgetary and/or planning documents approved by the appropriate authority; in addition, include appropriation or allocation (from MOF/treasury) in the cash planning as an additional means to ensure that financing is indeed readily available	A primary financial estimation is available in the national vaccination document.

Pillar 10. Vaccination			
Step	Actions to Be Taken	Responses and Plans	
2	13	Ensure the national regulatory authority or other concerned authority has clarified the regulatory requirements, and documents needed for regulatory approvals of COVID-19 vaccines and related supplies	The vaccination process was under the supervision of several organizations, including the regional deputies of health, Iranian MoH, <sup>b</sup> and so on.
	14	Ensure that regulatory procedures are in place for import permit of COVID-19 vaccines and related supplies, and identify the requirements and documents needed to import COVID-19 vaccines and related supplies, including taxes and tariffs	Available in the national vaccination document.
	15	Confirm to WHO the existence of expedited import approval from appropriate authorities. Timelines and maximum number of days should be mentioned (Expected timeline: maximum 5 working days)	The COVAX mechanism was fully approved and in action.
	16	Ensure COVID-19 vaccines can be released (lot release) in less than 2 days by reviewing the summary lot protocol only (testing is not required). Identify the requirements and documents needed for NRA lot release for COVID-19 vaccines. Timelines and maximum number of days for the lot release/waiver process should be mentioned	Based on preliminary coordination between responsible organizations for vaccine importation, local manufacturers, and NRA, all vaccines were released very fast lot by lot. Vaccine distribution and storage was under the direct supervision of the health deputy of the MoH. <sup>b</sup> Vaccines imported through the Red Crescent program after discharge were handed over to the health deputy of MoH, <sup>b</sup> as well as those directly procured by MoH <sup>b</sup> ; hence, the overall process was significantly accelerated.
	17	Update protocols for infection prevention and control measures, including adequate PPE to minimize exposure risk during immunization sessions	There was a guideline for safe injection and required provisions were provided by the Iranian MoH. <sup>b</sup>
	18	Identify potential COVID-19 vaccine delivery strategies and outreach strategies leveraging both existing vaccination platforms and non-vaccination delivery approaches to best reach identified target groups	Vaccine delivery was planned according to target populations. Health workers were passively vaccinated in teaching hospitals. The elderly population, at-risk groups, and high-priority groups were vaccinated through both active (mobile vaccination teams) and passive (vaccination centers) strategies.
	19	Develop a training plan at all levels to prepare for COVID-19 vaccine introduction, including an adaptation of training materials, identification of key training partners, and training methods (in-person or virtual)	A waterfall training module was developed in January 2021 for 2 different strategies: online and face-to-face. Region-specific programs were designed and implemented by the deputy of the health of every regional medical university.
	20	Ensure availability of plans to safeguard the security of staff (eg, during an emergency or major campaign) as well as security at the central and/or regional storage facilities and for transit of products	This was considered in the national vaccination document.
	21	Adapt supportive supervision tools and develop plans for visits at all levels	The vaccination process was under the supervision of several organizations, including the deputy of the health of the university, Iranian MoH, <sup>b</sup> and so on.
	22	Develop or adapt existing surveillance and monitoring frameworks with a set of recommended indicators (coverage, acceptability, disease surveillance, etc.) for the COVID-19 vaccine, including gathering information from facilities and contractors participating in vaccine delivery, and ensuring necessary human resource capacity is in place	Existing vaccination surveillance systems were adapted to monitor COVID-19 vaccination. Vaccination coverage was actively followed in rural areas, whereas in urban areas it is passive. Web-based electronic systems (eg, SIB <sup>c</sup> , SINA, NAB, and Parsa) were used for routine immunization; thus, these electronic systems also supported COVID-19 vaccination.
	23	Develop or adapt necessary paper-based and/or electronic monitoring tools and appropriate institutional arrangements (eg, vaccination cards/certificates, facility-based nominal registers, etc.) to monitor progress and coverage among different at-risk categories and facilitate vaccine delivery and timely reporting	The vaccination process was followed by national ID numbers, registered just before vaccination in our centers. A paper card was issued with the vaccine name and lot number, date, and name. Digital cards could also be inquired online at <a href="http://www.vcr.salamat.gov.ir">www.vcr.salamat.gov.ir</a> after 2-point ID verification for traveling purposes
	24	Produce and distribute monitoring tools to eligible vaccination providers, develop, test, and roll out any changes to electronic systems, and provide training for use of these tools and processes to traditional and new providers	A dashboard was utilized to track the vaccination process, and SIB, <sup>c</sup> SINA, NAB, and PARSAs were combined to track the total national vaccination process
	25	Update and implement systems and protocols for tracking and monitoring the stock management and distribution of vaccines and key supplies through the government's existing Vaccine Logistics Management and Information System, including operating procedures to reflect the characteristics of COVID-19 vaccines (ie, vial size, VVM, etc.)	The deputy of health at the MoH <sup>b</sup> level was in direct charge of the distribution of vaccines to fellow deputies of health at the regional level. Vaccine management was done by software named web-based Vaccine Stock Store Management. All vaccine vials were labeled by a unique national code that enabled the tracing of distributed vaccines. Under the supervision of the infection control officer, occupational health officer, and security officer of each vaccination unit and in accordance with the Reverse Logistic protocol of the national vaccination document, empty or damaged vials were retrieved for confirmation and security purposes.



