

COVID-19 vaccination: What have we learned and what more can we do to address the vaccine inequity in Africa and the Middle East?









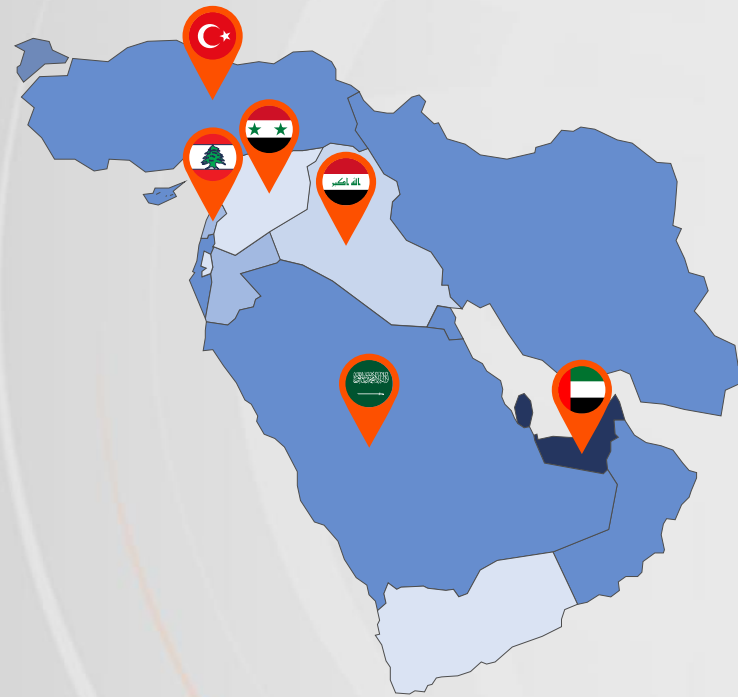
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Lebanon

**What progress has been made in addressing
COVID-19 vaccine equity issues in
the Middle East?**

There is wide variation in vaccination rates across the Middle East

Proportion of population who have received at least one dose of COVID-19 vaccine

	UAE >100%*
	Saudi Arabia 74%
	Turkey 68%
	Lebanon 50%
	Iraq 25%
	Syria 15%



Data as of 1 June 2023

*Exceeds 100% due to vaccination of non-residents.

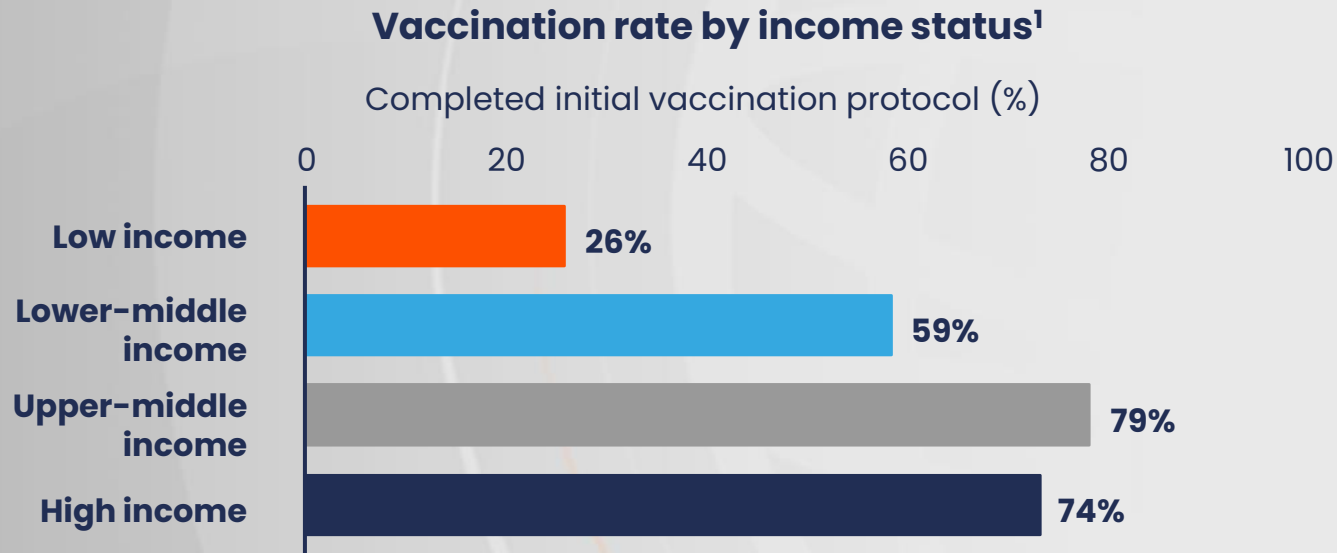
UAE, United Arab Emirates.

Our World in Data. 2023. Available at: bit.ly/43wcUtn (accessed 20 July 2023).

Global COVID-19 vaccination rates are correlated with income status¹



Vaccine equity means that vaccines should be allocated based on needs, regardless of economic status²



