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REPUBLIC OF LEBANON
MINISTRY OF PUBLIC HEALTH
Primary Health Care

INTEGRATING COVID-19 VACCINATION INTO THE PRIMARY HEALTH CARE NETWORK IN LEBANON

FULL VERSION

K2P COVID-19 SERIES

PURPOSE

The purpose of this document is to advocate for the integration of COVID-19 vaccination into the services delivered by the National Primary Health Care (PHC) network in Lebanon. It also aims to identify requirements for optimal integration, challenges for this undertaking, and counterstrategies to overcome challenges.

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ACKNOWLEDGEMENT

The authors would like to thank Ms. Diana Jamal and Ms. Nour Ataya for document review, and Ms. Rayane Nasreddine for the Arabic translation.

CITATION

Hilal N, Shaya R, Hamadeh R, Abou Samra C, El-Jardali F. K2P COVID-19 Series: Integrating COVID-19 Vaccination into the Primary Health Care Network in Lebanon (Full Version). Knowledge to Policy (K2P) Center, Beirut, Lebanon, April 1, 2021

This advocacy document is the result of collaborative efforts between the Primary Health Care Department at the Lebanese Ministry of Public Health and the Knowledge to Policy (K2P) center at the American University of Beirut. This joint work constitutes a continuum of a previous advocacy document titled 'Prioritizing 'Primary Health Care in Lebanon: A Call for action

This product was developed as an activity conducted during the practicum of Ms. Rima Shaya at K2P center, in fulfillment of the degree requirements of Masters of Public Health

SELECTION PROCESS

A comprehensive search of the literature was undertaken to identify articles focusing on the topic of integrating COVID-19 vaccination into PHC, requirements, barriers, and counterchallenges. Search strategy consisted of reviewing the following databases: Medline/ Pubmed (MeSH terms: Coronavirus Infections, Viral Vaccines, Vaccination, Primary Health Care), IMEMR (keywords: COVID-19 vaccine, coronavirus vaccine, primary health care), Health Evidence (keywords: COVID-19 vaccine, coronavirus vaccine, primary health care), Health Systems Evidence (keywords: COVID-19 vaccine, coronavirus vaccine, primary health care), and Embase (keywords: COVID-19 vaccine, coronavirus vaccine, primary health care). In addition, data retrieved from grey literature websites including WHO, FDA, CDC, Lebanese MoPH, clinical trials.gov, media, and others were included. Handsearching was also performed with two objectives: 1) searching for supporting data and 2) conducting fine searches. As a result of this methodology, 93 articles and data sources were included in this document.

CONTEXT

GLOBAL CONTEXT

Since its onset in December 2019, the COVID-19 pandemic has spread at an alarming pace, infecting millions, straining health systems, and bringing economic activities to a near-standstill. As of March 26th, 2021, there have been 124,871,140 confirmed cases of COVID-19, including 2,744,543 deaths globally (WHO, 2021c). Concomitantly, limited success of pharmacological and non-pharmacological interventions rendered the rapid development of an effective and safe vaccine a global imperative.

With the launch of COVID-19 vaccination in the end of 2020, countries around the world have been racing to vaccinate their populations at breakneck speed. As of March 25th, 2021, more than 501 million doses were administered across 140 countries, with an estimated 12.2 million doses administered daily (Bloomberg, 2021a).

Worldwide, different sites have been employed for COVID-19 vaccine delivery, some as part of an established health facility, while others were devised especially for this pressing purpose. Diversity in delivery sites allowed groups of people with different characteristics to get a vaccine in a way that suits their needs. For example, mobile services provided vaccines for individuals with limited mobility such as the frail elderly and persons with physical disabilities, whereas large venues such as football stadiums were recruited to provide vaccination in highly populated areas (DHSC, 2021). Other unconventional sites have also been employed, aiming at enhancing vaccine uptake. For instance, Disneyland in California was transformed into a mega vaccination site; an international airport in Singapore which was closed since May 2020 was reopened to deliver vaccines (Smithsonian magazine, 2021); and a bar in Israel offered COVID-19 vaccines in exchange for a free drink (Skynews, 2021).

Vaccine delivery sites included (DHSC, 2021; US DHHS, 2020; Newsroom, 2020):

- HOSPITAL HUBS
- PRIMARY CARE NETWORKS
- PRIVATE PRACTICE CLINICS
- COMMUNITY PHARMACIES
- LARGE-SCALE VENUES, SUCH AS FOOTBALL STADIUMS
- MOBILE VACCINATION UNITS
- HOME OR RESIDENTIAL VISITS FOR INDIVIDUALS SUCH AS THE FRAIL ELDERLY, PERSONS WITH DISABILITIES, AND PRISONERS

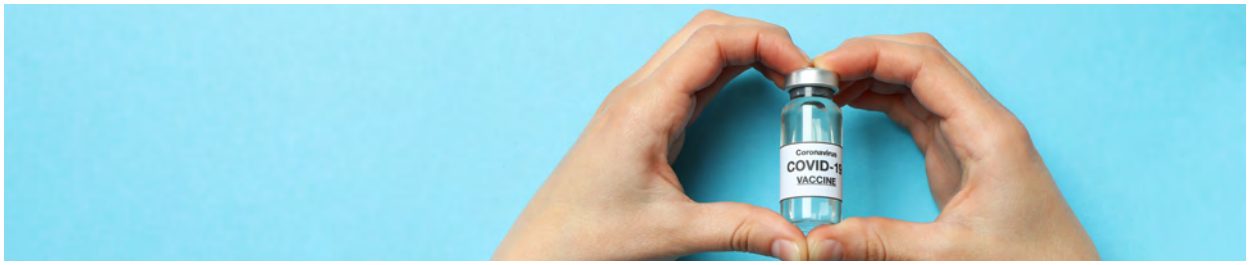
LOCAL CONTEXT

Lebanon, like many countries around the world, was hit hard by the COVID-19 pandemic with 452,281 cases and 5,964 deaths recorded as of March 25th, 2021 (MoPH, 2021b), let alone the grave consequences on the economy, social life, and the health sector. The economic impact of the pandemic was further exacerbated by the worst economic crisis in Lebanon's history with almost half of the Lebanese population falling below the poverty line either due to the decrease in the value of their wages or the unemployment that resulted from extensive layoff in all sectors (WorldBank, 2020).

In response to the urgent need for the importation and deployment of COVID-19 vaccines, the National Deployment and Vaccination Plan was devised to establish a national strategy for scaling up the preparedness for the roll-out of COVID-19 vaccines in Lebanon (MoPH, 2021a). This dynamic plan was based on the World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) interim guidance on developing national deployment and vaccination plans for COVID-19 vaccines. After securing the needed preparatory arrangements, including the legislations required for vaccine import, the first batch of Pfizer-BioNtech COVID-19 vaccines arrived on February 13, 2021. Vaccination across the country was immediately initiated the next day. On March 24th, 2021, Lebanon also received the first batch of the AstraZeneca-Oxford vaccine, with 33,600 doses procured through COVAX.

Until March 26th 2021, 180,074 doses of COVID-19 vaccines have been delivered in 32 hospitals and 1 mobile clinic, with the sites distributed as evenly as possible along the Lebanese governorates (Impact, 2021).

Highlights of Lebanon National Deployment and Vaccination Plan for COVID-19 Vaccines is presented in Annex 1.



Entrusting public and private hospitals with vaccine delivery is based on the availability of large premises which enable mass vaccination in a relatively short period of time, a necessity for the timely achievement of herd immunity, the availability of healthcare providers knowledgeable in COVID-19 disease and and who can be trained to deliver vaccines, the convenience of the existing infrastructure, and the public trust in hospitals and healthcare providers who were the frontline fighters in the battle against COVID-19 and can therefore provide the needed information and motivation for enhancing public vaccine uptake.

On the other hand, employment of hospitals for COVID-19 vaccine deployment undoubtedly poses additional strain on an overstretched hospital sector and projects further financial hardships for providing a non-reimbursed service. Such arrangement might also divert resources, particularly human resources, away from their duty of managing COVID-19 patients, which remains a priority particularly with the mounting number of COVID-19 cases and the shortage in physicians and nurses that has escalated following their recent massive emigration (The National News, 2020). Moreover, despite their geographic distribution across the country, equitable access to vaccination sites, particularly in remote areas, remains a concern.

It is still unclear when the COVID-19 pandemic will come to an end, with postulates that the ongoing pandemic may last from a few months (McKinsey and Company, 2021; The Harvard Gazette, 2020) to several years (Bloomberg, 2021b). Fundamentally, the end date of COVID-19 pandemic is largely determined by the race between the emergence of new viral variants and achieving herd immunity (McKinsey and Company, 2021) for which an uninterrupted, prompt supply of vaccines is a requisite. On the other hand, the current arrangement of COVID-19 vaccines delivery remains a short-lived errand or ‘favour’ provided by hospitals, rendering the institutionalization of the delivery of COVID-19 vaccines a dire need. This can be achieved through the integration of COVID-19 vaccination into a structured, formalized system, namely the National Primary Health Care network.

BACKGROUND

1. OVERVIEW OF PHC IN LEBANON

The Lebanese National PHC Network consists of 245 PHC centers distributed over all governorates (MoPH, 2021c). The network is established on a public-private partnership between the Ministry of Public Health (MoPH) and the civil society, with the aim of health services provision to the native population as well as to the displaced communities (MoPH, 2019a). Ownership of PHC centers in Lebanon is summarized in Figure 1.

MoPH plays a normative role in ensuring quality and affordability of the health care services provided at the PHC centres. Quality assurance is achieved through the implementation of the National PHC Accreditation Program and continuous capacity building for human resources (WHO, 2017). Community engagement is also achieved through proactive outreach activities, including health education and promotion (WHO, 2017).

