World Health Organization
Bahrain

حكومة مملكة البحرين
Government of Bahrain

BAHRAIN COVID-19 CASE STUDIES

WHO-EM/BAH/001/E

World Health Organization
Bahrain

حكومة مملكة البحرين
Government of Bahrain

BAHRAIN COVID-19 CASE STUDIES

WHO-EM/BAH/001/E

WHO Library Cataloguing in Publication Data

Names: World Health Organization. Regional Office for the Eastern Mediterranean, Government of Bahrain

Title: Bahrain COVID-19 case studies / World Health Organization. Regional Office for the Eastern Mediterranean, Government of Bahrain

Description: Cairo: World Health Organization. Regional Office for the Eastern Mediterranean, [2022]

Identifier: WHO-EM/BAH/001/E

Subjects: COVID-19 - prevention & control | Betacoronavirus | Disease Outbreaks | COVID-19 Testing | Vaccination | Quality of Health Care | Case Reports | Bahrain

Classification: NLM WC 506

CONTENTS

LIST OF ABBREVIATIONS

Ag-RDTs	antigen rapid diagnostic tests
BDF	Bahrain Defence Force
COVID-19	coronavirus disease 2019
EUA	emergency use authorization
EUL	emergency use listing procedure
HRH	His Royal Highness
ILI	influenza-like illness
IPC	infection prevention and control
LMRA	Labour Market Regulatory Authority
MOH	Ministry of Health
NCDs	noncommunicable diseases
NHIL	National Health Insurance Law
NPHL	National Public Health Laboratory
NTCC	National Taskforce for Combatting COVID-19
PHSM	public health and social measures
RT-PCR	reverse transcription–polymerase chain reaction
SAGE	Strategic Advisory Group of Experts on Immunization (WHO)
SARI	severe acute respiratory infection
WHO	World Health Organization

INTRODUCTION

"In 1932, Bahrain pioneered oil production in the Middle East, and in doing so established the region's initial framework for the petroleum industry."[1] Although it never reached the levels of production of Kuwait or Saudi Arabia, the resource enabled Bahrain to modernize and diversify its economy by moving beyond traditional industries. Today, Bahrain maintains a developed industrial sector and is home to the world's largest single-site aluminum smelter. In addition, it is one of the most socially liberal states in the Gulf and remains a popular tourist destination. The country's national plan, Bahrain Economic Vision 2030, "aims to enhance private sector growth as well as continue government investment in infrastructure, affordable housing, human resource development and digital transformation".[2]

With a universal health care system dating back to the 1960s, Bahrain possesses solid fundamentals for care provision. Bahrain's well-established primary health care system consists of 27 health centres distributed across the country, providing preventive and curative services to the population with more than 3 million visits per year. Significant measures have been taken to advance Bahrain's health and well-being agenda, including the passing of the National Health Insurance Law (NHIL), and the establishment of a national ambulance system in 2018. The NHIL paved the way for the implementation of the Social Health Insurance Programme (Sehati), which has improved the utilization of available resources and alleviated challenges created by population growth and rising incidence of noncommunicable diseases (NCDs). Health care is free of charge for Bahraini citizens at government hospitals and health centres across all governorates, and available for a nominal fee for non-Bahraini residents. Under the National Social Health Insurance Programme Bahrainis and domestic workers receive free health coverage from the government, while expatriates are covered by their employers.[2]

[1,2] Country profile [webpage]. Oxford Business Group. https://oxfordbusinessgroup.com/bahrain-2020/country-profile, accessed on 13 November 2021.
[2] Bahrain.bh. Kingdom of Bahrain's National Portal. https://www.bahrain.bh/new/en/health-services_en.html, accessed on 23 November 2021.

The COVID-19 pandemic has had a far-reaching and devasting impact on livelihoods, population welfare and economic growth iin many countries around the world. At the centre of the multitude of issues brought about by the pandemic is the issue of health and well-being, a challenge faced by leaders and entities such as the World Health Organization (WHO). Concerns associated with deteriorating health, inadequate provision of health services and lack of access to medicines and supplies are shared by health care providers who have worked tirelessly to combat the disease.

The first case of COVID-19 infection in Bahrain was confirmed in the early morning of 24 February 2020. Pre-emptive measures had been taken ahead of time, and implemented swiftly across all sectors in a whole-of-government approach. Three weeks before the first case was reported, the National Taskforce for Combatting COVID-19 (NTCC) was created by His Royal Highness (HRH) the Crown Prince and Prime Minister. The Taskforce held daily meetings to plan and coordinate prevention, preparedness and response activities, and used instant messaging to facilitate communication and coordination. In addition, senior leadership met twice a week to review policies and formulate decisions. The War Room, established on 13 February 2020, played an integral role in operationalizing COVID-19 preparedness and response efforts. Its most important function was to collate data and produce dashboards that were shared with decision-makers at regular intervals throughout the day (hourly, every six hours, once daily), ensuring that strategic decisions could be made in real time on an informed basis. Both the War Room and the Taskforce included personnel from multiple entities – Labour Market Regulatory Authority, Ministry of Health, Ministry of Interior, airport personnel etc. – to ensure an interdisciplinary approach to containment efforts.

On 19 February, five days before the first case was detected, a multilingual national campaign to combat COVID-19 was launched with a pre-prepared media statement to build awareness of the threat from the virus and how to prevent its spread.

From the very beginning of the pandemic, His Majesty the King issued Royal Directives to provide free COVID-19 testing and treatment for all citizens and residents in Bahrain. Equipped with solid infrastructure and systems already in place, Bahrain capitalized on and scaled up its existing resources and displayed a level of preparedness and synergy of efforts from both the top down and the bottom up. This proved critical in driving the success of the national COVID-19 response.

"The COVID-19 pandemic tested the capacities of Bahrain's health care system in an unprecedented way, but with timely support, the necessary infrastructure, equal access to care for all, an early and aggressive vaccination campaign, and a comprehensive track and trace system, we persevered"

Dr Sheikh Mohammed bin Abdullah Al Khalifa, Chairman, Supreme Council for Health

Bahrain's success in containing the spread of the disease through early testing, high vaccination coverage and the relatively uninterrupted provision of essential health services can be attributed to four enabling factors: preparedness and planning; the workforce; partnerships and collaboration; and high-level political support and engagement. As the nation and its people worked together through the pandemic, health services were provided under a framework of accessibility, acceptability, availability and quality.[3] Concerns from both the demand and supply sides were addressed, with a keen eye kept on equality and equity.

