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ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

26 MAY 2022

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 440)

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Abu Dhabi Public Health Center (ADPHC) is gathering the latest scientific research updates and trends on coronavirus disease (COVID-19) in a monthly report. The report provides summaries on breakthrough or updated research on COVID-19 to allow health care professionals and public health professionals get easy and fast access to information.

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Note : All articles presented in this report represent the authors' views and not necessarily represents Abu Dhabi Public Health Center views or directions. Due the nature of daily posting , some minor language errors are expected. For further inquiries you may communicate with us as PHR@adphc.gov.ae

RESEARCH UPDATES

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Risk of SARS-CoV-2 reinfections in children: a prospective national surveillance study between January, 2020, and July, 2021, in England

Estimated Transmission Outcomes and Costs of SARS-CoV-2 Diagnostic Testing, Screening, and Surveillance Strategies Among a Simulated Population of Primary School Students

Screening and vaccination against COVID-19 to minimize school closure: a modelling study

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Modelling results on the impact of COVID-19 testing in schools

EPIDEMIOLOGY

FROM 26 February 2020 TO 25 May 2022

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Figure 1: Total Number of Infected, Recovered, and Death Cases

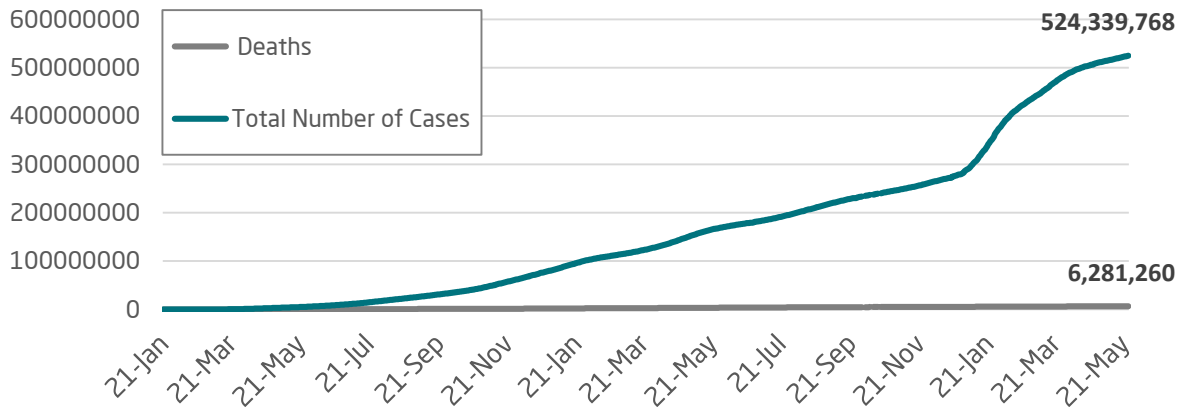

Figure 2: Daily New Infected COVID-19 Cases

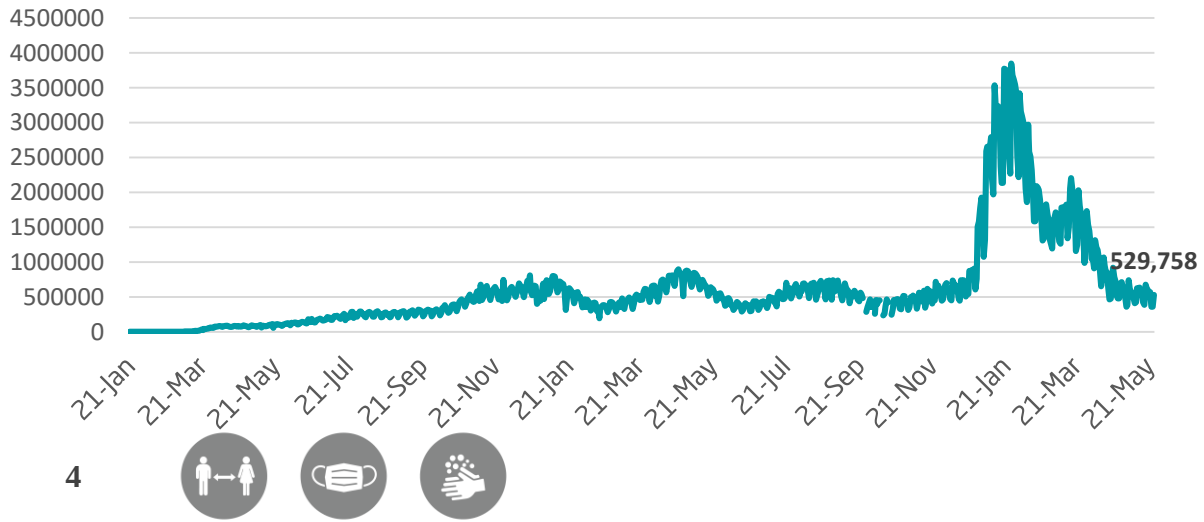

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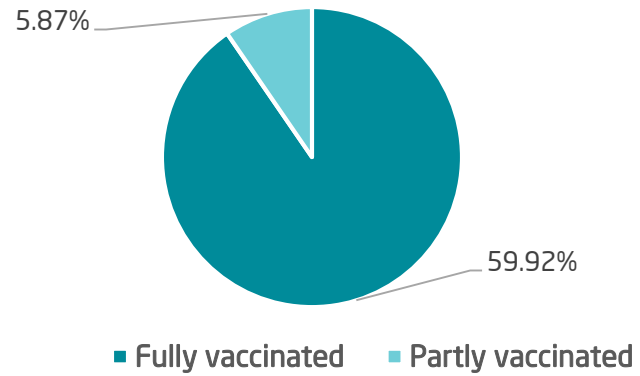
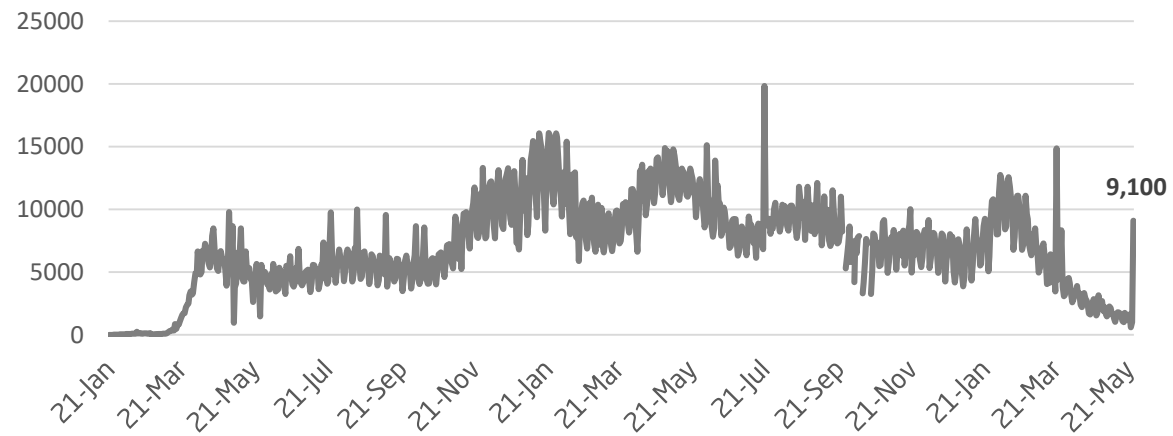
Figure 3: % of people vaccinated fully & partly against COVID-19