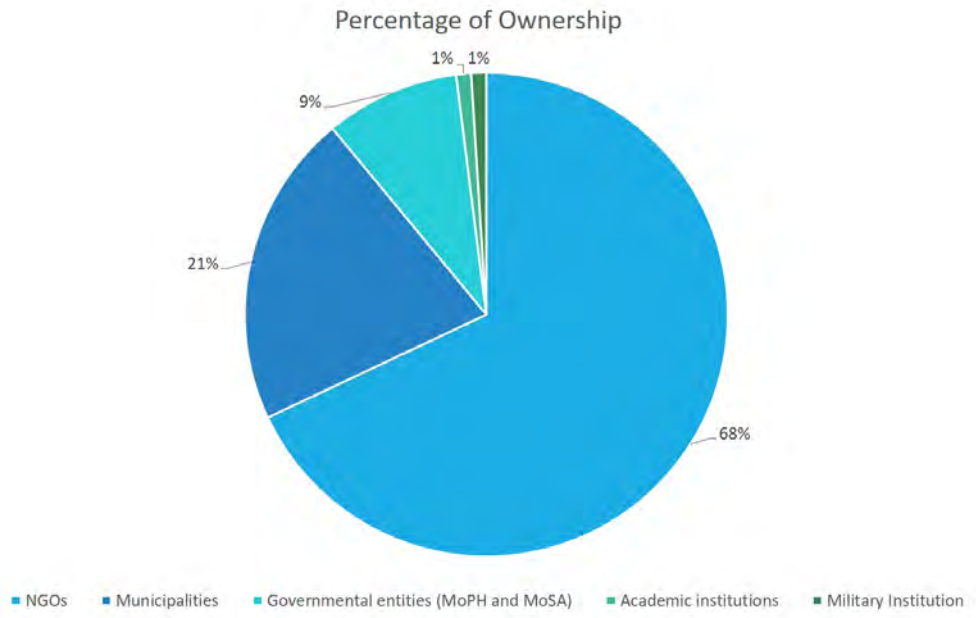


Figure 1: Ownership of PHC centers in Lebanon (MoPH, 2019a)

2. PHC NETWORK COVERAGE AND SERVICE DELIVERY

The highest proportion of PHC centers lies in Beirut and Mount Lebanon (31%) followed by South, Nabatieh, North Akkar, and Baalbek el Hermel (Figure 2) (MoPH, 2019a). The network caters to the health needs of all beneficiaries residing on Lebanese territories with the Syrian displaced consuming around 22% of services provided in 2019 (MoPH, 2019a).

Since 2010, the PHC network has experienced a gradual increase in the utilization of services. Over a decade, the number of services delivered by PHC has almost doubled with 2,350,776 services delivered in 2019 compared to 1,207,325 in 2010 (MoPH, 2019a). This increase in service delivery is attributed to both the expansion in geographical coverage and an increased demand for the high-quality care provided (MoPH, 2019a). The current economic crisis is expected to further increase demand for PHC services, triggered by populations who have lost health coverage due to unemployment and suffered from decreased purchasing power (Paes-Sousa, Schramm, & Mendes, 2019).

Under the MoPH guidance and oversight, PHC centers implement several preventive programs and initiatives, one of which is the Expanded Program on Immunization (EPI) which aims at reducing the risk of occurrence of vaccine-preventable diseases.

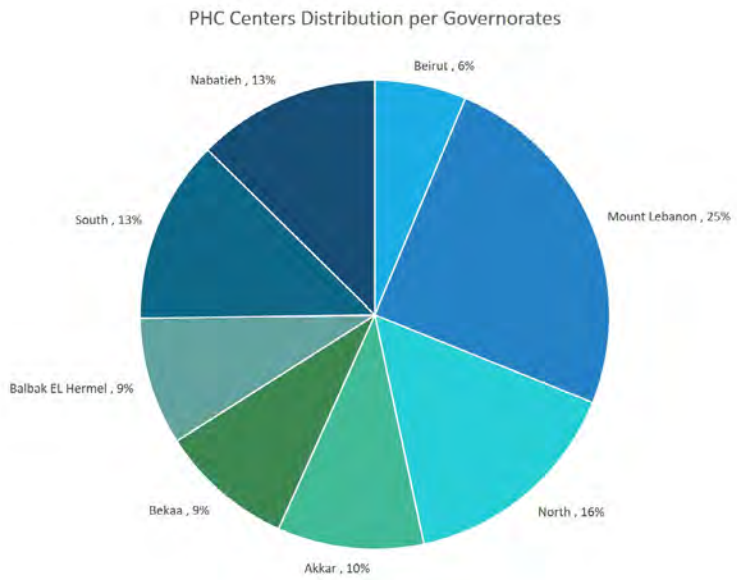


Figure 2: PHC Centers Distribution per Governorates

3. FACTORS UNDERLYING THE IMMUNIZATION SERVICE AT PHC

The following section presents the underlying arrangements at the governance, financial and delivery levels that have shaped that current PHC immunization service.

GOVERNANCE

The latest version of the National Immunization Strategy launched in 2017 provides the road map for the immunization program till 2022 (MoPH, 2017b). The strategy was complimented with the EPI Multi Year Plan of Action, which identified clear objectives and milestones for the program (2017-2022) (MoPH, 2017a). In addition, as part of the PHC accreditation program, policies and procedures for immunization services delivery, including infection prevention and control and medical waste management were developed and disseminated to PHC centers.

With regard to directives from the MoPH, the most recent ministerial circular tackling immunization services is circular 21/2019 which mandates the provision of free-of-charge vaccination services by a trained registered nurse in all PHC centers and dispensaries (MoPH, 2019b).

FINANCING ARRANGEMENTS

Prior to the Syrian crisis, the domestic budget allocated for the EPI was sufficient to cover vaccine purchasing for the Lebanese population. The influx of the displaced population resulted in an increased demand for immunization services. Donor support, particularly from the European Union, was channelled to cover the funding gap and ensure equitable access to free immunization services for both the host and displaced communities (Hamadeh, Kdouh, Hammoud, Leresche, & Leaning, 2020). Immunization services are delivered free-of-charge by trained registered nurses. In case a child has a medical condition which requires physician assessment, consultation fees ranging from 8,000LL to 18,000 LL are charged (MoPH, 2019a).

DELIVERY ARRANGEMENTS

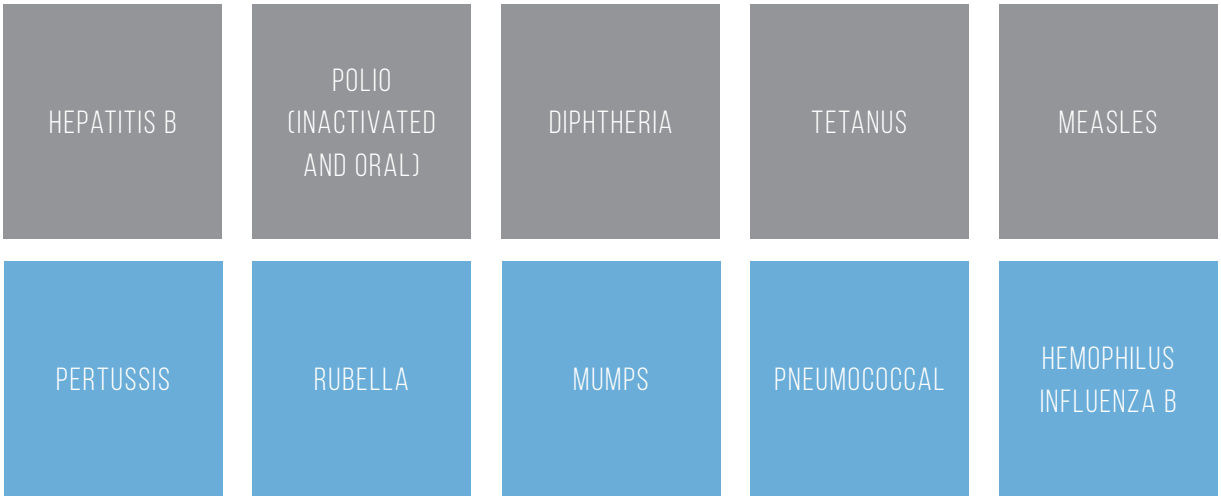
A. THE EXPANDED PROGRAM ON IMMUNIZATION

Immunization services in the public sector are implemented under the EPI. The EPI is the only PHC program that expands beyond the PHC network and is implemented by around 600 dispensaries. The program aims to reach to every district as per the Reach Every District (RED) strategy. As such, around 50-60 % of children residing in Lebanon receive their vaccines through the EPI, while the remaining 40-50 % are vaccinated in the private sector (MoPH, 2017b).