Bahrain faced a number of challenges during its COVID-19 response, including repurposing the workforce, planning and purchasing consumables, outreach to vulnerable populations and communication with external stakeholders. At times these tested the country. When obstacles were overcome, beyond the immediate rewards were the advantages that accrue from lessons learned and experience gained.

While Member States operate within unique contexts, and have different resources and needs, valuable insights can be gleaned from Bahrain's response to COVID-19. This report aims to:

1. narrate lessons learned from Bahrain's journey in responding to COVID-19;
2. illustrate the challenges that the Kingdom confronted and how they were overcome;
3. describe Bahrain's response framework; and
4. reflect on the experience gained and crystalize best practices which can be helpful beyond Bahrain.

The contents of this report are based on interviews conducted with key stakeholders and technical focal points, and reflect information available at the time of publication.

"The War Room was populated by young, creative, and multidisciplinary Bahrainis with the stamina and commitment necessary to shoulder the responsibility of fighting COVID-19 for over two years"

Mr Hamad Al Mahmeed,
Head of the War Room / Crown Prince Center for Training & Medical Research

[3] Tanahashi T. Health service coverage and its evaluation. Bull World Health Organ. 1978;56(2):295–303. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2395571/, accessed on 14 November 2021.

COVID-19: BAHRAIN'S RESPONSE

Testing

Summary of achievements

Test, trace, treat has been the driving motto of Bahrain's response. Advances in testing capacities allowed for the production of comprehensive and real-time epidemiological and virological data, which is crucial to early identification and treatment of cases. The data obtained from testing were invaluable in guiding decision-makers and protecting communities.

At the beginning of the pandemic, only the National Public Health Laboratory (NPHL) was able to perform reverse transcription–polymerase chain reaction tests (RT-PCR) for COVID-19. NPHL detected the first case of COVID-19 in Bahrain on 24 February 2020. Once it established its COVID-19 testing capacity, NPHL was able to perform 3000 tests per day. The Ministry of Health (MOH), in collaboration with partners, then rapidly expanded the national COVID-19 RT-PCR laboratory network's capacity to more than 25 000 tests per day. The laboratory testing network currently comprises three public laboratories, 10 private laboratories and one airport laboratory. The network is overseen by NPHL.

National testing strategies and guidelines were developed rapidly and were a key asset in the early identification and discharge/exit of cases and contacts. Tests were routinely performed for suspected cases and relevant contacts. Contacts were tested at least twice with RT-PCR, with the first test performed upon identification, and the second before leaving quarantine. The latter was refined based on national and international scientific evidence and evolved from day 14 to day 10 to day 7.[4] Several modes of sample collection were used: routine swabbing was set up at airports and causeways; testing centres, including mass drive-through centres, were established across the country; primary health care (PHC) mobile clinics were deployed to communities and areas with vulnerable populations and people with special needs; and random swabbing was introduced at community sites such as hostels, public malls, sports clubs, etc., for active surveillance purposes.

[4] For more information on contact tracing see the spotlight story on page 11.

These initiatives not only allowed for the early detection of cases, but also identified asymptomatic and mild cases, minimizing transmission of the virus in the community. For the bulk of the epidemic, random swabbing in mobile and stationary units accounted for most of the tests conducted each day, and was instrumental in the prompt identification of cases. On average, more than two thirds of cases testing positive through random swabbing were asymptomatic at the time of testing. Strategic placement was key to the successful mobilization of these units. Deployed to malls, banks and construction sites in towns, villages and highly populated neighbourhoods, they ensured that case numbers accurately reflected the epidemiological situation on the ground as the situation evolved.

In addition to contacts identified by the response teams, the BeAware Bahrain application and 444 telephone hotline were instrumental in supporting registration for testing of symptomatic contacts and travelers. On-demand testing was also readily available, for a fee, at private facilities.

Antigen rapid diagnostic tests (Ag-RDTs) were utilized for early detection in schools, sporting events and triage of patients entering PHC, and RT-PCR tests were arranged accordingly. Individuals who tested positive through Ag-RDTs at home were instructed to self-report via the BeAware Bahrain application, and conduct a follow up RT-PCR test immediately, without the need for registration.

Antibody testing in repeated cross-sectional sero-epidemiological surveys provided additional evidence for epidemiological surveillance and estimates of cumulative population immunity, the fraction of undetected cases (e.g. asymptomatic, pre-symptomatic, subclinical), and for analysis of local risk factors for infection.

Individual testing results were produced within an eight-hour timeframe through the BeAware Bahrain application. Detailed case-based data were immediately made available to the MOH for compilation and analysis, and real-time aggregate testing results were provided to the Taskforce for decision-making, and to the public for awareness. All positive cases were contacted by a public health specialist, referred to triaging facilities based on their medical condition, and requested to provide a list of contacts. People in contact lists were immediately contacted, and RT-PCR tested within 24 hours.[5]

Until vaccination coverage reached a specific threshold, all patients testing positive were triaged within 24 hours. They were examined by a physician, regardless of their age, health status, or the severity of their symptoms, to ensure their fitness for home isolation. People living in crowded settings or in accommodation with high-risk persons were offered alternative accommodation, fully equipped with medical personnel and supplies, for the mandatory isolation period.

COVID-19 sequencing capacity was rapidly established, and has been the backbone of national genomic surveillance aimed at monitoring variants in the country. It allowed the first cases of the Delta variant to be identified early, and appropriate public health measures to be put in place.

Despite the massive work involved in testing for COVID-19, testing for other priority diseases was maintained, and plans are in place to leverage the COVID-19 laboratory network for the testing of other priority diseases and future epidemics.

"Data-driven and decisive decision making"

Mr Waleed AlBassam,
Chief of Research / Prime Minister's Office

[5] For more information on contact tracing see the spotlight story on page 11.

What drove these achievements?