Pillar 10. Vaccination			
Step	Actions to Be Taken	Responses and Plans	
2	26	<p>Create a distribution strategy, including mapping the potential ports of entry, points of storage (stores) and stocking, and fallback facilities in the country with their respective cold chain storage (2-8C, -20C, and -60/70C) and transportation capacity for vaccines and ancillary products, and ensure necessary human resource capacity is in place</p>	<p>Preexisting vaccination systems were adapted to store and deliver COVID-19 vaccines. The cold chain was monitored using automatic data loggers in cold boxes. Excess demand for mass vaccination was initially addressed with the help of voluntary social mobilization to compensate vaccinators and staff until the human resources were reorganized.</p>
	27	<p>Map and develop a plan to provide for infrastructure needs, including energy (primary and backup power, especially in the cold chain), information technology/communications (including internet connectivity), and water</p>	<p>In addition to already-existing health care facilities that participated in immunization activities, new focused centers were developed for the COVID-19 vaccine nationwide. A number of these facilities reached out to more than 13,000 centers active for public vaccination across the nation. As for the capital, it started with 5 major facilities and eventually grew larger with the expansion of cold chain capacities and re-arrangement of staff to more than 200 centers.</p>
	28	<p>Plan and procure waste management supplies and equipment for appropriate implementation of waste management protocols</p>	<p>Waste was managed according to health facilities' waste management protocol described in the national vaccination document as before.</p>
	29	<p>Ensure guidelines, documented procedures, and tools for planning and conducting vaccine pharmacovigilance activities (ie, AEFI reporting, investigation, causality assessment, risk communication, and response) have been developed and disseminated to surveillance facilities/sites</p>	<p>We provided vaccine-specific guidelines on medical university websites as well as general AEFI guidelines to report and address different clinical scenarios.</p>
	30	<p>Plan active surveillance of specific COVID-19 vaccine-related adverse events. If this is not possible, develop provisions that allow reliance on active surveillance data, decisions, and information from other countries or regional or international bodies</p>	<p>Vaccine-related adverse events were reported by vaccination staff if presented acutely. There was also a self-declaration online platform available. In addition to strengthening the existing passive surveillance system, AVSS was designed and established in 7 provinces as a research study. The AVSS project was approved and funded by the WHO.</p>
	31	<p>Expedite appropriate representation, well-defined ToRs, and training of the AEFI committee to review COVID-19 vaccine safety data (eg, causality assessment of serious AEFI, clusters of AEFI, emerging safety concerns, etc.)</p>	<p>Serious adverse events were fully investigated in less than 48 hours and then discussed in detail for causality assessment in the regional and national committees of AEFIs.</p>
	32	<p>Identify provisions that require manufacturers to implement risk management plans and collect and report COVID-19 vaccine safety data to the NRA.</p>	<p>Based on NRA regulations, each vaccine manufacturer must have provisioned a pharmacovigilance department when their vaccine was certified to release and usage. The IUMS was the direct supervisor for "Razi Cov Pars" from Razi Vaccine and Serum Research Institute.</p>
	33	<p>Define roles and responsibilities and establish a coordination mechanism between relevant stakeholders (NRA, EPI, MAH, MoH,<sup>b</sup> WHO, and others) for exchanging COVID-19 vaccine safety information, including relevant data systems</p>	<p>The coordination mechanism consisted of COVID-19 at the country, provincial, and regional levels, and NITAGs. RITAGs, medical university administrators, and their respective deputies of health were the direct executives of vaccination.</p>
	34	<p>Identify and secure channels of data sharing mechanisms to share COVID-19 vaccine safety data and findings with relevant regional and international partners</p>	<p>COVID-19 immunization data were shared with the WHO based on weekly and monthly reports, including AEFI data.</p>
	35	<p>Design and distribute a social mobilization and engagement strategy/demand plan and information awareness program (including advocacy, communications, social mobilization, risk and safety comms, community engagement, and training) to generate confidence, acceptance, and demand for COVID-19 vaccines</p>	<p>A national study was conducted to evaluate the attitude and behavior of the community and some special groups on COVID-19 vaccines. This study developed a document on risk communication and strategies to improve immunization coverage. This study was approved and funded by UNICEF. Also, a social encouragement model for vaccination was described in the national vaccination document. The popular belief about vaccines, social processes, pragmatic considerations, and motivation were the key components of this model.</p>
	36	<p>Develop key messages and materials for public communications and advocacy, in alignment with the demand plan</p>	<p>Given the existing excess storage and vaccination capacity, national television, radio, and newspapers extensively publicized the topic and encouraged the general people to seek vaccination in the authorized facilities across the country.</p>

<i>Pillar 10. Vaccination</i>		
Step	Actions to Be Taken	Responses and Plans
3	37	<p>Continue monitoring of vaccine implementation, including the coverage and data monitoring</p> <p>The national vaccination document foresaw 5 indexes to monitor vaccination:</p> <ol style="list-style-type: none"> <li>1. Measuring equity and coverage by region, population groups, and high-risk populations</li> <li>2. National priority of high-risk and elderly populations</li> <li>3. Providing vaccination certification for travel, education, health, and occupation purposes</li> <li>4. Ensuring vaccination data to be used in surveillance, vaccination safety programs, and disease monitoring</li> <li>5. Ensuring a surveillance system for full vaccination, including booster shots.</li> </ol>
	38	<p>Ensure post-market surveillance studies are operational and ongoing</p> <p>This is foreseen in the national vaccination document. Under the direction of IUMS, telephone follow-ups by medical staff at certain intervals were scheduled for the Razi Cov Pars vaccine.</p>
	39	<p>Update the national deployment and vaccination plan or similar strategy documents with input from relevant bodies and in line with the WHO guidance and SAGE recommendations, incorporating new information on vaccine profiles, et cetera.</p> <p>The licensing and evaluation of novel vaccines, as well as the assessment of the current efficacy of vaccination procedures, were under the purview of the National Technical Committee for COVID-19 vaccine and Vaccination.</p>
	40	<p>Conduct post-introduction evaluation 6 months after the introduction</p> <p>This activity was not done because of budget limitations.</p>