Tunisia: a primary health care case study in the context of the COVID-19 pandemic

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Executive summary

The COVID-19 pandemic in 2020–2022 had a significant impact on primary health care (PHC) in Tunisia. This case study examines PHC – known locally as basic health care (BHC) – in the context of the pandemic between March 2020 and August 2022, with a focus on preparedness, response and resilience. The Astana PHC framework was used to analyse and report the findings.

A literature review of relevant academic literature and policy documents was conducted, followed by stakeholder consultations with health care personnel able to offer reflections on the role of the national health system in the COVID-19 pandemic response.

The health system pursued a vertical, hospital-centric approach in the pandemic response, relying particularly on emergency services. Nevertheless, several examples of community participation and multisectoral collaboration were observed. Civil society, professional organizations and official agencies were mobilized in support of health personnel. Pilot projects were initiated that aimed to integrate digital and technical innovations, personal protective equipment (PPE) was produced, oxygen concentrators were distributed, and resuscitation beds were installed. Despite the fragility and marginalization of PHC/BHC in the pandemic response, there was consensus among health care stakeholders that PHC/BHC contributed to preventing the collapse of the national health care system through inclusive participatory and collaborative practices.

The Tunisian experience suggests that the COVID-19 pandemic response may have benefited from earlier and greater PHC/BHC involvement. Increased recognition and support for the core functions of PHC/BHC, including critical emergency management, will be important to build current and future pandemic preparedness and response capacity.
Introduction and national context

COVID-19 emerged as a global threat in early 2020 (1). Once the first imported case was confirmed in Tunisia in March 2020 (2), the governing structures of the public health management and public security system moved towards a centralized response, relying on governmental leadership and a specialized hospital management approach (3). The accumulated expertise from 40 years of PHC/BHC practices was sidelined in favour of a vertical and technocratic approach (4).

The multiple and wide-reaching impacts of the pandemic have contributed to increased recognition among public health stakeholders of the importance of a PHC/BHC vision centered on essential health care, intersectoral collaboration and community participation. Investments in PHC/BHC have underpinned successes in responding to epidemics over the last four decades (5–7). Against this backdrop, questions have been posed about the effectiveness of the vertical approach and practices (8).

During the Astana Conference in Kazakhstan in 2018 and under the banner of universal health coverage (UHC), the international community renewed and consolidated its commitments to the 1978 Alma-Ata Declaration to provide continuous access to health care, equity and social justice (9, 10).

This case study examines PHC/BHC in Tunisia in the context of the COVID-19 pandemic between March 2020 and August 2022, focusing on the core components of the Astana Framework: primary care and essential public health functions, multisectoral collaboration, and community engagement. This analysis aims to contribute to the strengthening of PHC/BHC, including epidemic planning and control efforts, building on existing successes (15). Drawing on an analysis of relevant literature and feedback on local experiences obtained through stakeholder consultations, this case study aims to answer the following questions:

1. What were the specificities of the COVID-19 response strategy, in a country whose health care system remains oriented – based on official statements – towards PHC/BHC?
2. What was the impact of COVID-19 on the provision of essential health care, and what roles have multisectoral collaboration and community engagement played in the pandemic response across all pillars of PHC/BHC?
3. What lessons can be drawn from Tunisia’s integrated COVID-19 control strategy (preparedness, response, resilience) to reinforce PHC/BHC policies?
Health care planning and funding are jointly managed by the Ministry of Health (MoH) and the Ministry of Social Affairs. The division of responsibilities contributed to different views among public health care stakeholders during the pandemic. One view was that PHC/BHC should be preserved and strengthened in the face of possible epidemic threats (16–19). Another view is that the shock suffered by PHC/BHC services is an expected consequence of outdated health care structures, which have failed to adapt to the changing needs of the population by not providing continuous, comprehensive and integrated care (20). Overall, the impact of COVID-19 on PHC/BHC is influenced by multiple factors including trust in public institutions, stability of political and social life, robustness of information systems, governance transparency, and social responsibility and accountability.