1. Preparedness and planning: before and during the epidemic

NPHL had invested in building capacity for pandemic preparedness prior to the COVID-19 pandemic. In 2011 it established and hosted the National Influenza Centre and a biosafety level 2 facility. Personnel were trained in RT-PCR techniques, and NPHL participated in WHO external quality assessments to assure diagnostic proficiency. The laboratory formed the foundation of the national surveillance system for other notifiable diseases (e.g. measles), and has been accredited by WHO as fulfilling the relevant requirements.

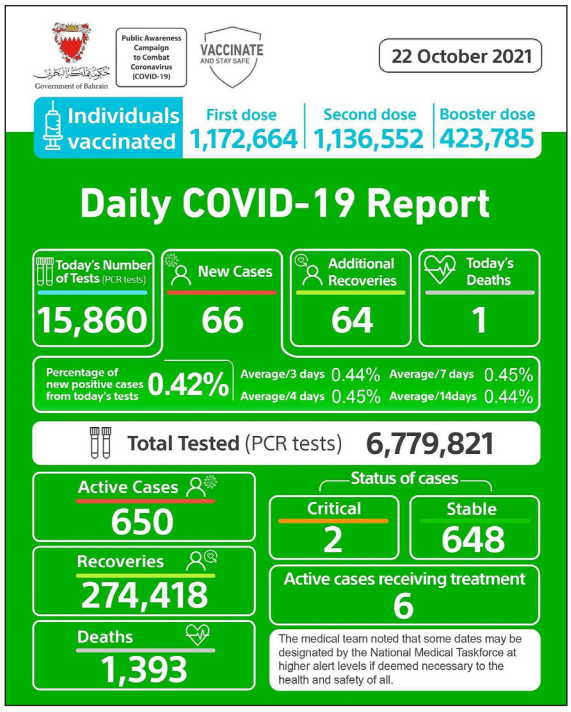
The laboratory is connected to the national health information system (I-SEHA), which integrates health information across one electronic reporting platform and is in use on all levels – including primary, secondary, and tertiary care facilities – of the public health care system. I-SEHA uses the national identity cards of nationals and expatriates to prevent duplication of cases and monitor individual patient files, connecting the demographic and clinical information of each patient to their laboratory tests with a medical record. With these elements in place, NPHL was designated the national referral laboratory for COVID-19 at the beginning of the pandemic.

Following the notification of the first COVID-19 cases globally, NPHL rapidly adapted existing preparedness plans, including contingency plans tested through simulation exercises for pandemic influenza A (H1N1) and Ebola. Early planning priorities included establishing testing capacity for SARS-CoV-2, capacity for the collection, storage and transportation of samples, and surge capacity to be used in times of increased testing demand.

The launch of BeAware Bahrain, the national mobile application for COVID-19, was accompanied by measures to link the app with I-SEHA. Starting in April 2020, this integration enabled real-time reporting of COVID-19 positive cases from the network (including, for the first time, private laboratories) to decision-makers, prompting timely and evidence-based public health action.

Before detection of the first case, the Public Health Directorate's testing room tested students and travelers returning from affected countries. The long-established influenza-like illness (ILI)/severe acute respiratory infections (SARI) network subsequently identified the probable patient zero in Bahrain, a case displaying upper respiratory tract infection symptoms and with a recent travel history. He presented himself to a local primary health care centre, and the diagnosis was confirmed by PCR test in the early morning of 24 February 2020. Though contacts tested negative, screening was initiated for all travelers on the same flight, 85 of whom tested positive within the same week.

The routine practice of storing respiratory samples allowed NPHL to retrospectively test in order to identify any COVID-19 cases in the country prior to 24 February 2020. The rapid identification of cases was made possible by the established RT-PCR capacity of the laboratory and the timely communication of results to decision-makers, allowing action to be taken immediately and preemptively in line with Bahrain's strategies for preparedness and response.

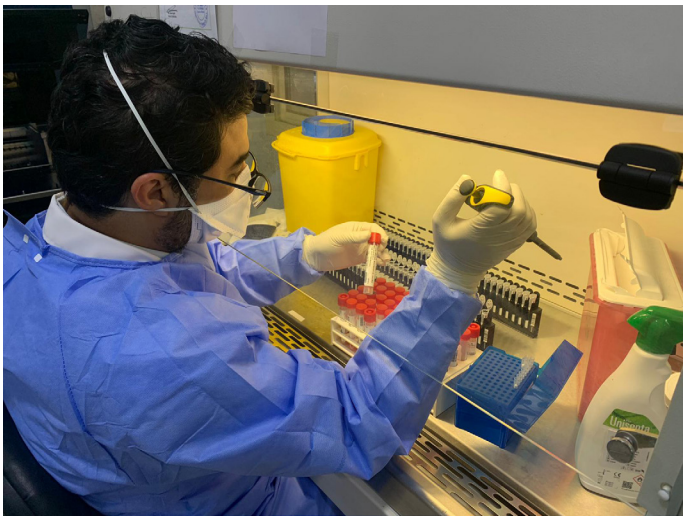


credit Bahrain Ministry of Health

2. Laboratory workforce

A skilled and motivated workforce was the cornerstone of the laboratory network's success. Prior to the pandemic, only two laboratory technicians in NPHL's virology section were trained in molecular methods. In response to the enormous demand for testing, NPHL repurposed technicians from other sections of the laboratory (environmental, bacteriology, etc.), recruited two technicians from each hospital laboratory, reached out to retired technicians and initiated a national call for volunteers from other health facilities, academia and to others with relevant skills. The workforce thereby grew from two technicians to 250.

More than 200 volunteers across the country signed up to support testing. Training in molecular methods – particularly fully automated high throughput analyzers – was provided to all new personnel over three months, and each was assessed to ensure they could perform the tests correctly. The volunteer recruits were highly motivated, and driven by a desire to help. Training ensured that they fully understood the surveillance objectives and were equipped with knowledge of the processes set in the protocol. The laboratory operated 24 hours a day, seven days a week, and maintained a shift-based system to ensure productivity and the well-being of the workforce.



The laboratory management team was flexible, and quick to adapt in terms of learning new skills such as demand forecasting, procurement, shipping and communication with external stakeholders. Perseverance and dedication to increasing laboratory capacity to fulfill national needs, were key to the laboratory's success. An example of this dedication is the Director's involvement in COVID-19 sewage testing. Moreover, awareness of the importance of maintaining testing for other priority pathogens led to newly available multiplex assays being used to test for several respiratory pathogens simultaneously, as well as the development of an appropriate testing algorithm for COVID-19 negative samples.