Data as of 1 June 2023

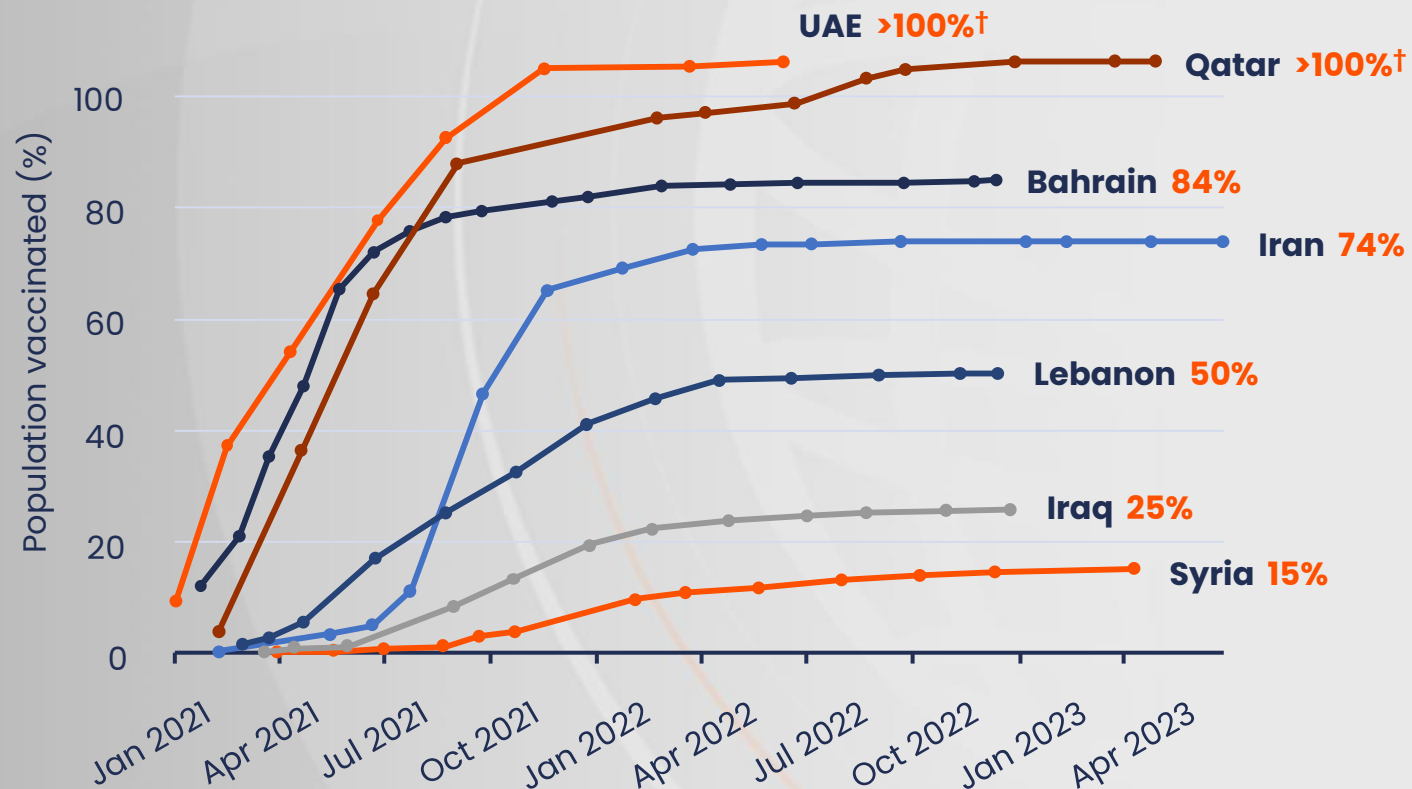


Income varies widely across the Middle East³

This disparity may contribute to vaccine inequity in the region⁴

Vaccination rates have plateaued across the Middle East

Vaccination appears to be slowing, although some countries still have suboptimal vaccination levels*



*Vaccination defined as percentage of population who have received at least one COVID-19 vaccine dose; †Exceeds 100% due to vaccination of non-residents.
UAE, United Arab Emirates.
Our World in Data. 2023. Available at: bit.ly/43wcUtn (accessed 20 July 2023).

There are multiple barriers to vaccination efforts in the Middle East

Public perception



- Fear of side effects^{1,2}
- Lack of trust in vaccine safety or efficacy³
- Attitudes towards pharmaceutical companies³
- Misinformation about the vaccine or COVID-19³

Accessibility



- Unreliable supply of vaccines⁴
- Unequal vaccine distribution⁵
- Women face additional barriers e.g. less autonomy, greater carer burden⁶

Socioeconomic



- Lower SES or minority status is associated with poorer vaccination rates^{7,8}

SES, socioeconomic status.

1. Abouzid M, et al. *Vaccines (Basel)*. 2022;10:1270; 2. Abuhammad S, et al. *PLoS One*. 2022;17:e0271625; 3. Al Naam YA, et al. *Public Health Pract (Oxf)*. 2022;3:100258; 4. Kaddar M, et al. *Vaccine*. 2019;37:3520–8; 5. Rydland HT, et al. *Hum Soc Sci Comm*. 2022;9:1–6; 6. Alatrany SSJ, et al. *PLoS One*. 2023;18:e02825235; 7. Saban M, et al. *Int J Equity Health*. 2021;20:242; 8. Benderly M, et al. *Int J Epidemiol*. 2022;51:709–17.

HCWs can influence public attitudes towards vaccination



Leading by example: HCWs are trusted figures in the community^{1,2}

Considered reliable sources of information^{1,2}

Role models for vaccination^{2,3}

Their recommendation can increase vaccine uptake^{1,2}

Their refusal or hesitancy negatively impacts perception²



HCWs are central to improving vaccine uptake

It is important for HCWs to be vaccinated to reassure the public⁴

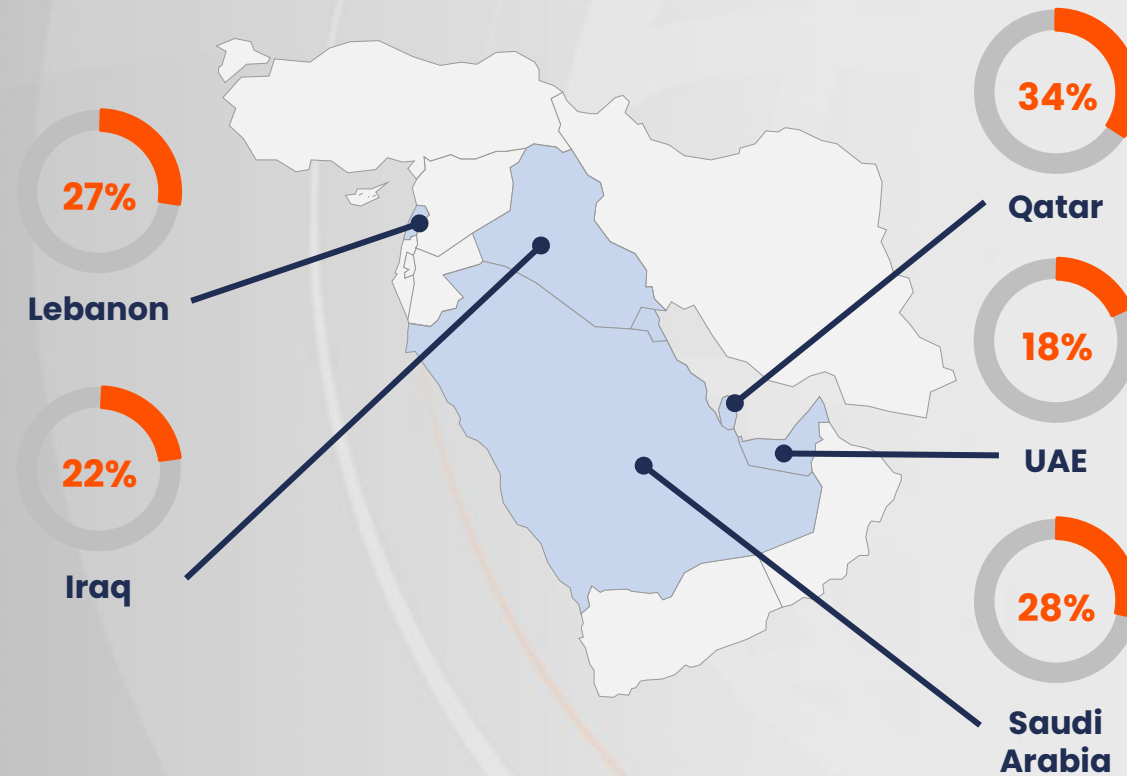
HCW, healthcare worker.