Study context

Tunisia is undergoing a threefold transition in terms of demographics, epidemiology and health care provision. It is a lower-middle-income country and, at the onset of the COVID-19 pandemic, was experiencing severe shortages in health infrastructure, medical and laboratory supplies, PPE and infection control products. The private sector plays a significant role within the health care system (21). However, a large proportion of the population is not covered by conventional health insurance.

The first confirmed case of COVID-19 was detected on 2 March 2020. The response strategy of the MoH was comprehensive and anticipatory (22). As of 3 August 2022, 1.13 million confirmed cases of COVID-19 had been recorded, with 29,041 deaths (23). By 5 August 2022, 14.9 million COVID-19 vaccine doses had been administered and 54% of the general population was fully vaccinated (24). In 2020 and 2021, there were four major outbreak waves: the first in September 2020, the second in March 2021 (Alpha variant), the third in July 2021 (Delta variant), and the fourth in December 2021 (Omicron variant).

The MoH developed a Plan of Preparedness and Response to the Risk of the Introduction and Spread of SARS-CoV-2 to curb the transmission of COVID-19 and prevent the health care system from being overwhelmed (3). The first phase of this plan focused on curtailing the introduction of the virus into national territory (25).

The MoH has been reorganizing and re-orienting its health policy – led by the Directorate of BHC – towards PHC (6,7). Progress on access and equity of health care has been attributed to this PHC/BHC policy during its first two decades of execution (1980–1999) (20). PHC/BHC emphasizes primary public health care facilities, while private practice and clinics operate on a fee-for-service basis and are oriented towards an exclusively curative approach.

When COVID-19 cases emerged, the PHC/BHC system was already facing a threefold burden of morbidity (communicable diseases, noncommunicable diseases (NCDs) and trauma), the expansion of private activities (see Table 1), the emigration of doctors abroad, and increasing demand for public-practice doctors to engage in complementary private activity. PHC/BHC practice had
been reduced to simple preventive tasks (e.g., vaccination, family planning, school health) in local health centres that were often deserted in urban areas and closed in rural areas (20).

A 2017 Mourakibun Network report on the status of basic health care centres (BHCCs) (26) and the multiple maps of health resources and activities in annual reports over the last decade (5) illustrate a decline in equity of access to care and regional disparities in health care provision. Tunisian civil society has noted declines over time in the quality of public health care services, with effects on essential preventive practices (27).

**Table 1. Human resources, equipment and health facilities in the Tunisian health care system in 2020**

<table>
<thead>
<tr>
<th></th>
<th>Public sector (absolute numbers)</th>
<th>Private sector (absolute numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Human resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners</td>
<td>3624</td>
<td>3157</td>
</tr>
<tr>
<td>Medical specialists</td>
<td>3416</td>
<td>5546</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of authorized hospital beds</td>
<td>22 036</td>
<td>6958</td>
</tr>
<tr>
<td><strong>Health facilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHCCs</td>
<td>2113</td>
<td>-</td>
</tr>
<tr>
<td>Local hospitals</td>
<td>110</td>
<td>-</td>
</tr>
<tr>
<td>Regional hospitals</td>
<td>31</td>
<td>-</td>
</tr>
<tr>
<td>University hospitals and specialized centres</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Pharmacies</td>
<td>-</td>
<td>2215</td>
</tr>
<tr>
<td>Private medical laboratories</td>
<td>-</td>
<td>605</td>
</tr>
<tr>
<td>Hemodialysis centres</td>
<td>-</td>
<td>117</td>
</tr>
<tr>
<td>Private clinics</td>
<td>-</td>
<td>110</td>
</tr>
</tbody>
</table>

Source: Department of Health (2022) (5).
Methodology

The study examines PHC/BHC in Tunisia in the context of the COVID-19 pandemic between March 2020 and August 2022. Data were collected via the following methods:

- A literature review of medical publications indexed on the PubMed database, with a bibliographic query combining the two Medical Subject Headings (MeSH) keywords “COVID-19” and “Tunisia” (n =approximately 60 publications in October 2022); scientific reports of international organizations and national associations (e.g., the Friedrich Ebert Foundation, MoH) (5, 27); and documentation of the Societal Dialogue on National Health Policies, Strategies and Plans (Phases 1 and 2) (28–30).