The challenges posed by the pandemic necessitated building on the existing infrastructure. The pandemic revealed a need to strengthen mid-level management within NPHL to ensure that the laboratory remained operational even when senior management was absent.

To capitalize on human resources, a roster of volunteers was established, creating a pool that can be utilized in future recruitment. Suitable volunteers have been retained within NPHL and at hospital laboratories with the aim of promoting sustainability. A key lesson learned has been that the provision of additional staff, succession planning of senior staff, and active recruitment, selection, training and guided supervision of new staff are all critical to maintaining the expertise and performance of NPHL.

> "The response culture became one sector; there were no boundaries"
>
> **Dr Amjad Ghanem Mohamed,**
> **Chief of Laboratory**

3. Political support and engagement

Commitment from the highest levels of government and the NCTT to increase laboratory capacity contributed significantly to its success. Laboratory testing was prioritized within the national response strategy, and a daily target of 25 000 tests was set. Financial support was provided to secure reagents, other consumables and equipment, including automated equipment to reduce the manual testing burden on the workforce. The laboratory was empowered to make autonomous decisions regarding the choice of diagnostic tests, and enabled to communicate directly with international suppliers.

Decisions were informed by the best available evidence at the time, and concerns raised by the laboratory management were addressed promptly. A direct line of communication, allowing for the expedited exchange of information, was set up between the Supreme Health Council and the NPHL Director. Ad hoc groups were also set up on instant messaging networks to receive technical input from the laboratory in real time. Detailed laboratory operations were presented regularly at NTCC meetings by the Director of the Public Health Directorate. Decision-makers were able to use real-time testing information to develop evidence-based policies and measures, including contact tracing, isolation and quarantine, public health and social measures (PHSMs), etc. Their timely response and actions serve as testament to the invaluable work done by the testing teams.

Recognition of the work of the laboratory team from the very start was critical to boosting staff morale. In addition to acknowledging their dedication on national television, the Prime Minister visited the laboratory on 14 April 2020, to express gratitude to the staff in person.

With political support, the laboratory was able to establish sequencing capacity from scratch. A next-generation sequencing machine was purchased for NPHL, with virtual hands-on training provided, and the responsibility of national genomic surveillance was entrusted to the laboratory. Despite operational difficulties and the Ramadan fasting season, staff actively engaged in training, acquiring new skills. COVID-19 genomic surveillance was established to monitor the circulation of the virus and emerging variants. All samples are currently being sequenced, and 150 are uploaded to GISAID each week.

To sustain the network's functions and its preparedness for future pandemics, discussions are ongoing on local production of consumables (PPE, extraction kits, amplification kits, enzymes, etc.), and on using newly purchased equipment for the testing and sequencing of other pathogens. The Ministry of Education has also committed to increasing student enrolment in molecular biology programmes.

4. Partnerships and collaboration

As host of the National Influenza Centre, NPHL had access to WHO regional and global laboratory expert networks which allowed it to remain up to date with the latest developments and advice regarding the use of available diagnostic reagents and the scaling up of capacity. Existing partnerships with international suppliers supported it in rapidly securing and acquiring supply stocks, while the documented collaboration between NPHL and the United States Centers for Disease Control and Prevention and WHO provided additional trust between NPHL and international suppliers. In coordination with the NTCC and primary health care facilities, a robust supply chain was developed with the result that the laboratory rarely faced supply shortages during the response.

Bahrain's first national testing centre in the country's Exhibition Centre was set up in just two days thanks to collaboration between the Supreme Health Council and other actors. The Ministry of Interior's capacities were instrumental in establishing the infrastructure, and PHC capacities, coordinated by the Public Health Directorate, were vital in the centre's operation.

Multisectoral collaboration involving, among others, the Ministry of Interior, civil defense and the Ministry of Education, increased the capacity of mobile and stationary testing units from 1600 samples to 15 000 samples per day. The open communication channel with the Ministry of Interior facilitated outreach to vulnerable populations and special groups, including migrant workers. As part of the active random testing campaign, representatives from the laboratory were accompanied by physicians and interpreters to households in high-risk areas to speak with communities and encourage voluntary RT-PCR and serological testing, further supporting the community immunity sero-surveillance initiative.

Multisectoral collaboration proved particularly useful in translation and interpretation, and in providing psychological support to address testing-related discomfort, fears and misconceptions.

Partnerships established with public and private sector laboratories allowed the expansion of testing capacity and facilitated resource sharing. In addition to ensuring continuity of supplies across the national network, these partnerships alleviated the testing burden on NPHL staff and engaged private laboratories in the national response.

Quality control of the network was entrusted by participating laboratories to NPHL, which provided free-of-charge training to all participating laboratories. In collaboration with the National Health Regulatory Authority (NHRA), NPHL has conducted regular assessments of all laboratories, overseeing quality through formal certification. Assessment panels are developed at NPHL, and disseminated to laboratories every 2–3 months.

Thanks to its collaboration with the NTCC, NPHL has been able to contribute to national and global research efforts, generating evidence on antibody-level impact following vaccination, particularly against circulating variants, facilitating data-driven decision-making. Studies were done on three vaccines (Sinopharm, Pfizer and Sputnik V) used in the country, investigating reinfection, booster doses, mix-and-match of vaccines, and the vaccination of children.

Bahrain Ministry of Health

"We see a problem, we act immediately. Not the next day, but now"

Dr Jaleela Alsayed Jawad,
National Task Force for Combatting Coronavirus

INTERESTING FACT

Around 90% of the dedicated laboratory and testing workforce is female

Spotlight story:

Contact tracing

At time of writing, Bahrain has traced and investigated every single contact a positive COVID-19 case has listed.

To identify networks of contacts, detailed case investigations and phone interviews were conducted with positive cases (or the case's caregiver) within 24 hours, with follow-up interviews conducted accordingly. Throughout the pandemic, individual case report forms have had high completion rates.

