The increasing threat of vaccine-preventable diseases in Lebanon

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The 'next pandemic' has become a common terminology increasingly used in media and academic literature (*1*). Emerging pathogens pose a considerable risk to our increasingly globalised communities and there is a need for adequate preparedness for them (*1*). However, in Lebanon, like in many countries, the 'next' pathogens, such as the measles pathogen, posing a dire threat to public health are neither emerging nor re-emerging; they are common, endemic and vaccine-preventable. What then are the barriers to vaccination and other prevention interventions against these pathogens?

We cannot overemphasise the challenges to healthcare in Lebanon due to the unfortunate events in recent years. A prolonged period of civil unrest, the continuous influx of Syrian refugees, the increasing population of Palestinian refugees, and an economic crisis, have all increased the health needs of the Lebanese population while constraining available resources (*2*). These challenges were further exacerbated by the COVID-19 pandemic, which changed an already difficult situation into a catastrophic one (*2*). At present, more than half the population live in poverty, and Lebanon hosts 1.7 million refugees, the highest number per capita in the world (*2*). Many of these refugees live in overcrowded shelters without access to clean water and sanitation facilities (*2*). Therefore, the healthcare system is under considerable strain, limiting its ability to deal with further outbreaks, while a large portion of the population is particularly vulnerable to infectious diseases.

In 2016, the coverage rate for the first dose of the pentavalent vaccine (diphtheria, tetanus, whooping cough, hepatitis B) and polio vaccine reached 90% (*3*). However, this was not achieved for other vaccines (measles and subsequent doses of diphtheria, tetanus and polio) among children aged 12–59 months (*3*). In the Beirut and Mount Lebanon areas, by February 2018, measles and pneumococcal conjugate vaccines coverage rates ranged from 55.8% to 70.4% and 56.6% to 69.8%, respectively (*4*).

Since the beginning of the COVID-19 pandemic, the proportion of children in Lebanon receiving their routine immunization has decreased; routine immunization rates have decreased by 31% and, as of 2020, 13% of children had not received a single dose of the vital pentavalent vaccine (*5*). Data from the Ministry of Public Health shows that the number of vaccine doses administered through the public sector decreased by 20% between October 2019 and April 2020 (*6*). A survey among 1317 paediatricians employed in the private health sector showed that vaccination appointments had decreased in private clinics by an average of 46.9% during the same period (*6*). UNICEF reports corroborate this disproportionate decrease in vaccination in the private sector: as of 2022, only 2 of 10 children were vaccinated by the private sector, compared to 4 of 10 before the economic crises (*5*).

There are many possible reasons for this decline. Before 2020, the cost of vaccination, concurrent illness, and lack of awareness of the importance of vaccines were commonly given reasons for non-vaccination (*3,4*). While routine immunization is offered for free at 800 public sector primary healthcare centres, many families struggle to afford travel to these centres and some clinics may not have all the vaccines (*7,8*). This poses a geographical and financial barrier to vaccination (*7*).

In many countries, vaccine hesitancy has increased due to the fear of exposure to COVID-19 at vaccination centres (*9*) and anti-COVID-19 vaccine sentiments (*10*). Lebanon has experienced a mass exodus of healthcare professionals, as up to 40% of its doctors had left the country as of 2022 (*5*).

It is difficult to identify the main reasons for the current decrease in vaccination rates, probably, new barriers have risen post-pandemic, making pre-pandemic studies less helpful. Available post-pandemic information mostly consists of anecdotes and field reports, which tend to emphasise economic barriers, including the cost of transportation and appointments (*5,7,8*). This is supported by a Wellcome Trust report, which claims that structural barriers, such as cost, are often responsible for sharp decreases in vaccination rates following periods of social and/or economic unrest, similar to what has occurred in Lebanon (*11*).

Studies evaluating interventions to improve vaccination rates are scarce. A 2016 Cochrane review analysed interventions to increase uptake of routine immunization in low- and middle-income countries (*12*). Neither this review nor an evidence gap map project of over 300 papers, which found only studies in North Africa

and the Middle East, found any study from Lebanon (*12*,*13*). Systematic reviews of financial incentives and communication strategies also noted this gap (*14*,*15*). We found only one study which evaluated an intervention in 2023 in Lebanon to increase vaccine uptake (*16*). The study found that a community-based outreach programme moderately increased demand and uptake, it found large discrepancies between ethnicities and locations and did not analyse the economic factors (*16*). This underscores another problem: Lebanon is religiously, culturally and economically heterogeneous, therefore, different communities may experience different barriers to vaccination.

More research needs to be conducted to provide evidence for improving vaccination rates in Lebanon. Such research should focus on 3 key areas. Firstly, we must implement and evaluate interventions to improve vaccine uptake as done commendably and recently by Osseiran et al (*16*). Secondly, interventions among hard-to-reach groups, such as refugees, needs to be evaluated because these groups are particularly vulnerable to outbreaks. Thirdly, different funded actions, including operational research, should be implemented simultaneously to improve vaccination rates in the short-term. The challenge, currently, given Lebanon's economic situation, is how policymakers will identify interventions with significant benefits that will justify the long-term implementation costs. Therefore, cost-benefit analysis should be included in any vaccination research strategy in the country. Current research in this regard will provide new and updated evidence for preventing an impending outbreak or pandemic.

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