- Stakeholder consultations with specialized medical teams who implemented aspects of the COVID-19 response in: a) hospitals requisitioned by the MoH to provide health care principally and exclusively for COVID-19 patients; and b) field hospitals set up during the pandemic. Stakeholders also included family physicians assigned to primary facilities across different facilities (including health care centres, emergency departments and local hospitals). Other health professionals also participated in consultations, including a national group of public health experts with national or international health services management skills and/or advanced degrees in preventive and community medicine obtained from national medical schools. The Delphi technique with a single round of consensus-building was employed with the help of 25 experts from the broad spectrum of the public health discipline (31). Multiple focus-group sessions were organized with key stakeholders from the primary care sector (practitioners, managers and patients) in the regions of Sousse, Kairouan and Monastir.

A series of review sessions were organized by the authors to critically read background documents, discuss the main concerns of the study and finalize the drafting of the report.

How primary care and essential public health functions are responding to COVID-19

The initial outbreak of COVID-19 occurred in a context of PHC/BHC policy fatigue, when there was a lack of trust in the public health system and increasing investment in the private sector and specialist departments.

During the first waves of COVID-19, the government introduced border control measures, generalized and targeted stay-at-home orders and business closures (32), sensitization campaigns, and other public health measures (hand washing, wearing of facemasks, social distancing). The response was built around five essential activities that reflected a hospital-centric and technocratic approach:
1. **Emergency Medical Services (EMS):** During the first quarter of 2020, the COVID-19 response focused on emergency departments and the setting-up of structures for COVID-19 patients in partnership with the EMS (known as the Services d'Assistance Médicales d'Urgences or SAMU). The EMS teams were responsible for conducting home visits to symptomatic patients, escorting them to health care facilities for microbiological analyses (screening tests) and transferring them to the emergency departments which were equipped with so-called COVID-19 circuits (triage).

2. **COVID-19 hospital circuits:** The governing health care structures called for the cessation of routine health care activities in all hospitals and the transfer of the logistical capacity of specialist health care in favour of patients with COVID-19, regardless of their medical or surgical prerogatives. Thus, all hospitals were ordered to create their own COVID-19 circuit (33). Professional associations facilitated the selection of patients to reschedule procedures. For example, the Tunisian Association of Surgery recommended delaying the management of non-tumour pathologies requiring elective surgery and for which the risk of complication was low (34). Thus, patients were discharged from particular departments to allow for the potential reception of COVID-19 patients.

3. **Referral hospitals:** In a context of uncertainty and fear of becoming overburdened, the MoH transformed some university hospitals into advanced facilities dedicated to the COVID-19 response. The Abderrahmane Mami hospital in Ariana, situated in Tunis health region and specializing in pneumology, was the first hospital centre requisitioned by the MoH to receive COVID-19 patients in the Greater Tunis area.

4. **Field-hospitals:** As university and specialist hospitals became overwhelmed with COVID-19 patients, a decision was made to create field-hospitals in larger cities. Among them was the Kairouan field-hospital in the central-eastern part of the country. Its performance during the pandemic response has benefited from logistical, financial and technical participation from the community. This field-hospital helped to relieve the pressure on the emergency department and other hospital departments in Kairouan, and to provide oxygen therapy.