As recommended by the WHO (WHO, 2021b) the national vaccine calendar includes 10 antigens aiming to combat most common vaccine preventable diseases. A national technical committee of experts representing orders, syndicates, academic institutions, and UN agencies guides the inclusion of new antigens to the calendar, supported by epidemiological evidence and fund availability. All vaccines procured for the public sector by the EPI are WHO prequalified. The following scheme lists the vaccines delivered by the PHC centers:

Vision of Expanded Program on Immunization

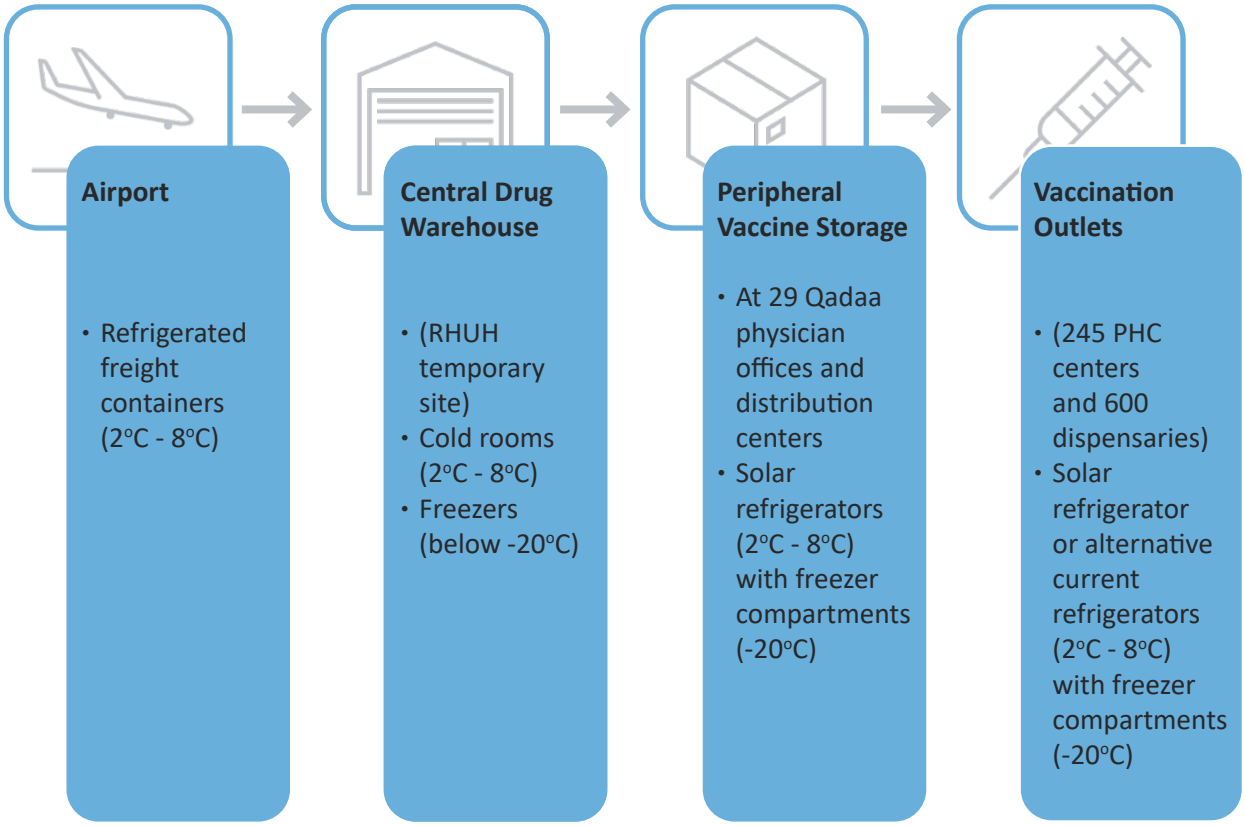
"The risk of occurrence of vaccine preventable diseases is reduced, and the country maintains its polio free and neonatal tetanus statuses; and eliminates measles" (MoPH, 2017a).



Thus far, adult vaccination is not covered by the EPI, with the exception of pneumococcal vaccine (PCV13) that is provided to the most vulnerable elderly or immunocompromised beneficiaries based on a medical prescription and preapproval. However, "expanding immunization beyond childhood" is one of the program objectives to be achieved by 2022 (MoPH, 2017a).

B. PROCUREMENT AND SUPPLY CHAIN

To ensure that procured vaccines reach children in optimal quality, cold chain is maintained and monitored at all levels of the supply chain. The EPI vaccine supply chain is summarized in the following scheme:

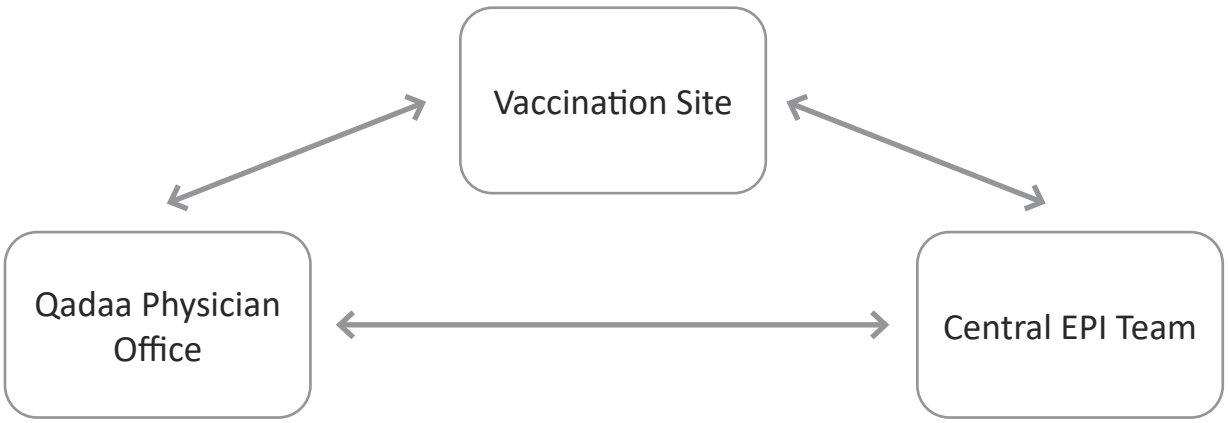


C. WASTE MANAGEMENT

As per the circular 91/2018, with UNICEF support, a national NGO specialized in medical waste management is subcontracted for waste collection and management of wastes generated by the immunization service including sharps, containers, and empty or expired vaccine vials (MoPH, 2018).

C. DATA COLLECTION AND REPORTING

The MoPH has achieved a milestone in automatization of the vaccine stock management and reporting process by linking the vaccination facilities with the Qadaa physician offices and the central EPI team via an electronic information system. In addition, in 2019, an immunization module was added to PHENICS, the online health information system available at PHC centers since 2016. This has allowed comprehensive documentation of immunization services delivered for every child. As for dispensaries, an android application, Mobile EPI Registry Application (MERA), was developed to facilitate reporting to the Qadaa physicians' offices both on stocks and service delivery. Both the PHENICS and the MERA systems constitute decision support tools through providing guidance to health care providers on due vaccines.



D. QUALITY ASSURANCE AND CAPACITY BUILDING

The MoPH provides the PHC centers with technical guidance and supports with continuous capacity building of the health human resources (MoPH, 2019a). In collaboration with the Order of Nurses, all registered nurses employed at PHC centers were trained on vaccine administration and anaphylaxis management. Other trainings on topics such as infection prevention and control (IPC), medical waste management, and quality of care are continuously delivered to health care providers in the PHC network (MoPH, 2019a). In addition, since 2016, strict attention for vaccinovigilance was adopted, where reporting and management of adverse events following immunization (AEFI) is closely monitored by the EPI team (MoPH, 2017b).

ADVANTAGES OF THE INTEGRATION OF COVID-19 VACCINATION INTO THE PHC NETWORK

There are several anticipated benefits for integrating COVID-19 vaccination into PHC.

SECURING EQUITABLE ACCESS TO VACCINES

Equity concerns are particularly pressing in the current context of the protracted Syrian crisis that has increased the influx of vulnerable refugee populations as well as the economic crisis, which has exacerbated poverty among the host and displaced communities alike.

Preliminary data on COVID-19 vaccination in Lebanon has revealed that registration for COVID-19 vaccination among the refugee population is very minimal, with less than 2% of those registered on the Impact platform belonging to the Syrian or Palestinian nationality (Impact, 2021). Multifactorial causes may underlie this diminished vaccine turnout. However, such alarming data undoubtedly warrants further investigation of possible access barriers to registration and vaccination.

Additional preliminary data has noted huge discrepancies across governorates in the number of individuals who registered to receive COVID-19 vaccines (Impact, 2021). Table 1 summarizes COVID-19 registration by governorate, as of March 26th 2021.

GOVERNORATE	PERCENTAGE (OF TOTAL NUMBER OF REGISTRATION)
MOUNT LEBANON	49.05%
BEIRUT	14.92%
NORTH	10.05%
SOUTH	8.33%
NABATIEH	6.82%
BEKAA	6.06%
BAALBEK-HERMEL	2.81%
AKKAR	1.97%

Table 1: COVID-19 Vaccine Registration by Governorates

On the other hand, it has been well demonstrated that primary health care, as compared to other health services, can improve equity of access, especially for disadvantaged individuals as access to primary care services is evenly distributed whereas access to specialized care is often reserved for the financially privileged populations. Several systematic reviews (Tao, Agerholm, & Burström, 2016; Batista et al., 2018) and single studies (Van Doorslaer, Masseria, & Koolman, 2006; Richard et. Al, 2016; Sweeney & Mulou, 2012; Ferrer, 2007) have consistently demonstrated that incorporating services into primary health care diminishes health disparities. As a result, it is believed that primary care should be at the heart of any vaccination strategy as such centers are embedded in communities, easy to access, and enjoy public trust (Majeed & Molokhia, 2020).

ENHANCEMENT OF VACCINATION COVERAGE

Integration of COVID-19 vaccines into PHC will allow responding to the ongoing needs of a growing population and vaccinating populations that, for many reasons -such as delayed subgroup vaccination authorization or vaccine hesitancy- were not vaccinated in the initial campaign. Studies on subgroups such as children, adolescents (ClinicalTrials.gov, 2020a; ClinicalTrials.gov, 2020b), and pregnant women (ClinicalTrials.gov, 2021) are currently underway to evaluate efficacy and safety of COVID-19 vaccines on such populations. As a result, additional approvals for COVID-19 vaccines use especially for children and adolescents are expected to be issued soon (Reuters, 2021b; Medscape, 2021).