Contacts were followed up through regular phone calls, and were required to undergo multiple tests. Contacts were admitted to institutional quarantine free-of-charge (regardless of nationality) to avoid further transmission of the virus, particularly at the beginning of the pandemic. Alternative accommodation was arranged for individuals living in crowded housing (mainly migrant workers) to ensure adequate social distancing. Individuals were also given a choice to quarantine at home if it was possible to do so safely. Contacts were tested at least twice with RT-PCR; the first test was performed upon identification and the second test before leaving quarantine. The latter was refined based on national and international scientific evidence, from day 14 to day 10 to day 7. The rapid turn-around of test results facilitated the implementation of quarantine/isolation measures.

The cornerstone of Bahrain's contact tracing success was the increase in the MOH's contact tracing workforce, which grew from six staff in the Communicable Disease Department to 20–30 staff, the majority of whom are volunteers. The team increased to over 300 tracers when Ministry of Interior investigators joined.

Tracers possessed good levels of general literacy, strong communication skills, and an understanding of the local context and culture which greatly contributed to the success of the programme. Volunteers with non-health backgrounds were often able to bring innovative solutions, improving contact tracing through automation and the digitalization of data collection and visualization.

Contact tracing protocols and tools were developed rapidly in the early stages of the pandemic, following WHO guidelines. Contacts were defined based on two categories: close contacts (high-risk exposure) and casual contacts (low-risk exposure). Special considerations were given to health care workers, prison guards and other essential workers. There was a considered division of labour within the team, based on experience and language skills, with multilingual Ministry of Interior investigators typically responsible for contact tracing in migrant communities. The response structure in Bahrain was responsive to the changing epidemiological situation, with contact definitions reflecting the evolving national situation and WHO guidance as it was updated.

The trust developed between the health authorities and the community allowed for the assumption that cases would list all their contacts. To facilitate transparency and communication with the public, the MOH maintained a public dashboard for contact tracing, including detailed archived reports which are available online.

While the digital tool BeAware Bahrain was not directly used for contact tracing by health authorities, it included a feature to alert individuals if they came into contact with a positive case.

The country's investment in contact tracing, including robust and aggressive testing, isolation and care of cases, was crucial in interrupting chains of transmission of the SARS-CoV-2 virus and reducing COVID-19-associated mortality.

> "Volunteers not only support the work, they improve its quality"
>
> **Dr Adel Salman Alsayyad,**
> **Public Health Consultant**

[7] Health Alert. Government of Bahrain. https://healthalert.gov.bh/en/category/weekly-contact-tracing#ContactTracingData

Vaccination

Summary of achievements

The high vaccination coverage achieved in Bahrain can be attributed several key factors, including:

a) preparedness and trust built through previous routine vaccination campaigns;
b) early clinical trials and vaccine studies (Bahrain joined WHO's Solidarity Trial on 19 March 2020, the first Arab country to do so);
c) innovation and technology;
d) volunteers;
e) early and sustained high-level political action to mobilize resources and secure vaccines;
f) early implementation of mass communication campaigns;
g) workforce empowerment and recognition;
h) multisectoral collaboration and partnerships; and
i) the removal of obstacles in the way of accessing vaccination, transparency and non-discriminatory approaches throughout the response.

What drove these achievements?

1. Preparedness and planning

Bahrain's success in vaccinating the majority of its population (by 30 September 2021, 92.9% of eligible residents and citizens had received at least one dose of COVID-19 vaccine) capitalized on the infrastructure and lessons learned from previous and existing routine vaccine programmes. Bahrain has been polio-free for two decades, eradicated measles in 2019, and has had 95% routine vaccination coverage for more than two decades.

Public familiarity with existing vaccine systems and structures was key to building trust and promoting high vaccine uptake. Building on the WHO SAGE roadmap for prioritizing uses of COVID-19 vaccines in the context of limited supply, as well as experience from previous vaccination plans, Bahrain established a vaccine deployment plan at an early stage. Under the guidance of the NTCC a phased approach to vaccination rollout was adopted, with systems and protocols that allowed for rapid scale-up once approval for use was granted.

In mid-December 2020, Bahrain launched its national vaccination campaign with the aim of securing access to vaccines for all citizens and residents free of charge. Priority access was given to those considered to be at high risk of infection or severe developments. A media campaign in multiple languages was launched to encourage uptake among different communities. Flexible arrangements were implemented for individuals over the age of 50: they could visit any PHC centre as walk-ins and receive the vaccine without needing to schedule an appointment. Mobile COVID-19 vaccination services were available to the elderly and people with special needs, and 31 vaccination centres with the capacity to vaccinate 30 000 people daily were set up across the country.

Early vaccination clinical trials played an instrumental role in building Bahrain's vaccine infrastructure and preparedness, including supply chains, an integrated data base and workforce capacity. Following the WHO Emergency Use Listing Procedure (EUL), Bahrain has approved and administered four vaccine platforms – Sinopharm, Pfizer-BioNTech, AstraZeneca/Covidshield and Sputnik V.

Bahrain was the second country to issue emergency use authorization (EUA) for both the Sinopharm and Pfizer vaccines, and the first to issue EUA for Johnson & Johnson. Following the success of Sinopharm's phase III clinical trial involving 7755 individuals in August 2020, Sinopharm was granted EAU for frontline workers in early November 2020, while Pfizer-BioNTech received EAU in December.

The national vaccination campaign was officially launched following approval of the registration of the Sinopharm COVID-19 vaccine. In the early stages, Sinopharm had a relatively high uptake due to its early delivery and availability, and its being based on an existing and well-known immunization technique. Pfizer-BioNTech subsequently became the preferred vaccine platform, although AstraZeneca/Covidshield (granted EAU in January 2021) was popular among the South Asian expatriate community.

The early approval of EUA for different vaccines paved the way for their rollout once the vaccines were delivered. The provision of different vaccine platforms aimed to reduce vaccine hesitancy by allowing people to choose from a range of vaccines, and helped keep the issue of scarcity at bay, allowing Bahrain to surpass WHO's global goal of vaccinating 70% of the population by the end of 2021.[7]

Sinopharm booster doses were introduced in June 2021, and in September booster doses with other vaccine platforms became available. Studies on mix-and-match for Sputnik V and Pfizer-BioNTech, as well as Sinopharm and Pfizer-BioNTech, were conducted. Mix-and-match is exclusively administered with Sinopharm and Pfizer-BioNTech, and registration can be completed using the BeAware Bahrain application which features built-in restrictions for non-authorized vaccine combinations. Due to international travel vaccination requirements, there is an increasing interest in receiving booster doses.