1. UNICEF. Available at: [uni.cf/3QxoQlr](https://www.unicef.org/3QxoQlr) (accessed 20 July 2023); 2. Shehata WM, et al. *Environ Sci Pollut Res Int.* 2022;29:15838–48;

3. Biswas N, et al. *J Community Health.* 2021;46:1244–51; 4. Reiter PL, et al. *Vaccine.* 2020;38:6500–7.

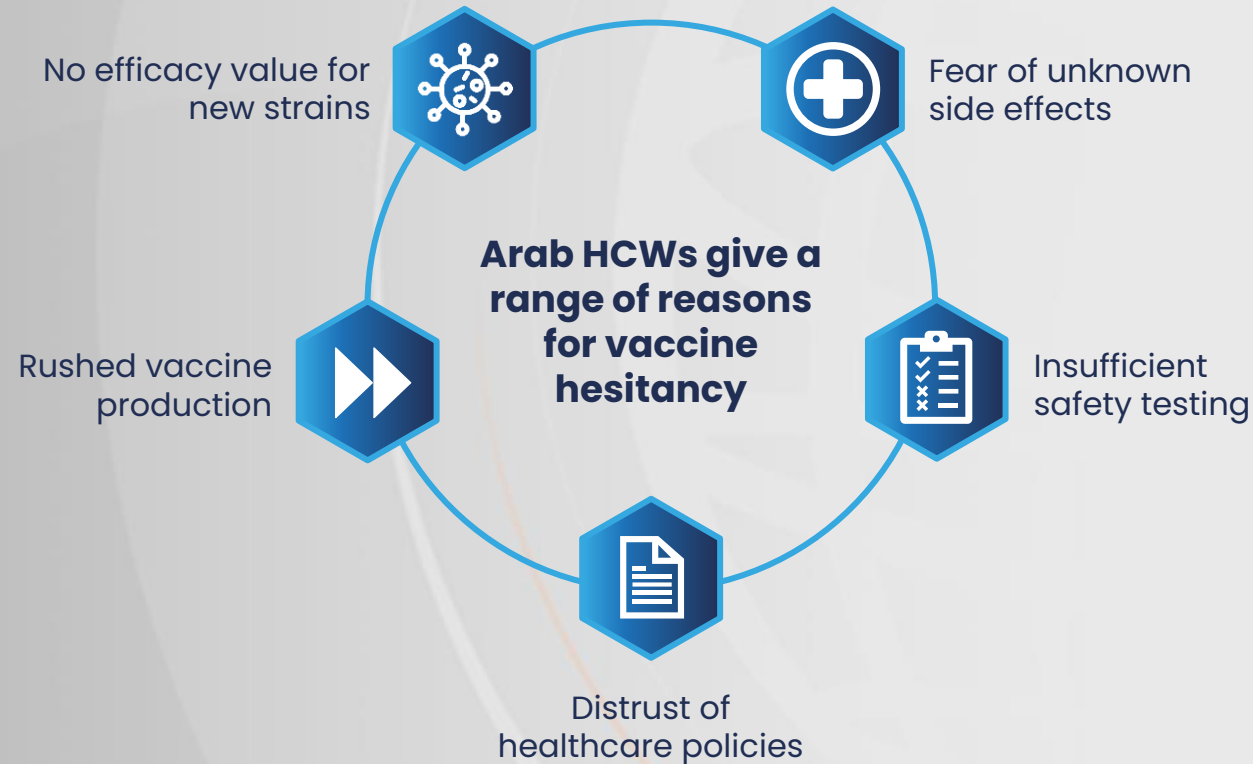
HCWs have low vaccine acceptance rates across the Middle East

HCW vaccine acceptance rates in the Middle East
Acceptance varied from 8% in Algeria up to 51% in Kuwait



Data from January 2021

Barriers to vaccination must be addressed to avoid hesitancy and support further widespread vaccination



COVAX vaccine allocations have preferentially supported lower-income countries to address inequity