RESPONDING TO THE ONGOING NEEDS FOR COVID-19 VACCINATION

Since the duration of protection provided by COVID-19 vaccines is still unknown (CDC, 2021a) and in the absence of consistent speculations regarding pandemic end, there is a considerable probability that booster doses of COVID-19 vaccines may be required at regular intervals for sustaining immunity against SARS-CoV-2. In addition, with the continual emergence of new SARS-CoV-2 strains, there is a probable need for boosters or periodic re-vaccination (CNBC, 2021). The PHC provides an opportunity for the ongoing update of COVID-19 vaccination status.

PROVIDING AN OPPORTUNITY FOR CATCH-UP VACCINATION

Among the adversities caused, the COVID-19 pandemic has disrupted the provision of critical services such as routine immunizations. In Lebanon, a study assessing the changes in the utilization of routine immunization services between October 2019 and April 2020 as compared to the same period in the preceding year revealed a decrease in the number of vaccines administered by 20% in the public sector and by around 47% at the national level (Mansour et al., 2021). Given the substantial decrease in the utilization of routine immunization services, integrating COVID-19 vaccination into PHC services will present an opportunity for catch-up vaccination, particularly when COVID-19 vaccines are approved for children and adolescents, which is expected to occur in the near future.

PROVIDING AN OPPORTUNITY FOR HEALTH PROMOTION AND PREVENTION

The increased utilization of PHC which shall be brought about by the quest for COVID-19 vaccines will provide an opportunity for the provision of health promotion and preventive services, including age-appropriate screening and patient education.

DECREASING THE BURDEN ON HOSPITALS

Since the onset of the epidemic, the hospital sector in Lebanon has been battered by the demand for expanding its capacity in response to the overwhelming number of COVID-19 cases (Reuters, 2021a; AlArabiya news, 2021). The role of hospitals has also been expanded through assuming the responsibility for delivering COVID-19 vaccines, despite no financial support and minimal administrative and technical support. Transferring delivery of COVID-19 vaccines into PHC centers will undoubtedly alleviate some pressure on hospitals and health providers.

MAKING USE OF THE AVAILABLE RESOURCES

The available infrastructure and expertise in routine immunization, as outlined in the 'Background' section, forms a solid ground that can be leveraged for the optimal delivery of COVID-19 vaccines at the level of PHC centers. In this regard, one survey assessing vaccine hesitancy has revealed that health care providers prefer to receive immunization services at PHC centers (IMC & MoPH, unpublished data).

PROVIDING AN OPPORTUNITY FOR IMPROVING PUBLIC KNOWLEDGE

Several systematic reviews have emphasized the role of PHC in public dissemination of information on innumerable health topics and through various channels, be it through direct patient education, awareness campaigns, or outreach activities (Abril & Dempsey, 2019; Berkhout et al., 2018; Cruz-Cobo & Santi-Cano, 2020; Goryakin, Suhlrie, & Cecchini, 2018; Ibanez et al., 2012; Nover & Jackson, 2013; Orrow, Kinmonth, Sanderson, & Sutton, 2012). Integrating COVID-19 vaccines into PHC presents an opportunity for delivering knowledge and dispelling myths and misinformation surrounding COVID-19 vaccines, thereby promoting informed public opinions and choices.

REQUIREMENTS FOR THE INTEGRATION OF COVID-19 VACCINATION INTO PHC

Proper integration of COVID-19 vaccination into PHC necessitates the advent of additional requirements, as outlined in Table 1 (WHO, 2020; WHO, 2021a; CDC, 2020a; CDC, 2020b; Australian government, 2020; Canadian MoH, 2020; Paterson et al., 2016; CASS, 2020; Mills, Rahal, & Brazel, 2020). Despite that many of the listed necessities -such as easy access, internet, fridges, IT system, PPE (personal protective equipment), policies for infection control, adverse events management and waste disposal -are readily available in PHC centers that provide routine immunization, listing them underscores the imperative need for their availability, proper use, and implementation.

PHYSICAL ENVIRONMENT AND INFRASTRUCTURE	• Proximity to population centers and mass transit to secure high vaccine access • Availability in remote peripheral areas to secure equitable access • Dedicated areas for clinic functions such as screening, registration, waiting, vaccine storage, preparation, and administration, observation, emergency care, waste disposal, and areas that provide other clinical services, all while observing physical distancing requirements. • Safe and directed access in clinical areas to allow movement of staff, with easy access to appropriate emergency equipment • Appropriate security provisions to ensure no unauthorized access to vaccine doses • Available entry and exit points, including a one-way clinic flow • Accessible by the elderly and those with disabilities and mobility issues • Parking facility with ability to organize traffic flow and accommodate to weather requirements • Adequate heating and cooling, lighting, handwashing facilities, and water and electricity supply • Access to telephone, computer networks, and internet • Maintenance of critical facilities including plans for backup power or alternate storage site if critical facilities malfunction • Plastic barriers at patient contact areas to provide protection • Visual reminders and cues in place to reduce the risk of errors • Visual alerts such as signs, posters, and floor markers at entrances and in strategic places to support screening and clinic flow and provide instructions on hand hygiene, respiratory hygiene, and cough etiquette
SUPPLIES	• Adequate availability of medical equipment such as PPE, emergency medical kits, thermometers, and stethoscopes • Sanitation supplies for hands use and cleaning stations between patients (done at a minimum every hour, between shifts and if station areas become visibly soiled) • Key documents for clinic function, including vaccine information sheet, immunization record, incident report, adverse event following immunization form, supply/resupply list, and post-clinic evaluation form
COLD CHAIN MANAGEMENT	• Refrigerators (2°C - 8°C) with freezer compartments (-20°C or -70°C depending on type of vaccine procured and local needs) with adequate numbers to store COVID-19 vaccines and usual vaccine stock • Opaque containers to store vaccine syringes that have been prepared for administration under appropriate temperature conditions and protected from light • Ability to monitor the temperature of the refrigerator where vaccines are stored • If the facility doesn't have the capacity to refrigerate the vaccine on arrival, then a portable vaccine storage unit or a qualified container and pack-out may be used along with a digital data logger • Regardless of whether vaccines are delivered to the site or transported there, plans must include regular monitoring of vaccine temperature and securing efficient and timely cold chain maintenance
WORKFORCE REQUIREMENTS	• Establish a staffing plan and identify functional roles and responsibilities, with scalable plans based on the expected number of people to be vaccinated. A staff member may be able to perform multiple tasks. • Adequate number of appropriately trained staff to ensure clinical safety including: ◊ Vaccinators to prepare and administer vaccines ◊ Authorised immunisation provider, such as a medical officer or fully trained immunisation registered nurse or nurse practitioner to assess patients and authorise other appropriately trained clinical staff (vaccinator) to administer the vaccine ◊ Concierge or team leader to direct clinic flow ◊ Clerical staff ◊ First aid staff ◊ Staff to manage staff, patient and stock safety ◊ Medical officer (may be the same as the authorised immunisation provider)

TRAININGS	• PHC centers staff must have appropriate training and qualifications in topics including: • COVID-19 vaccine storage, handling, preparation, and administration • Cardiopulmonary resuscitation and basic life support • Vaccination documentation • Infection control practices • COVID-19 vaccines related topics to ensure the ability to respond to questions raised by the public
POLICIES, PROCEDURES, PROTOCOLS, AND PATHWAYS	• Regulations should be available to guide the following areas of practice: • Receipt of vaccine doses including packaging acceptance and temperature checks • Storage and handling requirements of specific COVID-19 vaccines • Safe dispose of unused vaccines • Response to temperature breaches, including relocating vials to another refrigerator (or freezer) • Checking expiration dates for vaccines, diluents, needles, syringes, and alcohol wipes. • Screening and referral of patients who display symptoms of COVID-19 • Screening process for vaccine contraindications and for receipt of previous doses of COVID-19 vaccines or other vaccines • Protocol for management of anaphylaxis • Safety protocols such as physical distancing, incident reporting, needle stick injuries, and reporting of vaccination errors • Documentation of vaccination and adverse events • Post-vaccination patient education including information about adverse events and scheduling a second vaccination appointment • Infection prevention and control • Waste management • Referral for management of serious adverse events following immunizations that require medical attention
TECHNOLOGY AND RECORD KEEPING	• Provide IT support for online processes, including registration, scheduling, screening for eligibility, contraindications, and providing vaccine information • Connectivity for data integration into the national booking and vaccination record system (link the existent health information system to the national registration platform to allow registration and follow up of vaccinated individuals) • Ensure the proper integration of the IMPACT COVID-19 vaccination platform with the existing vaccination registries (Phenics and MERA) to accommodate the registration of COVID-19 vaccination and AEFI reporting • Recall previous immunizations, record current immunisation and any encountered adverse events • Recording and reporting of vaccines used, stock on hand, and discarded vaccines, including reasons for discarding, and vaccine wastage
WASTE DISPOSAL	• Facilities for waste disposal, including sharps and unused vaccines, in accordance with standard precautions and other regulatory requirements for vaccines
FINANCING	• Support PHC centers with operational cost incurred due to vaccine delivery and increased needs for staffing, trainings, supplies, and extended working hours
PUBLIC INFORMATION AND COMMUNICATION	• Communicating consistently, transparently, empathetically and proactively about uncertainties, risks, and vaccine availability will contribute to building trust
COMMUNITY ENGAGEMENT	• Harnessing social influences especially from people who are particularly trusted by and identified with members of relevant communities has demonstrated improvement in vaccines uptake • Health professionals are more likely to recommend vaccination if they themselves have been vaccinated. • Endorsers that share similar values and characteristics with the relevant group, such as religious or ethnic identity, are more likely to be influential