5. **Oxygen beds:** The COVID-19 pandemic revealed the fragility of the national health care system and the scarce resources available for resuscitation, oxygen beds and intensive-care doctors. Also, the country became aware of the regulatory constraints of its hospitals due to multinational companies monopolizing the distribution of medical gases. The situation was so alarming that the MoH established a crisis unit dedicated to monitoring the availability of oxygen in hospitals, anticipating the transfer of patients when oxygen reserves were low and regulating the oxygen supply donated by neighbouring countries.
Health workforce challenges relevant to these activities included that staff had “no accommodation between shifts, no transport, and no decent food” (35). Furthermore, the conversion of pneumology services into COVID-19 services interrupted specific care provision (e.g., chemotherapy). After the resumption of normal activities as the crisis subsided, physicians in this hospital were confronted with an increase in the burden of cancer patients and early mortality rates due to the discontinuity of care following the closure of specialized departments in the health care chain (chemotherapy, radiotherapy, surgery). Inadequate referral procedures and restrictions on social mobility that affected care-seeking behaviours also impacted disease burden and mortality (35).

In the summer of 2021, Tunisia’s health system was overwhelmed by the pandemic to the extent that the government and the public feared its collapse. The volume of oxygen in hospital tanks became a monitoring index of the COVID-19 response, both by health care managers and the mass media. Civil society organizations were mobilized via social networks to manage the distribution of oxygen condensers to patients at home. The oxygen crisis revealed the shortage of human and physical resources for intensive care units, dependence on few multinational companies for health care products, lack of transparency of hospital purchasing procedures, and lack of experience in community organization for popular relief efforts.

Specificities of the PHC/BHC response

Following the stabilization of COVID-19 infection rates in April 2022, decision-makers invited citizens to BHCCs to obtain their fourth booster of COVID-19 vaccine. This was the first contact between citizens and PHC structures after months of isolation, fear of virus transmission and deserted facilities, including for those monitored for chronic pathologies (e.g., arterial hypertension and diabetes mellitus). In an open letter dated 16 August 2021 (36), decision-makers were reminded by public health experts of the need to generalize the immunization campaign in all BHCCs across the country to ensure equity, guarantee the success of the vaccine programme and decentralize the management of the pandemic by “empowering the 223 health districts”. This call catalysed the demands of civil society and social networks to integrate the COVID-19 response into PHC, following analysis of the accumulated international experience in managing the pandemic.

This reconciliation with the BHCCs highlighted the need for a paradigm shift in the national COVID-19 strategy, with calls for the population to “coexist with the virus” (3). The recognition of the important role of PHC in the pandemic response was further supported by growing evidence of “collateral damage” from COVID-19 response measures (5). This included reduced access to health care between 2019 (pre-COVID-19) and 2020, particularly for specialist consultations and surgical procedures (reduced by 41%), and for general practice (family medicine) consultations in PHC facilities (reduced by 34%). Emergency room admissions saw an overall decrease of 23% between 2019 and 2020, with a slight recovery in admissions between 2020 and 2021 (5).

Local public health experts reported that the role of PHC facilities during the COVID-19 response was passive, overdue and a “stop-gap” to referral facilities (31). Interviewees in a published study remarked that the first waves of the pandemic were characterized by “the shutdown of the BHCCs, the refusal of patients, and, at best, the referral of patients to dedicated facilities”. PHC/BHC staff were involved in the COVID-19 response as effective auxiliaries to the official agents, who were mainly based in secondary and tertiary care organizations. PHC/BHC personnel were
reassigned as vaccinators in immunization megacities, which were piloted by specially recruited staff trained in the computerized management of large patient-flows with the assistance of logistical support teams. In addition, PHC personnel were redeployed in small mobile teams to provide screening services at homes of elderly people with limited autonomy. Fixed-term contracts were established to recruit new health executives for the provision of dedicated care for COVID-19 patients.