A study on vaccinating children, involving 592 children, was conducted in September 2020. Based on the results, Sinopharm was granted authorization to be administered to children between the ages of three and 11. Pfizer-BioNTech was granted emergency authorization for children aged 5 to11. Vaccination was gradually expanded from children with underlying health conditions to all children aged between three and 11 years.

[7] Based on national data: over 80% of the eligible population have received two vaccine doses and are considered fully vaccinated.

In October 2021, a large-scale vaccination campaign with Sinopharm for all children was initiated, with Bahrain becoming the second country in the Gulf region after the UAE to vaccinate children below 18 years.

There has been no major interruption of routine vaccination services and programmes, though there was minor disruption to diphtheria, pertussis, and tetanus (DPT) vaccine administration due to traditional delivery at schools being shifted to primary health care facilities.

Demand for flu vaccinations, which are free of charge for Bahraini nationals, health care workers, pregnant women, people with co-morbidities, people over 50 years and children between six months and five years, increased during the pandemic.

2. Vaccination workforce

As soon as the first COVID-19 cases were announced globally, Bahrain acted to scale-up its vaccination workforce capacity by repurposing staff in the health sector and engaging health workers in the private sector. Volunteers were also recruited from a national platform which saw more than 50 000 people register in a country of just 1.7 million. Initial volunteer recruitment focused on volunteers with health care experience such as university students from health-related disciplines and retirees from the health sector, subsequently expanding to include volunteers from outside the health sector.

Training was provided for health workers and volunteers through induction and specialization courses, both in person and virtually. Although volunteers were mainly Bahraini nationals, there were examples of expatriates taking part in the vaccination response. The engagement among professionals and volunteers was reportedly high, with people expressing their pride in being part of the response as Team Bahrain. Continued community engagement, recruitment, training, and retention of volunteers underwrote the high vaccine uptake, bolstered trust in the health care system and vaccines, and has created a cadre of trained and experienced staff which can be deployed in future public health acute events.

Bahrain's first, and largest, vaccination centre was housed in the Exhibition Centre. It had capacity for 7000 vaccinations daily across four halls. Staff at vaccination centres comprised volunteers who helped with registration and communication with the public, and employees from the MOH, the Bahrain Defence Force and other organizations. Marshals who had worked for Formula One racing events were repurposed as security guards and information personnel at vaccination centres.

Bahrain's embassy network was activated to vaccinate Bahrainis living abroad. Vaccines were shipped to Bahraini embassies and in the case of Egypt and Jordan, where a large Bahraini diaspora resides, medical teams were deployed to facilitate the vaccination campaign. Bahrainis living abroad were provided with the choice of AstraZeneca or Pfizer-BioNTech vaccines.

That Bahrain hosted two Formula One races and provided free vaccination for foreign staff taking part in the events is testimony to the capability and operational success of the country's response.

3. Political support and engagement

Commitment at the highest political level was instrumental to the success of Bahrain's COVID-19 vaccination campaign. Before the first detected case of COVID-19 in Bahrain in February 2020, HRH the Crown Prince and Prime Minister took preemptive action to mobilize resources. At the onset of the pandemic, discussions were initiated with vaccine manufacturers to secure supplies and prevent vaccine stockouts, making a relatively quick rollout of vaccines possible.

Bilateral discussions to explore participation in clinical vaccine trials also began early. A decision was made, based on a direction from His Majesty the King of Bahrain, to provide vaccinations free of charge to all Bahraini citizens and residents, regardless of nationality, residential status, or ethnicity.

HRH the Crown Prince and Prime Minister personally helped build public trust in vaccines and the health care workforce by participating in COVID-19 vaccine trials on 17 September, 2020.

High-level leadership guided the implementation of mass communication campaigns. Available in several languages, the campaigns proved crucial to community acceptance and the promotion of high vaccine uptake among the population. The communication campaigns were structured around inclusivity and transparency, and supported by innovative technology, as exemplified by the 444 hotline which provided information in 12 languages.

To reinforce the role and influence of the multilingual media campaign a proactive system of media scanning was established, facilitating real-time monitoring of misinformation and misconceptions and helping health workers address the rumours circulating around vaccines. The partial closure of society at the peak of the pandemic in May and June 2020, combined with the vaccine campaigns, underlined the magnitude of the pandemic in people's minds and contributed to building awareness and vaccine acceptance.

To encourage health care workers involved in the COVID-19 response, and who worked tirelessly throughout the pandemic, incentives were provided in the form of professional recognition and advancement, significantly boosting staff morale.

4. Partnerships and collaborations

Bahrain's vaccine infrastructure was designed and set up to eliminate obstacles to people getting vaccinated. Centres were established to cater for residents of densely populated areas, and barriers to vaccination were identified. Early in the pandemic, the MOH issued a temporary identification number to undocumented workers and those with visa processes pending to authenticate their identity and facilitate registration for vaccination. Discussions with employers helped ensure vaccination times were adapted to migrant workers' schedules, and that transportation to vaccination centres was provided free of charge. Vaccinating migrant workers from one company at a time also helped ensure that no one was left behind. For domestic workers, outreach was conducted through host families.

Bahrain adopted a non-compulsory, non-discriminatory approach to vaccination which, like all health care services related to COVID-19, was provided free of charge.

For those with pending residence status, vaccination was coordinated with their respective embassies, and in some instances the ambassador was present at the vaccination site. Individuals were granted immunity, and law enforcement officers were removed prior to their vaccination slots in order to build trust and a feeling of security and safety. Townhall meetings were also organized to address migrant workers' concerns regarding vaccination.

A platform was created for technical experts to raise concerns to the Immunization Committee, which could then provide input on vaccination issues to senior decision-makers. Partnerships were also forged with the Ministry of Interior, Ministry of Education, Ministry of Foreign Affairs and the Labour Market Regulatory Authority.

"The exhibition vaccination center became the place of hope".

Dr Basma Mahmood Alsaffar,
Public Health Consultant

Lessons learned

- To streamline logistics and operations, avoid confusion, regulate the flow of people and reduce manual errors, vaccination centres communicated with the public and were organized on a vaccine platform basis (Pfizer-BioNTech, Sinopharm, Sputnik V and AstraZeneca/ Covidshield).
- Documentation of events and experience is key to building capacity and resilience moving forward.