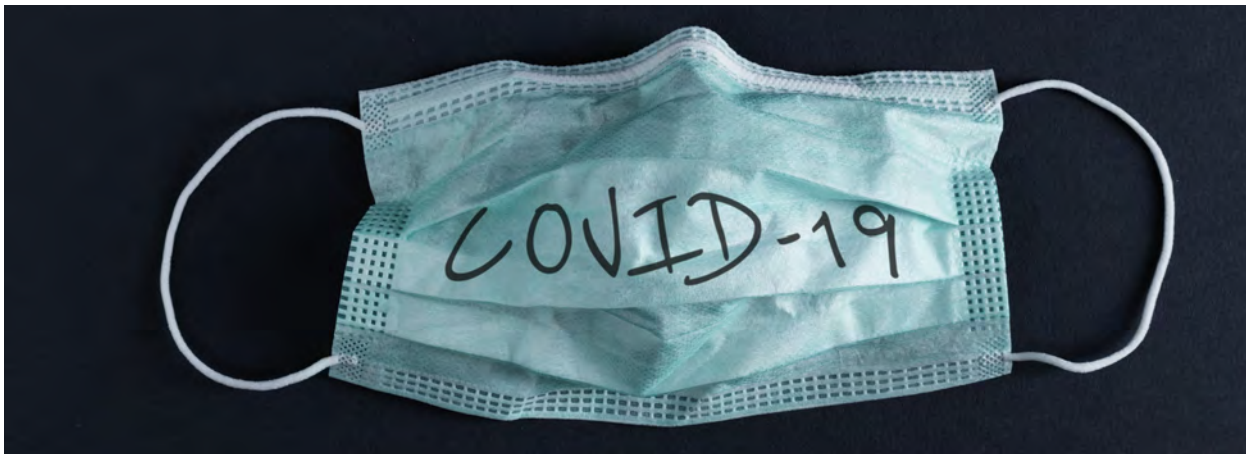
Table 2: Requirements for the Integration of COVID-19 Vaccination into PHC

In addition, the emergency equipment outlined in Table 2 should be immediately available for the assessment and management of anaphylaxis (CDC, 2021b).

Table 3: Requirements for the Management of Anaphylaxis

MANDATORY	OPTIONAL
Epinephrine (e.g., prefilled syringe, autoinjector)*	Pulse oximeter
H1 antihistamine (e.g., diphenhydramine, cetirizine)†	Oxygen
Blood pressure monitor‡	Bronchodilator (e.g., albuterol)
Timing device to assess pulse	H2 antihistamine (e.g., famotidine, cimetidine)
	Intravenous fluids
	Intubation kit
	Adult-sized pocket mask with one-way valve (also known as cardiopulmonary resuscitation [CPR] mask)

*COVID-19 vaccination locations should have at least 3 doses of epinephrine available at all times. Persons with a history of anaphylaxis who carry an epinephrine auto injector could be reminded to bring it to their vaccination appointment.
†Antihistamines may be given as adjunctive treatment but should not be used as initial or sole treatment for anaphylaxis.
‡Either an automated or a manual blood pressure monitor, with appropriate cuff sizes, is acceptable. If a manual blood pressure monitor is used, a stethoscope should also be available.



IMPLEMENTATION CONSIDERATIONS

The COVID-19 pandemic has unexpectedly and abruptly disrupted the functioning of the health system, rendering the integration of COVID-19 vaccination into PHC a challenging undertaking. Challenges at the technical, human resources, and public fronts are anticipated. Extrapolating from the experience with other vaccines and from COVID-19 vaccine rollout in hospitals in Lebanon, the following table presents some of the projected challenges for the integration of COVID-19 vaccination into PHC and presents evidence-based counterstrategies.

VACCINE DELIVERY

CHALLENGE	COUNTERSTRATEGY
Slow vaccination process with scarcity in the number of delivered COVID-19 vaccines, as up till March 26th, 2021, only 180,074 vaccines were delivered (Impact, 2021), suggesting that only a very small proportion of the population has received a vaccine so far. Despite that around 5 million vaccine doses are expected through contracting with Pfizer-BioNtech and COVAX support (in addition to other doses to be procured through ongoing agreements conducted by both the public and private sector) (MoPH, 2021a), the importation of vaccines is happening at a slower pace than that is required for rapid achievement of herd immunity.	• Expedite COVID-19 vaccine importation process through negotiations with COVAX and pharmaceutical companies (NPR, 2021). • Authorize and facilitate COVID-19 vaccines importation by the private sector, aiming at mitigating the pressure for vaccines on the public sector (L'Orient Today, 2021b). Allowing a proportion of the population to purchase a COVID-19 vaccine from the private sector will secure the availability of vaccines at PHC centers for those with limited purchasing abilities, and thus contributes towards more equitable access to vaccines.
Violation of vaccine delivery according to priority (L'Orient Today, 2021a)	• Implementation of fair and equitable distribution of COVID-19 vaccines, while respecting set priority groups (NoWasta) (The National News, 2021). • Pitfalls encountered in vaccine delivery in Lebanon should be perceived as opportunities for process improvement.

INFRASTRUCTURE AND EQUIPMENT

CHALLENGE	COUNTERSTRATEGY
Limited ability of the existent PHC infrastructure to comply with requirements for physical distancing, waiting area segregation ventilation, and queuing (Garg, Basu, Rustagi, & Borle, 2020)	• Selection of PHC centers with enough space to accommodate the requirements for physical distancing • Supporting PHC centers in the creation of external waiting areas, taking into consideration weather requirements • Developing a clear one-way patient flow trajectory customized for each PHC center aiming at reduction of disease transmission (CDC, 2020b)
Strict need for ultra-low temperature freezers in low-resource centers The mRNA vaccine developed by Pfizer-BioNTech must be stored at very low temperatures and used soon after defrosting (FDA, 2021).	• Storage in central warehouse or use of COVID-19 vaccines with less stringent storage requirements. • If strict storage requirements are not available, consider the use of adenoviral vector vaccines that are logistically easier to use as they can be stored long term in standard vaccine fridges (Ramasamy et al., 2020).
Problems related to vaccine storage such as temperatures outside the target range (Matthias et al, 2007; Yakum, Ateudjieu, Walter, Watcho, 2015) or lack of adequate temperature measurement devices (Gazmararian et al., 2002; Bailey, Kurinczuk, Kusel, Plant, 1999; Bell, Hogue, Manning, Kendal, 2001)	• Secure the availability of high-quality temperature monitoring devices • Temperature monitoring and periodic temperature audits (CDC, 2018) conducted by PHC staff and central authorities.

VACCINATION DIGITAL PLATFORM

CHALLENGE	COUNTERSTRATEGY
Vaccine platform technical insufficiency (AUB, 2021) with resultant contribution to delayed scheduling of appointments, incomplete documentation of vaccination, and loss to follow up on delayed AEFI	• Technical improvement of the vaccination platform (Stockwell & Fiks, 2013) with adaptation for linking with vaccination platforms at PHC centers (MERA and PHENICS).

PROVISION OF NON-COVID-19 VACCINE HEALTH SERVICES

CHALLENGE	COUNTERSTRATEGY
Negative potential impact on the provision of routine primary health services In Tanzania, one study aiming to determine the impact of the government's school-based Human Papilloma Virus (HPV) vaccine campaign on the provision of routine primary health services and staff workload, revealed that compared to the average week before and after the campaign, health workers reported longer working hours and patient waiting times, feeling over-stretched and performing duties outside their normal roles whilst colleagues were absent from the facility conducting the HPV vaccine campaign (Gallagher, Erio, Baisley, Lees, & Watson-Jones, 2018)	• Primary care services for the management of acute and long-term problems, and preventive programmes such as children's immunisations, must continue to operate normally. Additional capacity should be created to ensure the vaccination program does not displace or delay other essential clinical work. Funding will also be needed for additional trained staff to administer vaccines and provide administrative support (Majeed & Molokhia, 2020).

HEALTH PROFESSIONALS KNOWLEDGE AND PRACTICE

CHALLENGE	COUNTERSTRATEGY
Insufficient knowledge of health professionals on immunization information systems In one study in the US, 5% of pediatricians, 14% of family physicians, and 48% of general internists did not know that there was a state or local immunization information system (Kempe et al., 2017).	• Provision of trainings for health professionals practicing in PHC centers (CDC, 2021c) on vaccine documentation (using MERA and PHENICS)
Risk of vaccination errors (Haas-Gehres, Sebastian, & Lamberjack, 2014).	• Pharmacists play a key role in the pediatric primary care team to improve the appropriate use of vaccines. In one study form the US, the pediatric primary care clinic with a pharmacist had reductions in vaccination errors as well as missed opportunities. The error rate was found to be 0.28% in the intervention clinic and 2.7% in the comparison clinic (Haas-Gehres et al., 2014). • Ensure a blame free atmosphere where the reporting of medical errors is objectively handled (Musharrafieh et al., 2019; Rogers, Griffin, Carnie, Melucci, & Weber, 2017).