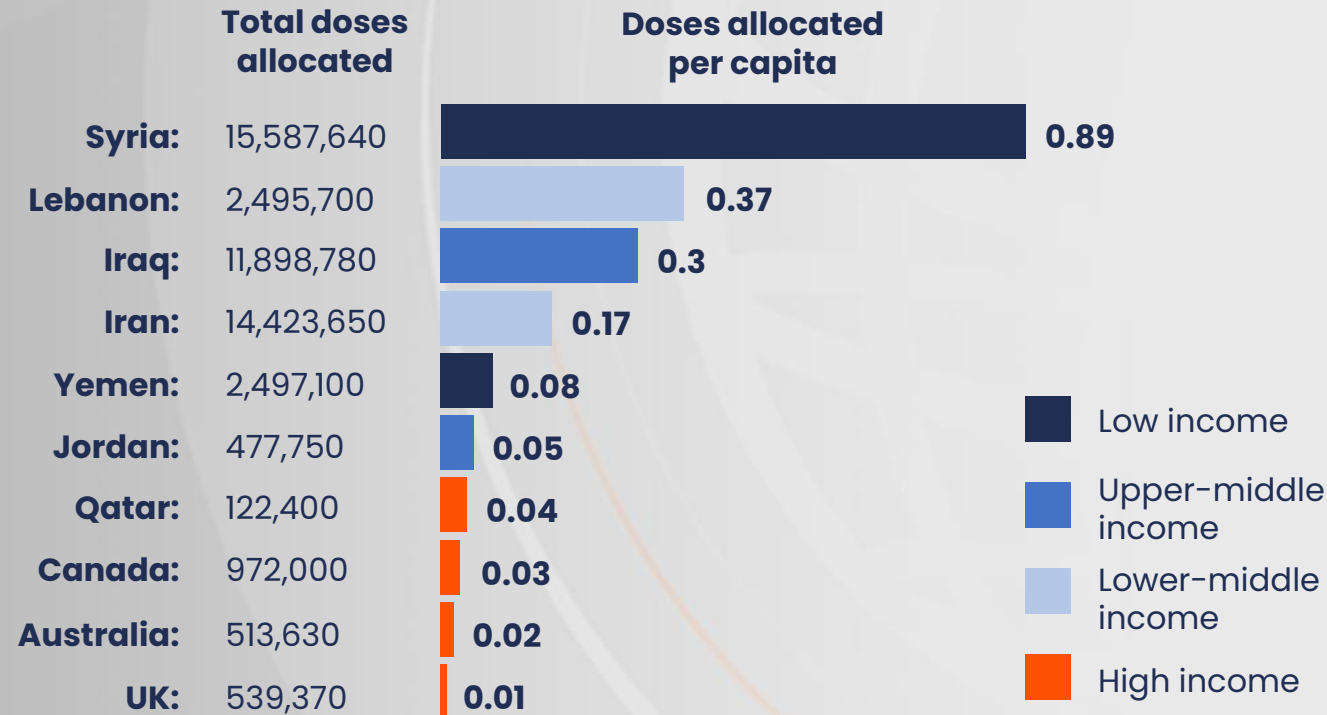


CEPI 



COVAX: The vaccines pillar of the ACT Accelerator¹
 Aims to accelerate the development and manufacture of COVID-19 vaccines, and guarantee fair and equitable access for every country

COVAX vaccine allocation in the Middle East vs high income countries^{2,3}



ACT, Access to COVID-19 Tools; COVAX, COVID-19 Vaccines Global Access.

1. World Health Organization. Available at: bit.ly/3YqI0Bz (accessed 20 July 2023); 2. Yoo KJ, et al. *Bull World Health Organ.* 2022;100:315–28;

3. World Bank. Available at: bit.ly/4594Ksa (accessed 31 July 2023).

The UAE has been a leader in COVID-19 vaccination

The UAE has successfully implemented their vaccination policy with high rates of public uptake^{1,2}



>100%

Total population vaccinated^{1*}

54%

Total population received booster dose^{1†}

2

Ranked second globally for daily vaccine distribution: 6 doses per 100 people²



High public satisfaction with COVID-19 strategies²

*Exceeds 100% due to vaccination of non-residents; †Data as of 22 July 2023.

UAE, United Arab Emirates.

1. Our World in Data. 2023. Available at: bit.ly/43wcUtn (accessed 20 July 2023); 2. Suliman DM, et al. *Vaccine*. 2021;39:6341-5.

The UAE has been a leader in COVID-19 vaccination

The UAE utilized various strategies to spread positive messages and ensure ease of access to the vaccine



Leaders promoted vaccination

- Addressed misinformation effectively¹
- Government partnered with pharmaceutical companies to run phase III vaccine trial²
- Ministers vaccinated early to set an example¹



Positive messaging to reassure the public

- Worked with religious leaders to reassure public¹
- Used social media to share information¹
- Shared information in multiple languages¹

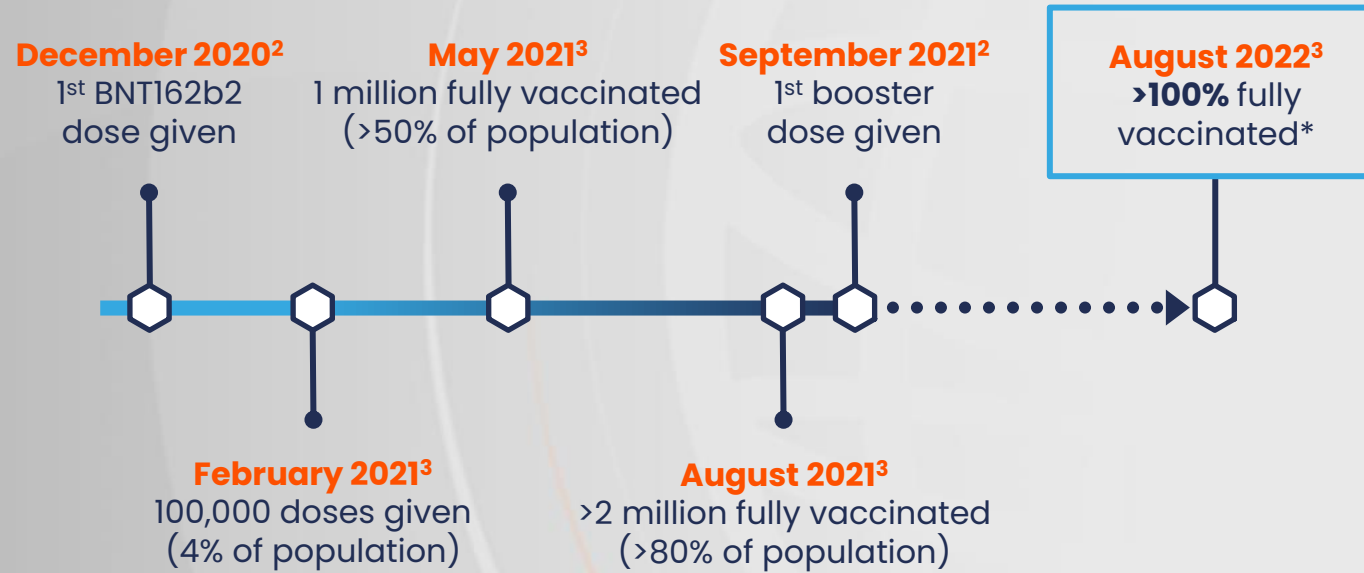


Supported easy access:

- Mobile app for booking appointments¹
- Drive-through and walk-in vaccination centres¹

Qatar has led a successful campaign with rapid vaccine uptake

Qatar had one of the fastest vaccine roll-outs in the region¹



*Exceeds 100% due to vaccination of non-residents.

1. Abdullahi YAM. *Int J Public Health*. 2023;68:1605614; 2. Albayat S, et al. *Vaccines*. 2023;11:953; 3. Our World in Data. 2023. Available at: bit.ly/43wcUtn (accessed 20 July 2023). In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data. The use of the company names is not to be construed as an endorsement of any particular pharmaceutical company or their products.