Key stakeholders commented that the PHC/BHC system “was completely eclipsed” during the first wave of COVID-19. However, public health experts anticipated that, eventually, the control of critical epidemics (such as COVID-19) would be an integral component of the PHC/BHC strategy due in part to “the proximity of the facilities” and the PHC/BHC personnel “enjoying the trust of the population”. During the first six weeks of the pandemic, and in a qualitative study of the perceptions of health professionals belonging to the central Maghreb region (Tunisia, Algeria, Morocco) (37), respondents reported that a key strength of response strategies was the human resources available. Reported weaknesses included “a health care system centered around the principal administration” and a “lack of scientific experts occupying central decision-making positions”. Intersectoral collaboration was reported as an opportunity, while a key threat was a “lack of public trust in the health care system” (37).

A thematic issue of the journal La Tunisie Médicale celebrating the 40th anniversary of Tunisian PHC/BHC summarized this journey through two phases (20): the first phase (1980–1999) was concerned with triumphs in the establishment of an accessible and effective PHC system through vaccination programmes, monitoring of pregnancies and treatment of communicable diseases. In contrast, the second phase (2000–2019) was marked by a low capacity for therapeutic education of chronic patients, cancer screening and the management of NCDs. PHC/BHC had been reduced to a package of care that has minimal and outdated technical capacity and is lacking in social justice values, synergistic strategies of community participation and intersectoral collaboration (20). Following an audit of 40 years of PHC/BHC practices, the issue concluded that “it is time to reinvigorate the health care frontline” (20).

Four years before the COVID-19 outbreak, these inadequacies in PHC/BHC practices were highlighted in a manual that set out a “plan of preparedness, response, and resilience facing diseases of epidemic potential in Tunisia” (38). This state of dislocation of PHC/BHC policy, particularly over the last decade, explains the fragility of the national health system in dealing with the challenges of the COVID-19 pandemic. Drawing on modified analytical components of Farmer’s model of health system strengthening (39), the pandemic response can be summarized following the so-called 5Ss.

• **Space**: The shutdown of BHCCs and regional hospitals represents a form of technical unemployment of primary structures and staff, following a decision to centralize the pandemic management.
• **Staff**: PHC workers were redeployed outside of PHC/BHC facilities into new local clinics requisitioned by the Central State and its 24 governorates (prefectures).

• **Stuff (equipment)**: There was a centralized management policy for PPE, biological analyses and oxygen equipment.

• **System**: A centralized governance approach was adopted to manage the pandemic response, albeit with a hybrid funding model of both public and private financing. A centralized information system was used for epidemiological surveillance.

• **Surveillance**: Regional surveillance was conducted by health boards, but under the responsibility of the national COVID-19 control committees.

**Provision of essential care**

During 2020 and 2021, the major functions of PHC/BHC – including the treatment of chronic diseases, vaccination of children under five and monitoring of pregnant women – were no longer part of the managerial priorities of decision-makers. Nor were they among the daily concerns of families who were seeking screening tests, oxygen machines and resuscitation beds. Community and provider attention was overwhelmingly focused on preventing deaths from COVID-19.

The most affected PHC/BHC functions during the COVID-19 pandemic from 2020 were the continuity of care for patients monitored for cardiovascular diseases and diabetes mellitus, and the provision of preventive services (i.e., childhood immunization, prenatal surveillance and gynecological cancer screening). The closure of BHCCs, redeployment of PHC staff, mobility restrictions and drugs shortages were key factors in the collapse of essential PHC/BHC functions during the first waves of the pandemic. During the initial phase, families were sometimes forced to travel 30–40 km to facilities in search of basic services, which in normal times would be provided in the BHCCs situated in their neighbourhoods.