PUBLIC ATTITUDE AND UPTAKE

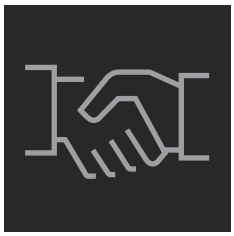
CHALLENGE	COUNTERSTRATEGY
Decreased public uptake of COVID-19 vaccines, knowing that until March 26th, 2021, only 993,733 of the Lebanese population has registered for taking the vaccine. Particular concern warranting further investigation relates to vaccine uptake among special groups such as the non-Lebanese who constitute less than 6% of those registered, and the elderly whereby the number of registered individuals aged more than 75 years was only 116,407 (Impact, 2021).	Evidence-based strategies for improving vaccine uptake include: • Creating an enabling environment by making vaccination practical, easy, and affordable, in all relevant respects (Schoch-Spana et al., 2020; Saso, Skirrow, & Kampmann, 2020) • Harnessing social influences especially from people who are particularly trusted by and identified with members of the community such as health professionals (Paterson et al., 2016) and other social influencers (CASS, 2020) • Increasing motivation through open and transparent dialogue and communication about uncertainty and risks (Betsch, Böhm, & Korn, 2013) with culturally tailored communications targeting subgroups (UK gov, 2020).
Decreased adherence to vaccine dosing schedule (Johnson, Lu, & Zhang, 2019)	• Tracking and reminder systems were described as important but insufficient for ensuring HPV vaccine uptake in the US at the primary care clinics (Chuang et al., 2017). • In one study in the US, an increase in the availability of primary care physicians was associated with a decrease in the percent of unimmunized people, whereby an increase of 1 provider per 10 000 people was associated with a 5% decrease in rates of adults without an influenza immunization (Ford, Weisbeck, Kerker, & Cohen, 2019). • Text messaging reminders were likely to result in modest improvements in influenza vaccine uptake, but levels of patients being texted need to markedly increase if text messaging reminders are to have remarkable effect (Herrett et al., 2016). • In Poland, patients who received sufficient influenza vaccination education from their healthcare provider and had been the patients of physicians who had been vaccinated against influenza had significantly higher vaccination rates (Nessler, Krzton-Krolewiecka, Chmielowiec, Jarczewska, & Windak, 2014).

MOVING FORWARD

It is well known that many social determinants of health -including poverty, physical environment and ethnicity- can have a considerable effect on COVID-19 outcomes (Abrams & Szefler, 2020). Though COVID-19 is infecting all populations alike, those with fewer resources will be hit hardest by the virus's collateral damage. Focusing on primary health care as a foundation of response and recovery will help minimize discrepancies in vaccine access and therefore mitigate some of the inequalities arising from COVID-19.

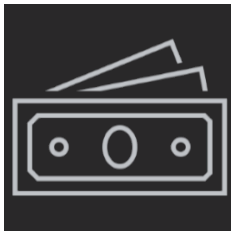
Despite years of underinvestment, the unparalleled experience in the delivery of routine immunisations places primary care in a strong position to respond to the prompt needs of COVID-19 vaccination. Even if the current epidemic proved to be short-lived, integrating of COVID-19 vaccination into PHC is an opportunity for empowering the role of PHC in responding to future epidemics and health emergencies. Moreover, in the midst of a crisis, broader health needs such as vaccinations, reproductive, maternal and child health, mental health, and treatment for chronic diseases should not be overlooked. Doing so will only add insult to injury, leaving millions more vulnerable to preventable and treatable illness.

Support and enablement remain vital for the integration of COVID-19 vaccination into PHC. This can be realized through:



LEGISLATORS

- Select PHC centers for piloting COVID-19 vaccines deployment, taking into account the available resources and equity of distribution, with step-wise increase in deployment sites based on need
- Negotiate with COVAX and pharmaceutical companies to secure continuous and sufficient supply of COVID-19 vaccines to cover the needs of the Lebanese population, irrespective of nationality
- Set in place the needed regulatory procedures for proper and equitable distribution of COVID-19 vaccines, whilst authorization of vaccine importation by the private sector
- Secure the needed policies, procedures, protocols, and pathways needed for optimal and safe deployment of COVID-19 vaccines at the level of PHC centers
- Apply a system for close monitoring of the COVID-19 vaccine deployment process that includes the number of doses delivered, data on beneficiaries, and adverse events
- Penalize the illegitimate delivery or utility of COVID-19 vaccines at PHC centers, including bypass of priority groups



FUNDERS

- Secure the needed funds for providing COVID-19 vaccines sufficient to cover the local needs
- Respond to the emerging costs due to the increased need for staff, equipment, trainings, and other needs that will ensue with COVID-19 deployment at PHC centers

PRIMARY HEALTH CARE CENTERS

- Publicize and advertise for the free availability of COVID-19 vaccines at PHC centers
- Provide education for enhancing public knowledge on COVID-19 vaccines
- Comply with set regulations for safe COVID-19 vaccines deployment, including proper vaccine preparation, monitoring of cold chain and AEFI, and disposal of vaccine-related wastes
- Provide continuous needs assessment and feedback on the deployment process
- Maintain up-to-date knowledge of health professionals on new data related to COVID-19 vaccines
- While delivering COVID-19 vaccines, seize the opportunity for providing other health promotion and prevention services

REFERENCES

Abrams, E. M., & Szefler, S. J. (2020). COVID-19 and the impact of social determinants of health. The Lancet Respiratory Medicine, 8(7), 659-661.

Abril, E. P., & Dempsey, P. R. (2019). Outcomes of Healthy Eating Ad Campaigns: A Systematic Review. Progress in Cardiovascular Diseases, 62(1), 39-43. doi:https://dx.doi.org/10.1016/j.pcad.2018.12.008

AlArabiya (2021). Coronavirus: Multiple daily COVID-19 deaths at Lebanon hospitals becomes new normal. Retrieved from https://english.alarabiya.net/coronavirus/2021/01/23/Coronavirus-Multiple-daily-COVID-19-deaths-at-Lebanon-hospitals-becomes-new-normal

American University of Beirut (2021). Retrieved from https://www.aub.edu.lb/President/Documents/Messages/Vaccination-launch-22-2-2021.pdf

Ammar, W., Kdouh, O., Hammoud, R., Hamadeh, R., Harb, H., Ammar, Z., . . . Zalloua, P. A. (2016). Health system resilience: Lebanon and the Syrian refugee crisis. Journal of global health, 6(2).

Australian government (2020). Site Requirements for COVID-19 vaccination clinics. Retrieved from https://www.health.gov.au/sites/default/files/documents/2021/02/covid-19-vaccination-site-requirements-for-covid-19-vaccination-clinics.pdf

Bailey, H. D., Kurinczuk, J. J., Kusel, M. M., & Plant, A. J. (1999). Barriers to immunisation in general practice. Australian and New Zealand journal of public health, 23(1), 6–10. https://doi.org/10.1111/j.1467-842x.1999.tb01198.x

Batista, R., Pottie, K., Bouchard, L., Ng, E., Tanuseputro, P., Tugwell, P. (2018). Primary health care models addressing health equity for immigrants: a systematic scoping review. Journal of Immigrant & Minority Health, 20, 214-230. https://dx.doi.org/10.1007/s10903-016-0531-y

Bell, K. N., Hogue, C. J., Manning, C., & Kendal, A. P. (2001). Risk factors for improper vaccine storage and handling in private provider offices. Pediatrics, 107(6), E100. https://doi.org/10.1542/peds.107.6.e100

Berkhout, C., Zgorska-Meynard-Moussa, S., Willefert-Bouche, A., Favre, J., Peremans, L., & Van Royen, P. (2018). Audiovisual aids in primary healthcare settings' waiting rooms. A systematic review. European Journal of General Practice, 24(1), 202-210. doi:https://dx.doi.org/10.1080/13814788.2018.1491964

Betsch, C., Böhm, R., & Korn, L. (2013). Inviting free-riders or appealing to prosocial behavior? Game-theoretical reflections on communicating herd immunity in vaccine advocacy. Health Psychology, 32(9), 978.

Bloomberg (2021a). Vaccine Tracker. Retrieved from https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/

Bloomberg (2021b). When Will Covid Pandemic End? Vaccine Calculator Shows 7 Years at Current Rate. Retrieved from https://www.bloomberg.com/news/articles/2021-02-04/when-will-covid-pandemic-end-near-me-vaccine-coverage-calculator

Canadian Ministry of Health (2020). COVID-19 Vaccine Clinic Operations Planning Checklist. Retrieved from http://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/vaccine/COVID-19_vaccine_clinic_operations_planning_checklist.pdf

CDC (2018). Vaccine Storage and Handling Resources. Retrieved form https://www.cdc.gov/vaccines/hcp/admin/storage/index.html

CDC (2020a). Checklist of Best Practices For Vaccination Clinics Held at Satellite, Temporary, or Off-Site Locations. Retrieved from https://www.izsummitpartners.org/content/uploads/2019/02/off-site-vaccination-clinic-checklist.pdf

CDC (2020b). Guidance for Planning Vaccination Clinics Held at Satellite, Temporary, or Off-Site Locations. Retrieved from https://www.cdc.gov/vaccines/hcp/admin/mass-clinic-activities/index.html

CDC (2021a). Frequently asked questions about covid-19 vaccination. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html

CDC (2021b). Interim considerations: preparing for the potential management of anaphylaxis after COVID-19 vaccination. Retrieved from https://www.cdc.gov/vaccines/covid-19/clinical-considerations/managing-anaphylaxis.html

CDC (2021c). Training and Education. Retrieved from https://www.cdc.gov/vaccines/covid-19/training.html

Cellule d'Analyse en Sciences Sociales (2020). Humanitarian programme recommendations for COVID-19 based on social sciences evidence from the DRC Ebola outbreak response. Social science support for COVID-19: lessons learned brief 3. Retrieved from https:// www.unicef.org/drcongo/media/4131/ file/CASS-Brief3-recommendations.pdf

Chuang, E., Cabrera, C., Mak, S., Glenn, B., Hochman, M., & Bastani, R. (2017). Primary care team- and clinic level factors affecting HPV vaccine uptake. Vaccine, 35(35 Pt B), 4540-4547. doi:https://dx.doi.org/10.1016/j.vaccine.2017.07.028