Qatar has led a successful vaccination programme

Qatari MoH used combined strategies to implement a broad spectrum of strategies across a diverse population



Supported access	 <p>Contacted public by telephone</p>  <p>Opened drive-through centres</p>
Raised awareness	 <p>Ehtheraz app: tracked transmission, gave updates</p>  <p>Social media campaign answered questions from the public</p>  <p>Media campaign: targeted expatriates to increase awareness</p>
Addressed hesitancy	 <p>Television and radio interviews in multiple languages</p>  <p>Shared information on government websites</p>

**How can communication with the public
in the Middle East about COVID-19
vaccines be improved?**

There are misconceptions about the safety and efficacy of vaccines

Cross-sectional studies identified misconceptions by the public^{1,2}



Vaccination will not protect me from getting sick with COVID-19



People may die as a result of negative side effects of the COVID-19 vaccine



The COVID-19 vaccine is unsafe



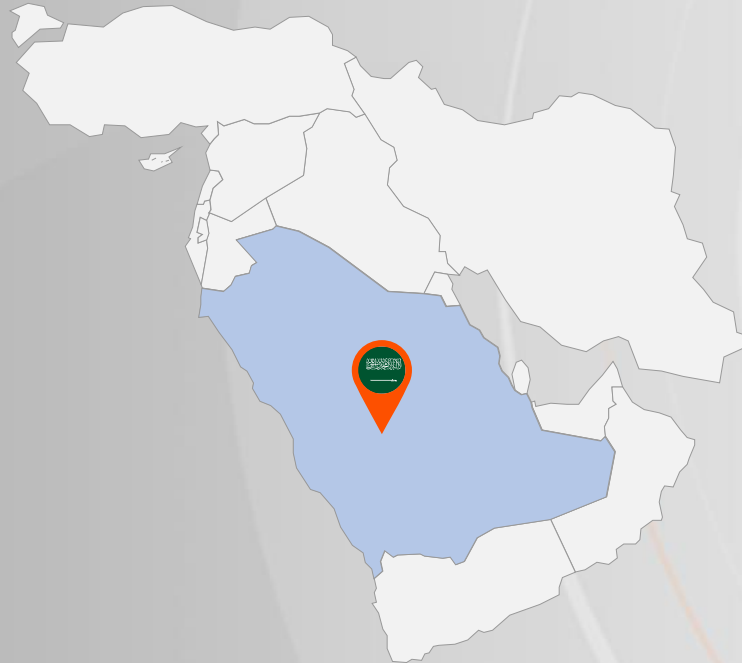
COVID-19 vaccines can cause autism



COVID-19 vaccines may change our DNA

Real-world data demonstrate vaccine efficacy in ME populations

Real-world data from across the Middle East: **Saudi Arabia***



**BNT162b2, ChAdOx1-S or
mRNA-1273 ± boosters**



N=3,000



Reduced risk of hospitalization
(vaccinated vs unvaccinated
5% vs 19%; $p < 0.0001$)

*Longitudinal real-world study enrolled participants between March 2021 and September 2022.

ME, Middle Eastern.

Kamal SM, et al. *Viruses*. 2023;15:326.

In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data.

The use of the company names is not to be construed as an endorsement of any particular pharmaceutical company or their products.

Real-world data demonstrate vaccine efficacy in ME populations

Real-world data from across the Middle East: UAE*



BBIBP-CorV and BNT162b2



N=4,618



**Reduced risk of hospitalization
for Delta and Omicron variants**

*Observational case-control study between 28 May 2021 and 13 January 2022.

ME, Middle Eastern; UAE, United Arab Emirates.

Albreiki M, et al. *Front Immunol.* 2023;14:1049393.

In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data.

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Real-world data demonstrate vaccine efficacy in ME populations

Real-world data from across the Middle East: **Bahrain***



BBIBP-CorV and BNT162b2



N=305



**Demonstrated
immunogenicity**

*Non-randomized observational community trial.

ME, Middle Eastern.

Mallah SI, et al. *Vaccine*. 2023;41:1925–33.

In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data.

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Real-world data demonstrate vaccine efficacy in ME populations

Real-world data from across the Middle East: **Qatar***



mRNA-1273 and BNT162b2



N=384,246



**Protected against hospitalization
and death**

*Matched, retrospective cohort study using data from national COVID-19 electronic database between December 2020 and October 2021.
ME, Middle Eastern.

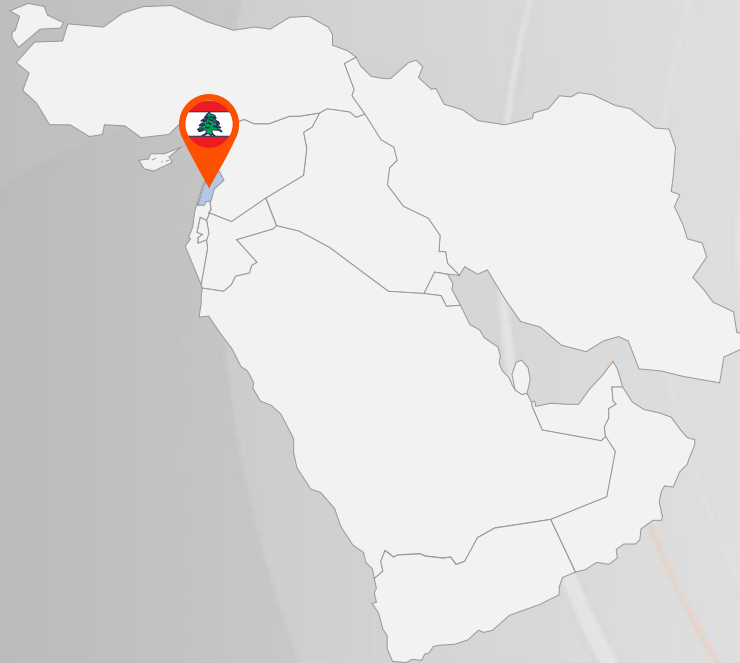
Abu-Raddad LJ, et al. *N Engl J Med.* 2022;386:799–800.

In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data.