For COVID-19 screening, reverse transcription polymerase chain reaction (RT-PCR) tests were often provided by the private sector. The MoH’s online appointment platform proposed a list of more than 100 accredited private laboratories for an unaffordable unit cost of 170 Tunisian Dinars (US$ 52), equivalent to 40% of the Guaranteed Minimum Inter-professional Wage (SMIG). By 25 February 2021, the MoH had authorized a new list of 84 private laboratories to perform RT-PCR tests in different regions.
Referrals

Within the framework of PHC/BHC integration, major efforts have been invested in organizing health units. This comprises a primary, functional health care unit that provides an interface between the population and the health care system, and a secondary health care unit that provides patient referral structures for specialist consultations or essential hospitalization. Thus, the referral system is built on a mechanism centred on the general practitioner/family doctor who is responsible for synthesizing significant episodes and who is equipped with an appropriate information system (40).

However, during the COVID-19 response, the horizontal organization of health care structures was abolished and a vertical approach was adopted focusing on a single health problem (i.e., COVID-19). All health care facilities that remained functional during the pandemic – such as emergency departments and COVID-19 specific hospitals – became autonomous and were loosely linked to other facilities. Gradually, for the sake of individual safety and due to the generalized fear of transmission, the inclusive horizontal organization of care units in the public health sector crumbled and care supply schemes were no longer functional. The private sector, on the other hand, which is typically financially autonomous, was able to cope with the multiple health crises through public-private partnerships.

Despite government assurances that the state would cover all medical expenses of COVID-19 patients who could not find a bed at a public hospital, patients and their families faced paying significant sums of money simply for oxygen treatments. Families had to pool their resources and enter debt to access treatment. As such, in addition to the burden of illness, there was the anxiety of being unable to receive medical attention due to the lack of means. Thus, referral mechanisms were interrupted under the vertical model of pandemic management. All of this was set against the backdrop of considerable fear and anxiety among the public about virus transmission (41–43).

Critical emergencies

The management of critical emergencies within populations is a core expectation of PHC and is almost as important as the recovery from ordinary diseases or the stabilization of chronic conditions. The 2018 Astana Declaration (9) draws attention to critical emergencies, relating them to the global burden of disease and premature deaths. It refers to epidemics, wars, violence, natural disasters and climate change (15), and recommends explicitly that “coherent and inclusive approaches” be used to extend PHC to include these emergencies, paying particular attention to care continuity. However, PHC policy in Tunisia is restricted to eight priority actions detailed in the Alma-Ata Declaration, for which national programmes were designated through the Direction of Basic Health Care (7). As Tunisia did not have enough time prior to the onset of COVID-19 to adapt its PHC/BHC policy to the Astana Declaration, the PHC/BHC policy lacked elements addressing social justice, equity in health care provision and continuity of care (15).
How the country is responding to COVID-19 through multisectoral policy and action

WHO and the Public Health Agency of Canada (44) define multisectoral action in the health care domain as “actions implemented by sectors other than health care, possibly but not necessarily in collaboration with health care, aimed at achieving health outcomes or health equity or addressing determinants of health or health equity”. Such collaboration addresses the social and economic factors affecting the health profile of a certain population, and it is one of the top priorities in establishing positive action to address the social determinants of health and health equity (45).

Throughout the history of PHC/BHC in Tunisia, the response to COVID-19 has been the singular event that has mobilized most citizens. All segments of society, regardless of their status, age or level of education, were rallied to promote approaches that could combat the COVID-19 virus and its transmission nationwide. Since January 2020, for example, the MoH has collaborated closely with the Civil Aviation Office and airports. To aid in the identification of travellers from high-risk areas, thermal cameras were set up in airports to detect fever upon entry and to refer suspected cases of COVID-19 to isolation units for medical follow-up. Public awareness messages were delivered to travellers through posters, fliers and electronic newsletters to disseminate information about COVID-19 symptoms and necessary preventive measures. A form was developed to register the contact details of passengers and to track their travels.

Other examples of multisectoral collaboration attest to the importance and relevance of partnership with the MoH to protect health security:

• In some Engineering Schools (Universities of Sousse and Carthage), students manufactured a low-cost oxygen-therapy machine and developed an open-access digital tool that allowed instant diagnosis of COVID-19 based on lung X-rays.