ClinicalTrials.gov (2020a). A Study to Evaluate the Safety, Reactogenicity, and Effectiveness of mRNA-1273 Vaccine in Adolescents 12 to <18 Years Old to Prevent COVID-19 (TeenCove). Retrieved from https://clinicaltrials.gov/ct2/show/NCT04649151

ClinicalTrials.gov (2020b). Study to Describe the Safety, Tolerability, Immunogenicity, and Efficacy of RNA Vaccine Candidates Against COVID-19 in Healthy Individuals. Retrieved from https://clinicaltrials.gov/ct2/show/NCT04368728

ClinicalTrials.gov (2021). Study to Evaluate the Safety, Tolerability, and Immunogenicity of SARS CoV-2 RNA Vaccine Candidate (BNT162b2) Against COVID-19 in Healthy Pregnant Women 18 Years of Age and Older. Retrieved from https://www.clinicaltrials.gov/ct2/show/NCT04754594?term=NCT04754594&draw=2&rank=1

Chetty, U. J., O'Donnell, P., Blane, D., Willems, S., World Organization of Family Doctors (WONCA) Special Interest Group on Health Equity (2016). The role of primary care in improving health equity: report of a workshop held by the wonca health equity special interest group at the 2015 wonca europe conference in istanbul, turkey. International Journal for Equity in Health, 15, 128. https://dx.doi.org/10.1186/s12939-016-0415-8

Chuang, E., Cabrera, C., Mak, S., Glenn, B., Hochman, M., & Bastani, R. (2017). Primary care team- and clinic level factors affecting HPV vaccine uptake. Vaccine, 35(35 Pt B), 4540-4547. doi:https://dx.doi.org/10.1016/j.vaccine.2017.07.028

CNBC (2021). Moderna to begin clinical trials of Covid booster shots for variant from South Africa, sends to NIH for study. Retrieved from https://www.cnbc.com/2021/02/24/moderna-covid-vaccine-booster-shots-south-africa-variant-trials.html

Cruz-Cobo, C., & Santi-Cano, M. J. (2020). Efficacy of Diabetes Education in Adults With Diabetes Mellitus Type 2 in Primary Care: A Systematic Review. Journal of Nursing Scholarship, 52(2), 155-163. doi:https://dx.doi.org/10.1111/jnu.12539

Department of Health and Social Care (2021). UK COVID-19 vaccines delivery plan. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/951928/uk-covid-19-vaccines-delivery-plan-final.pdf

Ferrer, R. L. (2007). Pursuing equity: contact with primary care and specialist clinicians by demographics, insurance, and health status. The Annals of Family Medicine, 5(6), 492-502.

Ford, M. M., Weisbeck, K., Kerker, B., & Cohen, L. (2019). Actionable Analysis: Toward a Jurisdictional Evaluation of Primary Care Access in the Community Context. Journal of Primary Care & Community Health, 10, 2150132719891970. doi:https://dx.doi.org/10.1177/2150132719891970

FDA (2021). Fact Sheet For Healthcare Providers Administering Vaccine. Retrieved from https://www.fda.gov/media/144413/download

Gallagher, K. E., Erio, T., Baisley, K., Lees, S., & Watson-Jones, D. (2018). The impact of a human papillomavirus (HPV) vaccination campaign on routine primary health service provision and health workers in Tanzania: a controlled before and after study. BMC Health Services Research, 18(1), 173. doi:https://dx.doi.org/10.1186/s12913-018-2976-2

Garg, S., Basu, S., Rustagi, R., & Borle, A. (2020). Primary Health Care Facility Preparedness for Outpatient Service Provision During the COVID-19 Pandemic in India: Cross-Sectional Study. JMIR Public Health Surveill, 6(2), e19927. doi:10.2196/19927

Gazmararian, J. A., Oster, N. V., Green, D. C., Schuessler, L., Howell, K., Davis, J., ... & Warburton, S. W. (2002). Vaccine storage practices in primary care physician offices: assessment and intervention. American journal of preventive medicine, 23(4), 246-253.

Goryakin, Y., Suhlrie, L., & Cecchini, M. (2018). Impact of primary care-initiated interventions promoting physical activity on body mass index: systematic review and meta-analysis. Obesity Reviews, 19(4), 518-528. doi:https://dx.doi.org/10.1111/obr.12654

Haas-Gehres, A., Sebastian, S., & Lamberjack, K. (2014). Impact of pharmacist integration in a pediatric primary care clinic on vaccination errors: a retrospective review. Journal of the American Pharmacists Association: JAPhA, 54(4), 415-418. Retrieved from https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med11&AN=24860867

Herrett, E., Williamson, E., van Staa, T., Ranopa, M., Free, C., Chadborn, T., . . . Smeeth, L. (2016). Text messaging reminders for influenza vaccine in primary care: a cluster randomised controlled trial (TXT4FLUJAB). BMJ Open, 6(2), e010069. doi:https://dx.doi.org/10.1136/bmjopen-2015-010069

REFERENCES

Ibanez, G., de Reynal de Saint Michel, C., Denantes, M., Saurel-Cubizolles, M. J., Ringa, V., & Magnier, A. M. (2012). Systematic review and meta-analysis of randomized controlled trials evaluating primary care-based interventions to promote breastfeeding in low-income women. Family Practice, 29(3), 245-254. doi:https://dx.doi.org/10.1093/fampra/cmr085

International Medical Corps & MoPH (unpublished data). Vaccine Hesitancy Survey amongst IMC beneficiaries and PHC healthcare workers.

Impact (2021). Vaccine Dashboard. Retrieved from https://www.impact.gov.lb/home/dashboard/vaccine

Johnson, K. D., Lu, X., & Zhang, D. (2019). Adherence to hepatitis A and hepatitis B multi-dose vaccination schedules among adults in the United Kingdom: a retrospective cohort study. BMC Public Health, 19(1), 1-9.

Kempe, A., Hurley, L. P., Cardemil, C. V., Allison, M. A., Crane, L. A., Brtnikova, M., . . . Lindley, M. C. (2017). Use of Immunization Information Systems in Primary Care. American Journal of Preventive Medicine, 52(2), 173-182. doi:https://dx.doi.org/10.1016/j.amepre.2016.07.029

L'Orient Today (2021a). Lebanon's vaccination program is thrown into question as MPs appear to bypass rules to get inoculated. Retrieved from https://today.lorientlejour.com/article/1252956/controversy-mounts-as-16-mps-receive-covid-19-vaccines-at-parliament.html

L'Orient Today (2021b). Private sector actors set their sights on filling the almost inevitable shortfall in public sector COVID-19 vaccinations. Retrieved from https://today.lorientlejour.com/article/1251605/private-sector-actors-set-their-sights-on-filling-the-almost-inevitable-shortfall-in-public-sector-covid-19-vaccinations.html

Majeed, A., & Molokhia, M. (2020). Vaccinating the UK against covid-19. BMJ, 371, m4654. doi:https://dx.doi.org/10.1136/bmj.m4654

Mansour, Z., Arab, J., Said, R., Rady, A., Hamadeh, R., Gerbaka, B., & Bizri, A. R. (2021). Impact of COVID-19 pandemic on the utilization of routine immunization services in Lebanon. PloS one, 16(2), e0246951.

Matthias, D. M., Robertson, J., Garrison, M. M., Newland, S., & Nelson, C. (2007). Freezing temperatures in the vaccine cold chain: a systematic literature review. Vaccine, 25(20), 3980-3986.

McKinsey and Company (2021). When will the COVID-19 pandemic end? Retrieved from https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/when-will-the-covid-19-pandemic-end

Medscape (2021). Fauci: Vaccines for Kids as Young as First Graders Could Be Authorized by September. Retrieved from https://www.medscape.com/viewarticle/945685

Mills, M., Rahal, C., Brazel, D., Yan, J., & Gieysztor, S. (2020). COVID-19 vaccine deployment: Behaviour, ethics, misinformation and policy strategies. London: The Royal Society & The British Academy.

MoPH (2017a). EPI Multi Year Plan of Action 2017-2022. Retrieved from https://www.moph.gov.lb/userfiles/files/HealthCareSystem/EPI/EPI%20Multi%20Year%20Plan%20of%20Action%202017-2022.pdf

MoPH (2017b). National Immunization Strategy 2017-2022. Retrieved from https://www.moph.gov.lb/userfiles/files/HealthCareSystem/EPI/National%20Immunization%20Strategy%202017-2022.pdf

MoPH (2018). تعميم رقم 91 - إلى كافة أطباء الأقضية ومراكز توزيع اللقاحات حول التخلص الأمن من مستوعبات الإبرالحقن

MoPH (2019a). Annual Report of Primary Healthcare Department. Retrieved from https://moph.gov.lb/en/Pages/3/749/primary-health-care#/en/view/1198/reports-and-publications

MoPH (2019b). تعميم حول إلزامية تقيد المراكز الصحية والمستوصفات21/2019 العاملةعلى الاراضي اللبنانية بمجانية اللقاحات والأدوية الأساسية. Retrieved from https://moph.gov.lb/Laws/index/10?name=21#/Laws/view/51

MoPH (2021a). Lebanon National Deployment and Vaccination Plan for COVID-19 Vaccines. Retrieved form https://www.moph.gov.lb/en/Pages/2/44738/covid-19-vaccine

MoPH (2021b). Monitoring of COVID-19 Infection in Lebanon. Retrieved form https://www.moph.gov.lb/en/Pages/2/194/surveillance-data#/en/Pages/2/24870/novel-coronavirus-2019-

MoPH (2021c). National PHC Network. Retrieved from https://www.moph.gov.lb/en/Pages/3/749/primary-health-care#/en/view/966/national-phc-network

MOPH (2021d). الخطة الوطنية للقاح الكوفيد-١٩. Available at https://www.moph.gov.lb/userfiles/files/Prevention/nCoV-%20 2019/Minister%20Presentation-Final-Jan%2028.pdf

Musharrafieh, Umayya, Raji Nammani, Joy Badaoui, Khalil Baddour, Nancy Issa, Soundos Youssef, Bashar Hadaie, Jawad Fares, and Thalia Arawi. "Barriers to medical error disclosure at a tertiary care hospital in Lebanon: physicians versus nurses." Health 4 (2019): 1-6.