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Pharmacovigilance data show vaccine side effects in ME populations

Data from across the Middle East: **Lebanon***



Common side effects (>20%) experienced after first dose of **BNT162b2** (N=2,711)



General body aches
(33%)



Headache
(27%)



Fatigue
(26%)



Fever
(21%)

*A retrospective study including adverse events following immunization received through passive surveillance over 1 year, from 14 February 2021 to 14 February 2022. ME, Middle Eastern.

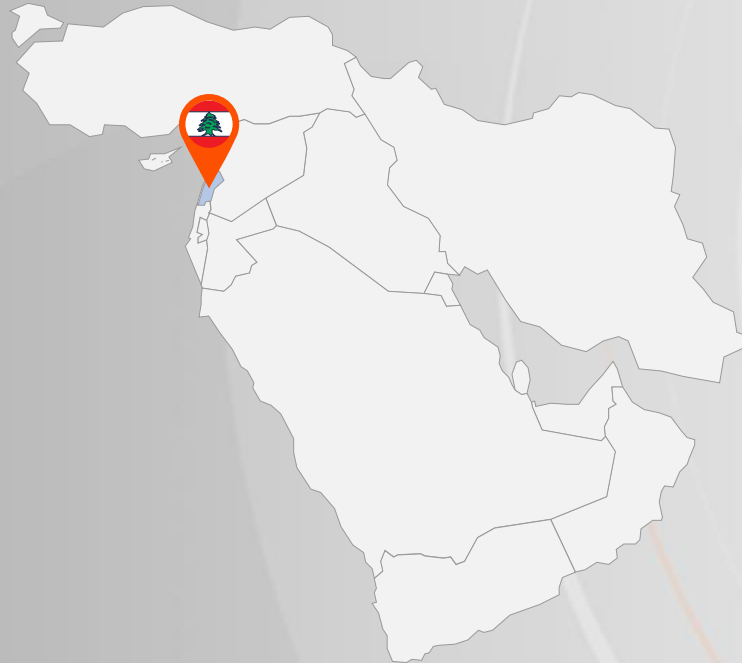
Zeitoun A, et al. *J Pharm Policy Pract.* 2023;16:24.

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The use of the company names is not to be construed as an endorsement of any particular pharmaceutical company or their products.

Pharmacovigilance data show vaccine side effects in ME populations

Data from across the Middle East: **Lebanon***



Common side effects (>45%) experienced after first dose of **AZD1222** (N=1,997)



Fatigue
(58%)



General body aches
(52%)



Headache
(51%)



Fever
(48%)

*A retrospective study including adverse events following immunization received through passive surveillance over 1 year, from 14 February 2021 to 14 February 2022. ME, Middle Eastern.

Zeitoun A, et al. *J Pharm Policy Pract.* 2023;16:24.

In order to accurately portray data related to the COVID-19 vaccines, USF Health has chosen to list the names of the pharmaceutical companies associated with the data.





The use of the company names is not to be construed as an endorsement of any particular pharmaceutical company or their products.

Several interventions are proven to increase vaccine uptake in the MENA region

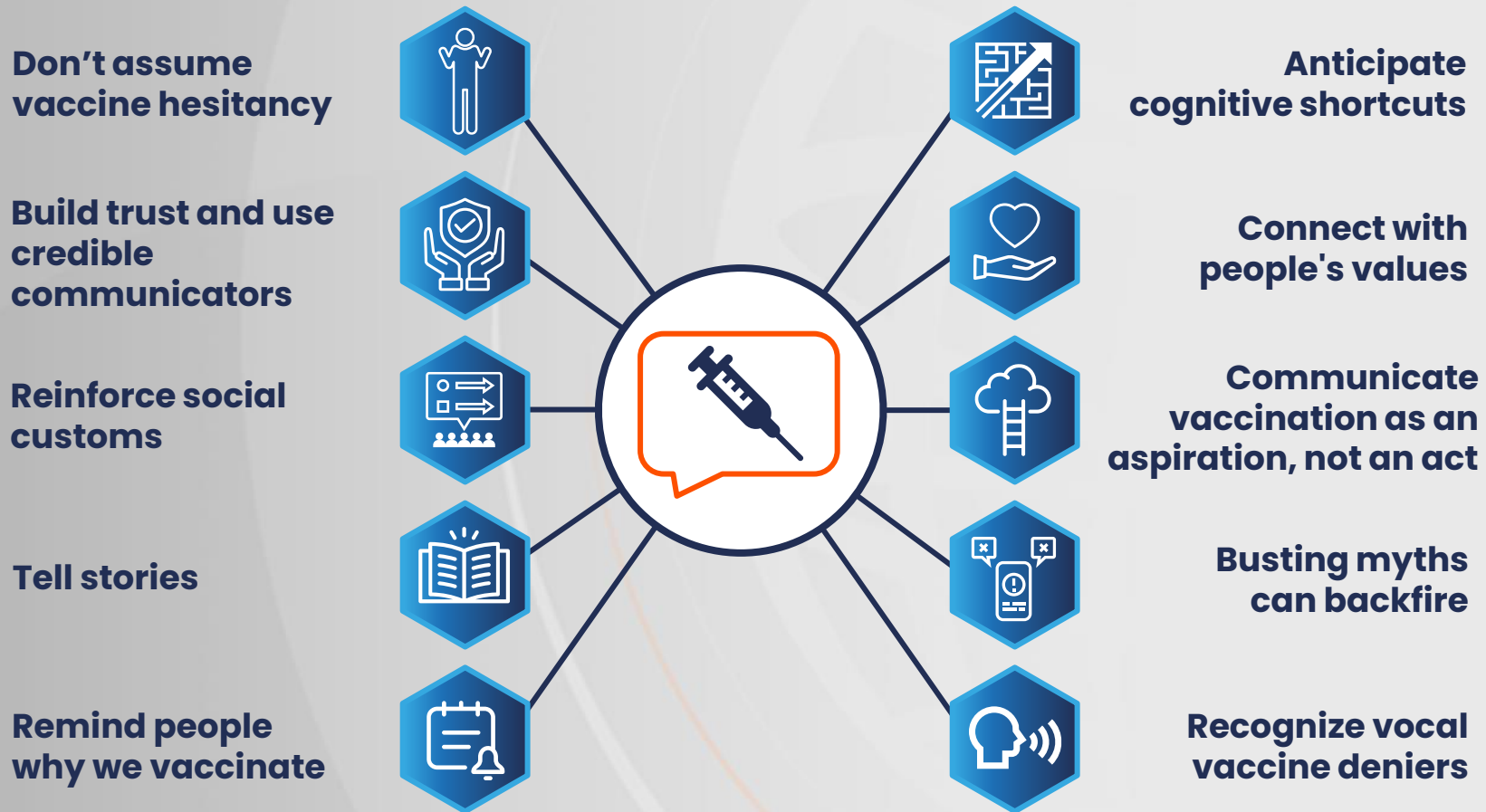


Specific interventions can be used to encourage vaccine uptake in particular groups