• The Ministry of Interior Affairs acquired a robotic ground vehicle used to help reinforce the country’s stay-at-home measures and business closures. Controlled remotely by government officials, the robot was equipped with infrared and thermal imaging cameras, an audio system, a global positioning system (GPS) tracker, and sound and light systems that could be used to request IDs from people who failed to comply with the public restrictions and to issue verbal warnings.

Multisectoral collaboration was generally well conducted despite little direct involvement from PHC/BHC facilities. However, community engagement – which was officially led by the central facilities of epidemiology and directly involved the MoH – was not as successful. For example, the COVID-Maghreb (Cov-Mag) research team conducted a study (46) to evaluate the quality of media communication during the first week of June 2020. The audit concluded that community-led initiatives and multisectoral actions – essential for managing mass panic and for mobilizing the population during pandemics – were not sufficiently valued.
Implementation of measures such as hand washing, social distancing and the use of face masks offer opportunities for multisectoral collaboration among community development stakeholders to prevent virus transmission. A healthy lifestyle, which is a major determinant of health, also constitutes an axis of partnership between the health system and social sectors including education, regional development and agriculture. In Tunisia, the national restrictions on mobility, public gatherings, and business and school closures introduced as part of the COVID-19 pandemic response—constituted obstacles that inhibited collaboration. These policies affected the degree of collaboration between health professionals (and other state officials), and between actors in the private sector who encountered economic difficulties due to unemployment and limited access to financial aid (47–49).

How communities are responding to COVID-19

Community participation, a fundamental pillar of PHC, is understood as the process of the active engagement of citizens. The Alma-Ata Declaration (1978) stated that “citizens have the right and duty to participate individually and collectively in the planning and implementation of health care policies” (15).

The COVID-19 crisis awakened the capacity for innovation and altruism among the population, supporting the efforts of health professionals towards an efficient and coordinated response. A study conducted by the CoV-Mag research group examined community initiatives in the first quarter of 2020 (50). The study demonstrated that community initiatives went beyond traditional preventive interventions (e.g., the production of visors and face masks, and the provision of resuscitation beds) to encompass the development of digital applications and systems for risk scoring and drug distribution. Members of computer science, robotics and artificial intelligence clubs, and entrepreneurs from startup companies, were among the first to develop innovative applications to facilitate the work of health care professionals and to improve quality of life during the early waves of the pandemic.

Such community participation, specifically from young people, required community solidarity. It became important to establish trust between government services and younger generations through transparent and proactive communication, support and appreciation of their initiatives, and a better understanding of their needs (51). The following are examples of technical and digital innovations developed by young people during the pandemic response:

• **Veasense** is a robot developed by the start-up Enova Robotics to help medical staff perform remote preliminary diagnoses and safely monitor patients without physical contact;

• **Six FabLabs Solidaires** in Tunis, Sfax and Gabes, in collaboration with the MoH and the Orange Foundation, worked on manufacturing protective visors using laser-cutting machines;
How communities are responding to COVID-19

- In Consomed, a Kairouan-based factory for medical products, 150 employees agreed to double their working hours and stay in dormitories installed at the factory to produce 50,000 face masks per day;
- Sartex, a Monastir-based company, converted part of its production-line to manufacture face masks;
- The Beja-based Kromberg & Schubert company developed protective visors using 3D printing technology; and
- Corona Bot, a digital application aiming to spread awareness about the COVID-19 virus, successfully sent over 200,000 messages to 10,000 people.

During the first wave of the pandemic in 2020, several businesses pledged to build emergency and intensive-care units and field hospitals in their hometowns and work areas within two to three weeks.