Nessler, K., Krzton-Krolewiecka, A., Chmielowiec, T., Jarczewska, D., & Windak, A. (2014). Determinants of influenza vaccination coverage rates among primary care patients in Krakow, Poland and the surrounding region. Vaccine, 32(52), 7122-7127. doi:https://dx.doi.org/10.1016/j.vaccine.2014.10.026

Newsroom (2020). Ontario Expands COVID-19 Vaccine Locations. Retrieved from https://news.ontario.ca/en/release/59753/ontario-expands-covid-19-vaccine-locations

Nover, C., & Jackson, S. S. (2013). Primary care-based educational interventions to decrease risk factors for metabolic syndrome for adults with major psychotic and/or affective disorders: a systematic review. Systematic Reviews, 2, 116. doi:https://dx.doi.org/10.1186/2046-4053-2-116

NPR (2021). Here's How The U.S. Can Jump-Start Its Sluggish COVID-19 Vaccine Rollout. Retrieved from https://www.npr.org/sections/health-shots/2021/01/08/954662748/heres-how-the-u-s-can-jump-start-its-sluggish-covid-19-vaccine-rollout

Orrow, G., Kinmonth, A. L., Sanderson, S., & Sutton, S. (2012). Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. BMJ, 344, e1389. doi:https://dx.doi.org/10.1136/bmj.e1389

Paes-Sousa, R., Schramm, J. M. A., & Mendes, L. V. P. (2019). Fiscal austerity and the health sector: the cost of adjustments. Ciencia & Saude Coletiva, 24(12), 4375-4384. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=medl&AN=31778488

Paterson, P., Meurice, F., Stanberry, L. R., Glismann, S., Rosenthal, S. L., & Larson, H. J. (2016). Vaccine hesitancy and healthcare providers. Vaccine, 34(52), 6700-6706.

Ramasamy, M. N., Minassian, A. M., Ewer, K. J., Flaxman, A. L., Folegatti, P. M., Owens, D. R., ... & Demissie, T. (2020). Safety and immunogenicity of ChAdOx1 nCoV-19 vaccine administered in a prime-boost regimen in young and old adults (COV002): a single-blind, randomised, controlled, phase 2/3 trial. The Lancet, 396(10267), 1979-1993.

Reuters (2021a). Lebanon's COVID-19 spike overwhelms battered hospitals and exhausted doctors. Retrieved from https://www.reuters.com/article/health-coronavirus-lebanon/lebanons-covid-19-spike-overwhelms-battered-hospitals-and-exhausted-doctors-idINL8N2JQ2D7

Reuters (2021b). Pfizer finishes enrolling kids in its COVID-19 vaccine study. Retrieved from https://www.reuters.com/article/health-coronavirus-pfizer-int-idUSKBN29R26A

Richard, L., Furler, J., Densley, K., Haggerty, J., Russell, G., Levesque, J. F., & Gunn, J. (2016). Equity of access to primary healthcare for vulnerable populations: the IMPACT international online survey of innovations. International journal for equity in health, 15(1), 1-20.

Rogers E, Griffin E, Carnie W, Melucci J, Weber RJ. A Just Culture Approach to Managing Medication Errors. Hosp Pharm. 2017;52(4):308-315. doi:10.1310/hpj5204-308

Tao, W., Agerholm, J., & Burström, B. (2016). The impact of reimbursement systems on equity in access and quality of primary care: A systematic literature review. BMC health services research, 16(1), 1-10.

Saso, A., Skirrow, H., & Kampmann, B. (2020). Impact of COVID-19 on Immunization Services for Maternal and Infant Vaccines: Results of a Survey Conducted by Imprint—The Immunising Pregnant Women and Infants Network. Vaccines, 8(3), 556.

Schoch-Spana, M., Brunson, E. K., Long, R., Ruth, A., Ravi, S. J., Trotochaud, M., ... & Hall, L. L. (2020). The public's role in COVID-19 vaccination: Human-centered recommendations to enhance pandemic vaccine awareness, access, and acceptance in the United States. Vaccine.

Skynews (2021). COVID-19: Israeli bar offers free drink for jab to tempt more young people to get vaccinated. Retrieved from https://news.sky.com/story/covid-19-israeli-bar-offers-free-drink-for-jab-to-tempt-more-young-people-to-get-vaccinated-12222595

Smithsonian magazine (2021). Eight Unusual Covid-19 Vaccination Sites Around the World. Retrieved from https://www.smithsonianmag.com/smart-news/eight-unusual-covid-19-vaccination-sites-around-world-180976762/

Stockwell MS, Fiks AG. Utilizing health information technology to improve vaccine communication and coverage. Hum Vaccin Immunother. 2013;9(8):1802-1811. doi:10.4161/hv.25031

REFERENCES

Sweeney, R., & Mulou, N. (2012). Fee or free? Trading equity for quality of care for primary health care in Papua New Guinea. International health, 4(4), 283-288.

The Harvard Gazette (2020). Fauci says herd immunity possible by fall, 'normality' by end of 2021. Retrieved from https://news.harvard.edu/gazette/story/2020/12/anthony-fauci-offers-a-timeline-for-ending-covid-19-pandemic/

The National News (2021). #NoWasta: Covid vaccine monitoring in Lebanon to fight corruption. Retrieved from https://www.thenationalnews.com/mena/lebanon/nowasta-covid-vaccine-monitoring-in-lebanon-to-fight-corruption-1.1166704

UK Government (2020). Factors influencing COVID-19 vaccine uptake among minority ethnic groups. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952716/s0979-factors-influencing-vaccine-uptake-minority-ethnic-groups.pdf

U.S. Department Of Health And Human Services (2020). From the Factory to the Frontlines The Operation Warp Speed Strategy for Distributing a COVID-19 Vaccine. Retrieved from https://ruralhealthinfocenter.health.mo.gov/from-the-factory-to-the-frontlines-the-operation-warp-speed-strategy-for-distributing-a-covid-19-vaccine/

Van Doorslaer, E., Masseria, C., & Koolman, X. (2006). Inequalities in access to medical care by income in developed countries. Cmaj, 174(2), 177-183.

WHO (2017). Primary health care systems (PRIMASYS): comprehensive case study from Lebanon. Retrieved from https://www.who.int/alliance-hpsr/projects/AHPSR-PRIMASYS-Lebanon-comprehensive.pdf

WHO (2020). Guidance on developing a national deployment and vaccination plan for COVID-19 vaccines. Retrieved from https://www.who.int/publications/i/item/WHO-2019-nCoV-Vaccine_deployment-2020.1

WHO (2021a). COVID-19 vaccination: supply and logistics guidance. Retrieved from https://apps.who.int/iris/handle/10665/33956.

WHO (2021b). Recommended Routine Immunizations for Children. Retrieved from https://www.who.int/immunization/policy/Immunization_routine_table2.pdf?ua=1

WHO (2021c). WHO Coronavirus Disease (COVID-19) Dashboard. Retrieved from https://covid19.who.int.

WorldBank. (2020). Lebanon Economic Monitor. Retrieved from https://www.worldbank.org/en/country/lebanon/publication/lebanon-economic-monitor

Yakum, M. N., Ateudjieu, J., Walter, E. A., & Watcho, P. (2015). Vaccine storage and cold chain monitoring in the North West region of Cameroon: a cross sectional study. BMC research notes, 8, 145. https://doi.org/10.1186/s13104-015-1109-9

ANNEX 1:

HIGHLIGHTS OF LEBANON NATIONAL DEPLOYMENT AND VACCINATION PLAN FOR COVID-19 VACCINES (MOPH, 2021A; MOPH, 2021D)

Plan Objectives
- Achieve vaccination rate of 70% by the end of year 2021
- Protection against viral transmission
- Decreasing incidence of cases, need for critical care, and mortality
- Target 400 vaccinations per center per day

Plan Principles
- Voluntary vaccination, based on priority groups
- Informed choices and decisions through public education
- Free-of-charge vaccine delivery across all sites
- Inclusion of all residents of Lebanon, irrespective of nationality

Access
- Regional and demographic distribution
- Known address and easy to reach
- Free service delivery
- Ability to adapt to weather changes
- Presence of appropriate entrances and exits in each site and parking lot allocation
- Assistance to access vaccination site can be requested in selected cases through the Red Cross and other civil society organizations
- Mobile vaccination teams may be employed in selected cases such as vaccination of elderly in residential homes

Expected Vaccines
- Around 2.1 million doses of Pfizer-BioNTech vaccine
- Around 2.7 million doses of AstraZeneca-Oxford vaccine through the COVAX facility
- Ongoing deal with AstraZeneca-Oxford for addition 1.5 million doses
- Private sector ability to import Sputnik V and Sinopharm vaccines

Resources
- 50 private and public hospitals
- Power supply with alternative support sources
- Sufficient space and rooms for vaccination procedures and waste management, with ability to maintain physical distancing
- Cooling and heating system
- Installed sinks
- Computers and internet connection
- IPC equipment, including PPE
- Human resources including physicians, RNs, vaccination nurses, supporting staff, and center director

Information
- Public educational campaigns through onsite instruction and education and through various media outlets
- Information included knowledge on vaccines benefit, potential side effects, and reporting of adverse events

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