In some Middle Eastern countries, women have higher levels of vaccine hesitancy and lower vaccination rates

	BARRIER	INTERVENTION
Structural	 Limited mobility and time	Bring vaccines to places that women frequent
Social	 Cultural preference for female HCWs	Promote and provide 'women only' vaccination sites and platforms
Individual	 Fear of side effects	Share positive stories from trusted messengers
	 Lower perceived risk and need for vaccination	Highlight the risks of getting COVID-19 and use prosocial messaging

Understanding behavioural principles can lead to effective vaccine messaging



Social marketing can promote vaccination uptake

AUB spearheaded a vaccination drive with the ambitious goal of vaccinating its entire community



Branding

A logo was created and used in all communications

Email invites and updates

To inform the community about the strategy and explain logistics

Booking system

Developed using Microsoft Bookings to book vaccine appointments



Website

Providing information on how, when and where to receive the vaccine

Digital media

Use of social media written in English and Arabic to summarize email content

Personal communications

Utilized word-of-mouth and personal contacts to encourage community members to vaccinate

98% of the community were vaccinated following the campaign

Messaging from HCWs should be clear and accurate

Pro-vaccine communications should be evidence-based, context-specific and culturally appropriate



Know your target audience

Effective vaccine communication strategies require an understanding of the particular social and psychological factors that determine vaccination decisions of population subsets



Saying it is not enough

Design communications to fit the needs and motivations of communities and individuals



Build trust

A message from a HCW saying, **“I vaccinated my children, and you should too”** can be an effective message

HCWs should counter misinformation to build demand for vaccination

Misinformation is false information that is shared by people – including vaccine advocates – who do not realize it is false and do not mean any harm



FACT

Lead with the truth, state the facts clearly.
Do not try to refute the misinformation, just state what is true



WARNING

An explicit warning that misinformation is coming, which may contain a weakened version of the misinformation.
Only repeat the misinformation once



FALLACY

Explain **why the misinformation is wrong** and, as with prebunking, explain the specific misleading tactics being employed



FACT

Repeat the truth. This is crucial because the alternative correct information fills the mental 'gap' generated by the correction.
Make the facts 'stickier' than the misinformation

HCWs can engage with religious leaders to improve vaccine uptake

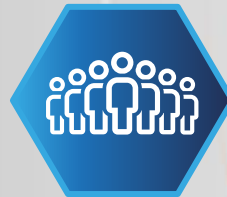
Religious leaders are highly trusted by local communities, can often reach marginalized individuals and populations, and can complement and reinforce the work of national and global public health organizations¹

Sharing evidence-based information about COVID-19, preparedness, and response²



Ensuring a human-rights-based approach to advocacy, messaging, and service delivery is upheld²

Avoiding large group gatherings and conducting faith-related activities virtually²



Addressing stigma, violence, and the incitement of hate²

Strengthening mental health, wellbeing and resilience, through individual contact²



Ensuring that accurate information is shared with communities; countering and addressing misinformation²

HCW, healthcare worker.

1. Multi-Religious Faith-in-Action COVID-19 Campaign. 2020. Available at: bit.ly/43oT4QT (accessed 12 July 2023);

2. World Health Organization. 2020. Available at: bit.ly/43jFaPL (accessed 12 July 2023).

**If vaccine equity is not improved in
the Middle East, what are
the consequences?**

Vaccine inequity leads to global challenges



New variants

Virus can continue to mutate^{1,2}



Prevents herd immunity

Slower time to reach critical vaccination level³



Recurrent waves

Disparity leads to earlier and larger peaks in future waves²



Widening economic gaps

High-income countries can vaccinate faster and recover economically⁴



More infections

Particularly affecting low- and middle-income countries²

Vaccine inequity continues to place a strain on local healthcare systems

Vaccine inequity means healthcare systems must continue to focus on managing COVID-19¹



Continued infections limit capacity to manage other needs¹



Infection of HCWs reduces vital human resources¹



Strained healthcare systems are less likely to monitor emerging threats¹

The COVID-19 pandemic has led to immunization setbacks¹



- Sharp drop in routine vaccination coverage²
- Fall in number of children fully vaccinated against diphtheria, tetanus and pertussis²

Reversing the drop in vaccination will be a major challenge requiring substantial investment²

The COVID-19 pandemic has had a greater financial impact on low-income countries compared with high-income countries¹

High vaccine coverage is a vital route to economic recovery¹



Higher vaccination rates have supported labour market recovery in high-income countries²



In low-income countries, low vaccine accessibility has slowed growth²



Lower vaccination rates are associated with more lockdowns, creating further disruption²



Ongoing gaps in vaccination may further increase the economic gap between high- and low-income countries¹

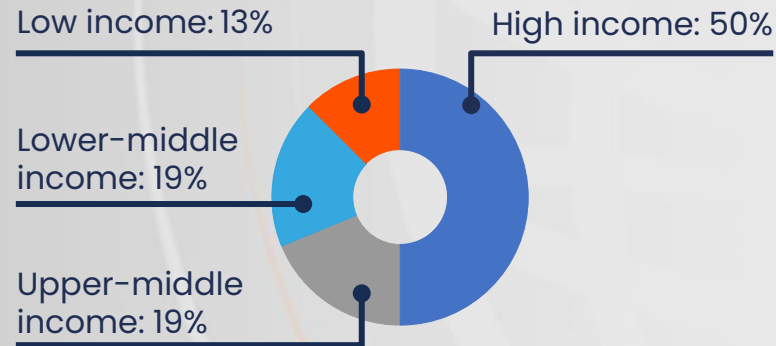
Vaccine inequity can slow economic recovery



Countries with a high rate of vaccinations are likely to recover faster from the economic shock of the pandemic^{1,2}

Vaccine inequity undermines the economic recovery of low- and middle-income countries³

There is a wide distribution of low- and high-income countries across the Middle East:^{4*}



Vaccine inequity will have a greater impact on the economic recovery of these lower income countries²