Visit to a vaccination centre in Sitra Mall

Sitra Mall was transformed into a large COVID-19 vaccination centre that was inaugurated on 21 March 2021. Well organized, equipped and staffed, it is managed by the MOH and BDF. Primary health care and Public Health Directorate staff from other departments (e.g. tobacco control) were redeployed and assigned to the centre in the early stages of the pandemic to support vaccination efforts. Training for staff and volunteers at the vaccination centre on vaccination efficacy, storage, handling, administration and contraindications is conducted regularly by the Public Health Directorate.

Separate sections of the mall were used for administration of different vaccines (Sinopharm and Pfizer-BioNTech), which helped to streamline operations and mitigate errors. Visiting in November 2021, there were few people present, which can be explained by the high vaccine coverage in Bahrain at the time.

Given an expected increase in demand for doses of the modified Pfizer-BioNTech vaccine for children, which was scheduled to become available during the first quarter of 2022, there were no plans to dismantle the vaccine centre.

The centre includes a small clinic to handle adverse effects due to vaccination. According to staff at the site, very few people experience adverse effects, and to date none of them have been fatal.

Maintaining high quality of care for COVID-19 and essential health services

Summary of achievements

1. Throughout the pandemic, health care facilities across the country did not experience stockouts of essential health supplies and consumables.

2. Overall, the provision of essential health services remained uninterrupted, with all health centres remaining open throughout the pandemic.

3. COVID-19 related health care services were provided free of charge to all.

4. Innovative methods of delivering health services were implemented.

What drove these achievements?

1. Preparedness and planning

Preparations to combat the COVID-19 pandemic started at the Salmaniya Medical Complex in January 2020, a month before the first case was detected in Bahrain. Calculations were made to estimate the quantity of consumables and ICU capacity required in a country of just under 1.8 million under the worst-case scenario, and it was immediately realized that human resources had to be well managed, and overall capacity increased.

Senior management decided from the start of the pandemic that COVID-19 would be managed and treated in separate facilities, away from main hospitals. A car park outside the BDF hospital near the capital city Manama was converted into a 130-bed intensive care unit, and field hospitals were set up – taking anywhere from 24 hours to two weeks – across the country.

In Sitra, a fully equipped field hospital was set up with a capacity of 4362 beds and 154 ICU beds. Outside Salmaniya, 64 ICU beds divided across four halls, for males, females, asymptomatic patients and those with special needs, were set up in what was previously a parking lot. Anticipating increased demand for health care capacity, the National Health Regulatory Authority granted licenses to private hospitals to provide health care for asymptomatic positive cases.

In February 2020, the medical team under the National Taskforce began discussing treatment protocols, based on the principle that all patients would be treated the same. Drugs authorized in international guidelines to treat COVID-19 were approved and scaled up, and daily meetings were held to discuss case management and discharge processes. Treatment protocols were subsequently updated as needed, based on emerging evidence.

High-level management also made proactive decisions regarding testing. The NTCC did not wait for patients to report to medical facilities with symptoms before intervening, with over 55% of positive cases identified in Bahrain classified as asymptomatic at the time of testing. Two principal benefits stemmed from this proactive testing strategy. First, patients were generally identified early in the course of their disease, before becoming infectious. This helped to reduce onward transmission. Second, as a result of the extensive testing strategy, many patients were triaged and assessed by medical professionals before developing symptoms. A key component of Bahrain's relatively high survival rate is that patients considered high risk were admitted for observation before their condition could deteriorate.

An "agility store", set up in April 2020 under the direction of HRH the Crown Prince and Prime Minister of Bahrain, maintained a stock of COVID-19 supplies and served as

a warehouse for all centres. The number of ventilators was increased, and Bahrain began producing domestic ventilators. Even at the height of the pandemic, there was no need to re-sterilize and reuse N95 respirator masks as forecasting for the warehouse was based on modelling estimates for the worst-case scenario. This was critical to ensuring that there were no stockouts during the pandemic, and reassured those working on the frontlines that they were supported at the highest levels of Bahrain's political leadership.

Bahrain's success in maintaining nearly uninterrupted provision of health care services throughout the pandemic can be attributed to the solid infrastructure already in place. Primary health care centres and hospitals continued to provide non-COVID-19 care, and mobile clinics were used for triage of those who could not access services elsewhere. In addition to COVID-19 facilities which included dedicated areas for the evaluation of symptomatic suspected cases, and health facilities for triage of positive cases, there were also 24-hour medical centres available for those isolating at home.

Bahrain expanded telemedicine, which was already employed under the PHC setup before the pandemic, to follow up on cases isolating at home, and increased the range of services available to the population. Hospital staff proactively followed up and provided consultations for appointments originally scheduled for in-person visits, and non-critical essential visits which had to be in-person were postponed to a later date. Those who did not want to receive teleconsultations had prescriptions filled automatically, with medication delivered by mail to families, usually within 24 hours.

Health care services were delivered using automatic reminder systems for check-ups, and designated slots at health care centres to reduce crowding. Dental services, which are provided free of charge, also remained operational. For the entirety of the pandemic, health centres remained open to all, and health services were maintained in primary and secondary care through telemedicine and the home delivery of medication.

Tele-physiotherapy was also provided virtually, with patients sent instructive videos to follow, and health care professionals following in real time to monitor compliance and provide professional advice.

2. Health workforce

The continuous provision of essential health services could not have operated smoothly and effectively without a capable and flexible workforce.

As preparations for the infrastructure for COVID-19 treatment began, internal human resources were repurposed from other departments for mobilization across the 10 facilities designated to provide COVID-19 care.

In the early stages of the pandemic, COVID-19 cases discharged after two weeks were followed up closely for post-COVID complications, allowing for the provision of timely quality services when needed. Volunteers, of all ages and from varying academic backgrounds, were recruited, and supported the response in roles such as data entry and validation. Nurses and physicians from the private sector also came forward to offer their expertise, demonstrating the commitment and collaboration between sectors. Social workers were instrumental in reaching out to families who were in isolation via phone calls, assisting them with their needs and supporting their mental well-being. Current fellows and alumni of The Prime Minister's Office Fellowship Program, established by HRH the Crown Prince and Prime Minister seven years ago, also joined in the response effort, and continue to contribute.