To garner financial support from communities, the MoH announced two initiatives for public funding. The first invited in-kind donations for the fight against the coronavirus. This initiative distinguished between two types of donations, either material/equipment (e.g., medical supplies, cleaning products, disinfection and sterilization equipment, PPE) or services (the provision of human resources to the MoH (e.g., medical, paramedical, secretarial services). The second initiative was a fund called 18-18, which allocated funds for medical equipment and transport, artificial respirators and other medical supplies. Portions of this fund were granted to cover the housing expenses of citizens placed in compulsory confinement, the recruitment of paramedics and medical trainees under service contracts, as well as scientific research. A balance sheet for this fund up to 24 March 2021 indicated a total amount of 204 billion Tunisian dinars (over US$ 73 billion), with planned expenditure of 164 billion Tunisian dinars (around US$ 60 billion), or 80% of funds (52).

These examples of community participation illustrate some success stories of the health care system and its BHC directorate, under the supervision of family physicians belonging to the private sector and general practitioners belonging to public health centres. They demonstrate the generosity of the population when contributing to community development projects and supporting health professionals engaged in COVID-19 response efforts.
Conclusion and lessons learned

The COVID-19 pandemic in 2020–2022 severely impacted the stability and performance of the health system. The vertical, hospital-centric approach adopted by the government meant that the PHC/BHC system was marginalized in the pandemic response. It was only later in the pandemic that policy-makers began to recognize the importance of PHC/BHC. Community participation and multisectoral collaboration were recognized as essential for public trust in decision-making and coordination of an effective response. A key lesson learned from the pandemic is that strengthening PHC/BHC is of paramount importance for future pandemic preparedness.

The marginalization of PHC/BHC during the pandemic response mirrors experiences reported elsewhere (53–56). Moreover, the COVID-19 pandemic is reported to have disrupted essential care such as preventive maternal and child health services (57, 58). Future studies on the impact of the COVID-19 pandemic on preventive practices (e.g., vaccination, prenatal surveillance, gynecological cancer screenings) and the management of chronic diseases (mainly early screening, medication compliance and therapeutic education for diabetes mellitus and arterial hypertension) are likely to be important to inform PHC/BHC-centred approaches to infectious disease outbreaks and pandemics.

This case study is the product of collective reflection by a group of independent researchers in PHC and hospital medicine. Lessons learned can be used to inform efforts to enhance PHC and strengthen the country’s capacities to address epidemic-prone diseases (59–61). Based on the findings from this case study, the following opportunities to strengthen PHC are identified:

1. **There are opportunities to renew commitments to PHC/BHC policy, with an emphasis on continuous access to essential health care and UHC.** Resilience can be built in the national health system to guarantee access to essential health care in the face of the global burden of disease.

2. **A clear ethical basis will be important to underpin PHC/BHC policies in the organization of health services.** Social justice, equity of health services and continuity of care can be strengthened as part of a rights-based approach to health.

3. **There is an opportunity to establish a new look PHC project.** The PHC/BHC system can integrate and capitalize on new health programmes that tackle the global burden of disease, utilizing digital technologies and multidisciplinary teams, such as to integrate tele-health and virtual procedures into models of care (19).

4. **Epidemic management in PHC/BHC: preparedness, response and resilience functions for epidemics/pandemics can be better integrated into PHC facilities across different health regions.**
5. **There is an opportunity to establish a comprehensive training project for a new generation of PHC providers.** Training could be designed and implemented to create a cohort of new PHC/BHC leaders with specific skills in health care provision, employing technical and digital applications and tele-health approaches.


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This case study was developed by the Alliance for Health Policy and Systems Research, an international partnership hosted by the World Health Organization, in collaboration with the WHO Regional Office for the Eastern Mediterranean (EMRO) and WHO country offices. In 2015, the Alliance commissioned the Primary Health Care Systems (PRIMASYS) case studies in twenty low- and middle-income countries (LMICs) across WHO regions. This case study builds on and expands these previous studies in the context of the COVID-19 pandemic, applying the Astana PHC framework considering integrated health services, multisectoral policy and action and people and communities. This case study aims to advance the science and lay a groundwork for improved policy efforts to advance primary health care in LMICs.