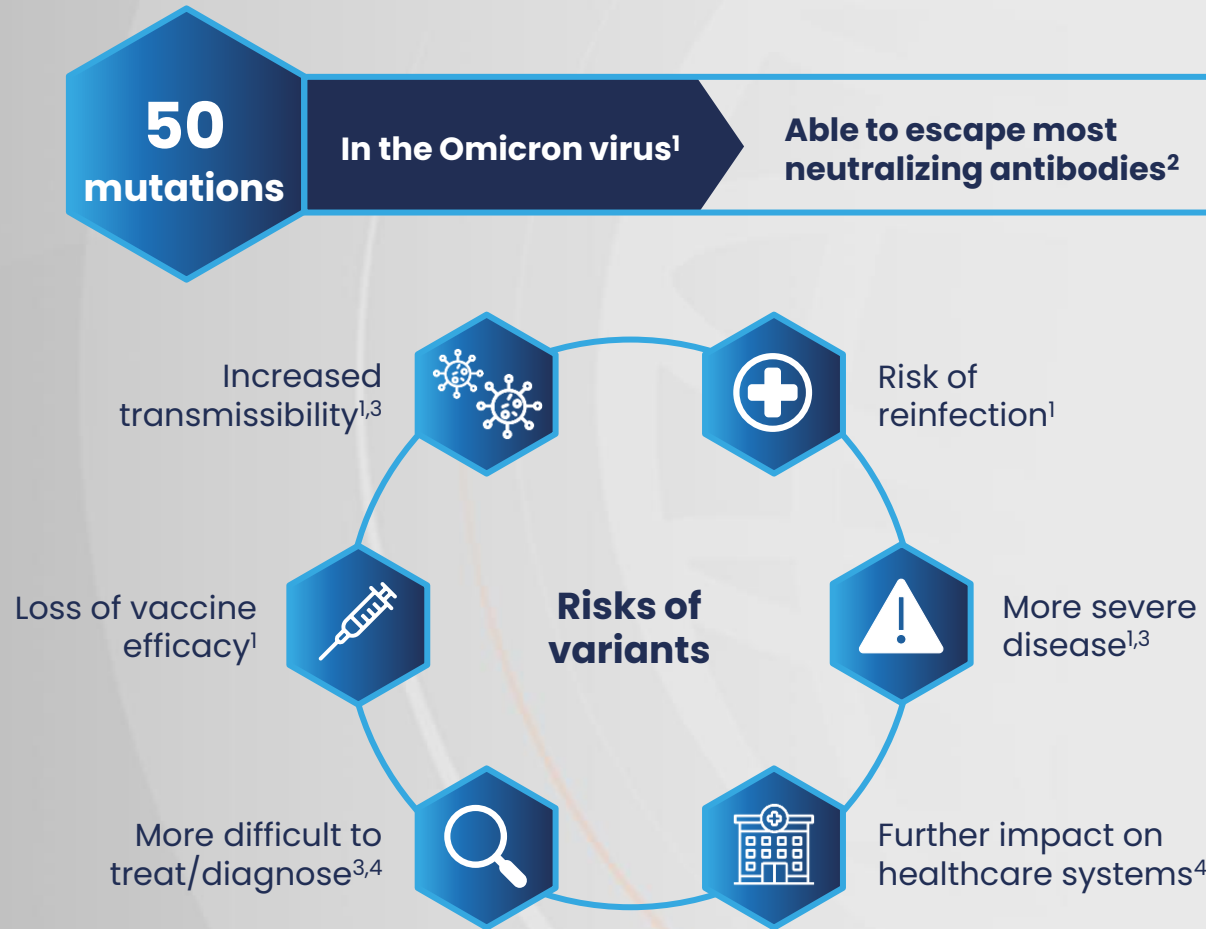
*Percentages do not add up to 100% due to rounding.

1. United Nations Development Programme. Available at: bit.ly/3Q3eYFY (accessed 20 June 2023); 2. Suárez-Álvarez A, et al. *Glob Health*. 2022;12:05020;

3. Yamey G, et al. *BMJ*. 2022;376:e070650; 4. World Bank. Available at: bit.ly/3XRiWU9 (accessed 20 July 2023).

COVID-19 variants create important healthcare challenges

Variants can have many mutations, leading to immune escape



1. Tian D, et al. *J Med Virol*. 2022;94:2376–83; 2. Cao Y, et al. *Nature*. 2022;602:657–63; 3. Islam S, et al. *Clin Pathol*. 2022;15:2632010X221075584; 4. Dias VM, et al. *Braz J Infect Dis*. 2022;26:102703.

Numerous variants have been reported in the Middle East¹



Variants of interest:²

Known or predicted to have a growth advantage over other variants; epidemiological signs of an emerging risk to public health

XBB.1.5: Bahrain, Israel, Jordan, Oman, Qatar, Saudi Arabia, Turkey, UAE

XBB.1.16: Bahrain, Israel, Oman, Turkey, UAE



Variants under monitoring:²

Genetic changes that may affect virus characteristics and may have a growth advantage, but phenotypic or epidemiological impact unclear

BA.2.75: Iran, Iraq, Israel, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Turkey

CH.1.1: Bahrain, Iran, Israel, Lebanon, Oman, Saudi Arabia, Turkey

XBB.1.9.1: Bahrain, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, UAE

XBB.1.9.2: Bahrain, Israel, Kuwait, Oman

XBB.2.3: Israel, Oman

Booster doses can help protect against new variants

Current vaccines may not provide sustained protection from infection or transmission of the Omicron variant¹



Vaccination should aim to provide long-term protection against severe disease, hospitalization and death from current and future variants¹

Initial two-dose vaccine series has limited efficacy against COVID-19 variants



Booster doses can increase variant-targeting antibodies^{2,3}



Variant-targeted boosters may offer the greatest protection³



Any booster can provide additional protection against new COVID-19 variants³

Booster doses can help protect against new variants

Real-world data from Qatar



Matched retrospective cohort study:

Effectiveness of booster vs two-dose primary series:

BNT162b2 booster:



Symptomatic infection

49% reduction in risk



Severe, critical or fatal disease

77% reduction in risk

mRNA-1273 booster:*



Symptomatic infection

47% reduction in risk

**Booster doses offer protection against variants,
even if not variant-targeted**

*Estimates for severe disease for mRNA-1273 could not be derived due to low number of events.

Abu-Raddad LJ, et al. *N Engl J Med.* 2022;386:1804–16.

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