Throughout the pandemic, the health sector was able to maintain essential health services to the public, with staff supported by volunteers. Relatively few nurses and physicians were recruited from abroad, and then only in the last phases of the response. A recruitment pool was established, and the decision was taken to retain it for one year and provide rotational training.

With the health workforce working tirelessly to support response efforts, measures were taken to boost morale and ensure staff health was prioritized. The hotline for mental health overseen by Bahrain's psychiatric hospital was supplemented by a separate dedicated hotline for health care workers with mental health-related concerns. When health care workers became infected, they were immediately contacted to ensure they felt included, cared for, and remembered. Their needs were met, and children and family taken care of in cases where the health care worker needed to quarantine.

Cleaners and security personnel were trained on IPC measures to mitigate nosocomial transmission and ensure continuity of services, and contributed to innovative ways of disinfecting surfaces. Though access to Bahrain's public health system was simple and efficient, at the height of the pandemic most people chose to stay home, and went to private facilities for minor consultations and procedures. As a result, in-patient admissions decreased significantly, helping to reduce the burden on health care facilities and staff. Testing and screening of other diseases continued, though there was a slight slowdown, and a backlog of elective surgeries developed.

"We were hoping for a sprint, but prepared for a marathon"

Mr Waleed AlBassam,
Chief of Research / Prime Minister's Office

3. Political support and engagement

High-level institutional flexibility from the start was a determining factor in the overall success of Bahrain's preparedness and response efforts. Multiple protocols were prepared in anticipation of changes in situation or in the medical consensus, with preparations geared towards multiple scenarios. As the science evolved, so did the response effort.

Empowerment from the highest levels of government was felt by every person working on the COVID-19 response. Each link in the response chain was given support to make autonomous decisions in their area of work.

The entire response was characterized by honesty, transparency and communication. The public received details of the first case, the number of severe cases receiving treatment, the number of people infected, and other indicators, and the health alert website launched by the MOH kept users abreast of the latest scientific knowledge about the pandemic and health developments within the Kingdom, helping to fight misinformation.

Despite struggles with the fiscal balance programme due to the decline in global oil prices, decision-makers ensured that the COVID-19 response was prioritized without jeopardizing other funds. Budget concerns did not affect response efforts, and the decision was taken to expand capacity as soon as a hospital filled 50% of its ICU beds. Constant feedback loops and real-time communication with medical and executive committees ensured that policies were calibrated according to the medical situation and evolving scientific evidence.

COVID-19 treatment was not only provided free of charge for all, but to alleviate the financial burden on households during the pandemic, loans were deferred, utility bills waived, and fiscal support packages rolled out to support businesses large and small.

4. Partnerships and collaboration

Partnerships and collaboration throughout the pandemic were vital to the overall strength of the response against COVID-19.

Clear and effective communication channels were established in January 2020 between different ministries, including the Ministry of Interior, Ministry of Education and Ministry of Foreign Affairs, and the needs and demands of hospitals were communicated directly to representatives of the relevant sectors.

While prior to the pandemic it may have been difficult for staff in the MOH to envision how to facilitate collaboration with the Ministry of Interior due to differences in the bureaucratic structures of the ministries, many opportunities for task sharing and cooperation arose between the two. For example, the Ministry of Interior supported the construction of COVID-19 treatment facilities, the transportation of equipment and supplies, and the transfer of patients between hospitals. Personnel from the Ministry of Interior who spoke multiple languages also provided invaluable help in communicating with non-Bahrainis on health-related matters.

Partnering with pharmacies helped ensure that patients' prescriptions were filled and delivered to households as quickly as possible, and coordination with the national ambulance service was instrumental in transporting cases.

Recognizing the value of sharing knowledge and experience, additional investment has been devoted to joint training programmes and exercises which encourage multisectoral collaboration and foster well-rounded individuals able to work within and between ministries. Younger graduates and volunteers have also been retained and added to a recruitment pool which will be helpful in strengthening health system resilience as Bahrain moves forward.

Ongoing development of the national health insurance system continued in parallel with the COVID-19 response. Health centre bylaws were developed, a CEO was nominated, and additional services for end users were added, including for mental health, physiotherapy and post-COVID syndrome.

Bahrain also developed international partnerships. Bahraini doctors were sent to Jordan and India to help with the local COVID-19 response, extensive sessions were held with the United Kingdom to discuss strategies when the Delta variant first emerged, and medical teams from Italy and Germany visited Bahrain to exchange experiences. The COVID-19 traffic light system, adopted by several countries to reflect the prevalence of the coronavirus and determine, based on the level of spread, which activities are permitted, is just one example of the positive outputs of international partnerships.

"The private and public health sectors worked hand in hand as a unified whole to ensure the highest quality care"

Dr Mariam Al Jalahma
(CEO NHRA)

CONCLUSION

The successes of Bahrain's COVID-19 preparedness and response effort are built on countless contributions from different sectors and individuals and cannot be captured in their entirety in this report. Multisectoral cooperation, partnership and trust formed the foundation for contact tracing, isolation, triaging, treatment, mitigation measures, awareness campaign/social media platforms, economic strategies and packages, and the expansion of services. Together, they are paving the way for sustainable collaboration across sectors, further improvements in health emergency preparedness and response, and building back better.

The word which resonates most loudly throughout Bahrain's response is solidarity. It is reflected in every action taken, every decision made. It was not only a whole-of-government approach, but a whole-of-society approach, grounded in the principle of equality which enabled a unified, continuous and collaborative campaign against COVID-19.

While the world thought that initially COVID-19 would be a sprint, Bahrain prepared for a marathon. But it is not a race. Nobody wins until everyone wins.

The experiences and lessons learned from Bahrain's experiences in testing, vaccination and maintaining high quality care in essential health services contain invaluable insights into best practices that, shared, will have far-reaching and long-lasting effects beyond Bahrain's borders.

World Health Organization Country Office in Bahrain
Building 929, Road 1015, Block 410 Sanabis Alkhair Tower 1

www.emro.who.int/countries/bahrain/index.html

emacobaawr@who.int