Total:
65.8 %

Figure 4: Global Daily New Deaths Due to COVID-19



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO, Our world in data

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 25 May 2022

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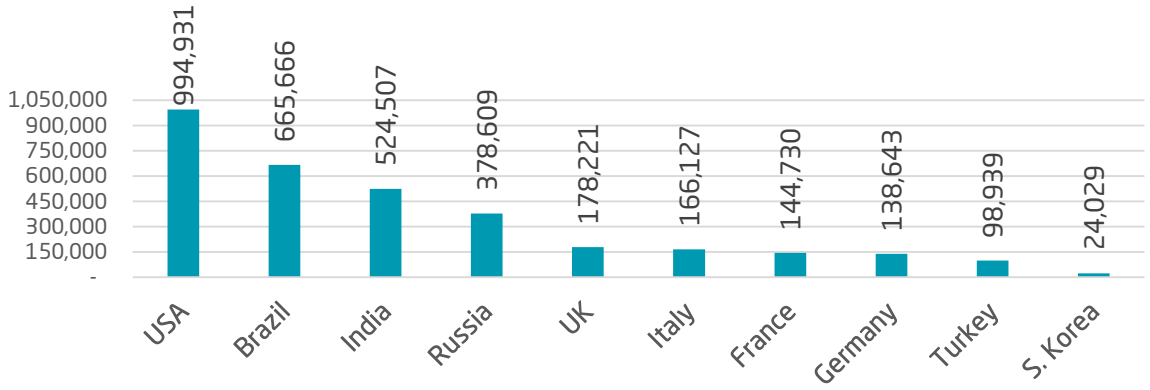
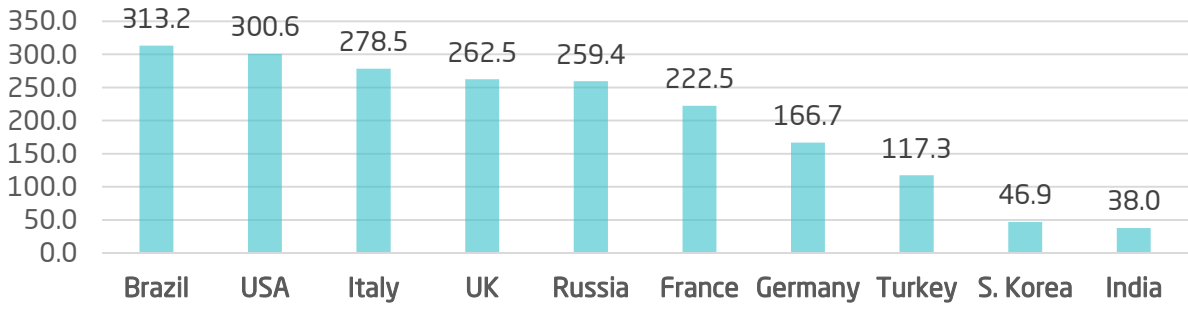
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

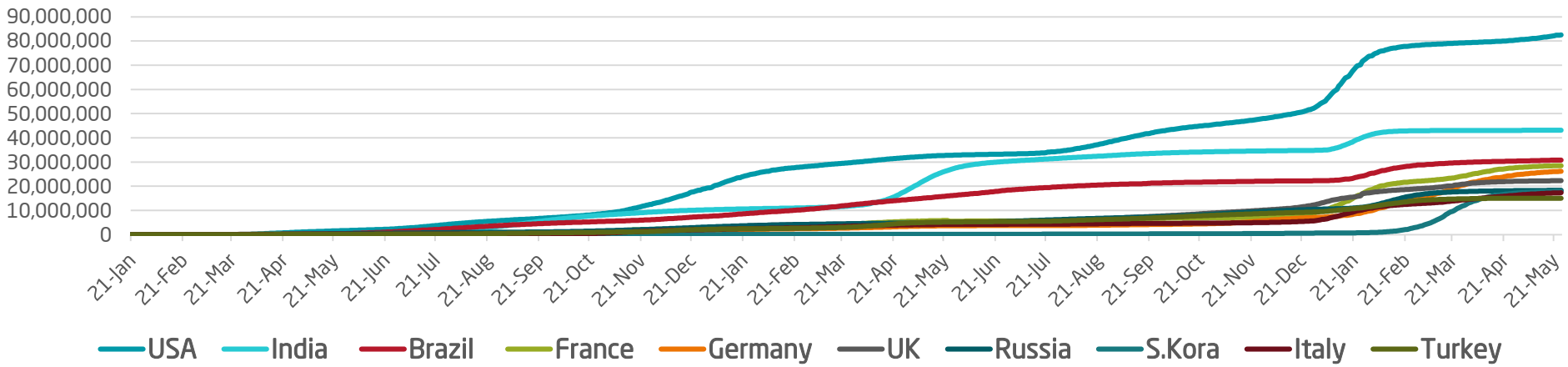
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	82,549,419
India	43,142,192
Brazil	30,803,995
France	28,518,939
Germany	26,159,106
UK	22,271,126
Russia	18,305,973
S. Korea	18,017,923
Italy	17,288,287
Turkey	15,065,524

Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 25 May 2022

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Figure 8: COVID-19 Status in the UAE (Federal Competitiveness and Statistics Authority Dashboard. (Last update on Aril 2022)

Daily Tests
284,172.6 Average Tests
2,873.2 per 100k population
0.1% Positive Rate

Daily Cases
241.1 Average Cases
2.4 per 100k population

Daily Recovered
356.7 Average Recovered
3.6 per 100k population

Daily Deaths
0.0 Average Deaths
0.0 per 100k population
0.0% Case Fatality Rate

Figure 6A: TOTAL Number Of Infected And Recovered Cases Due To Covid-19 Reported By The UAE

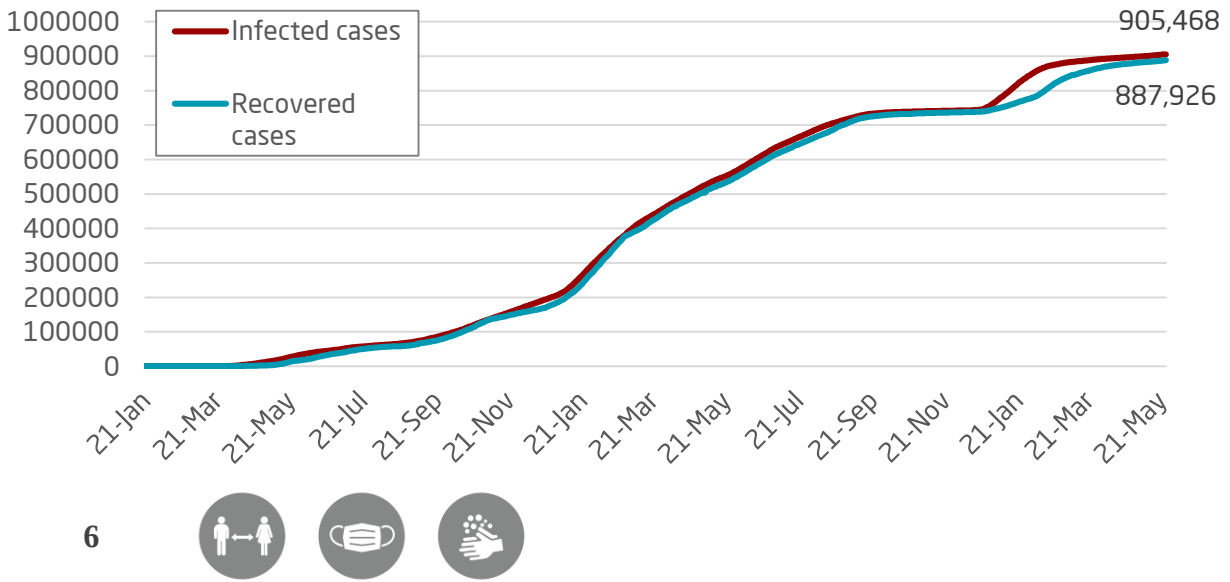
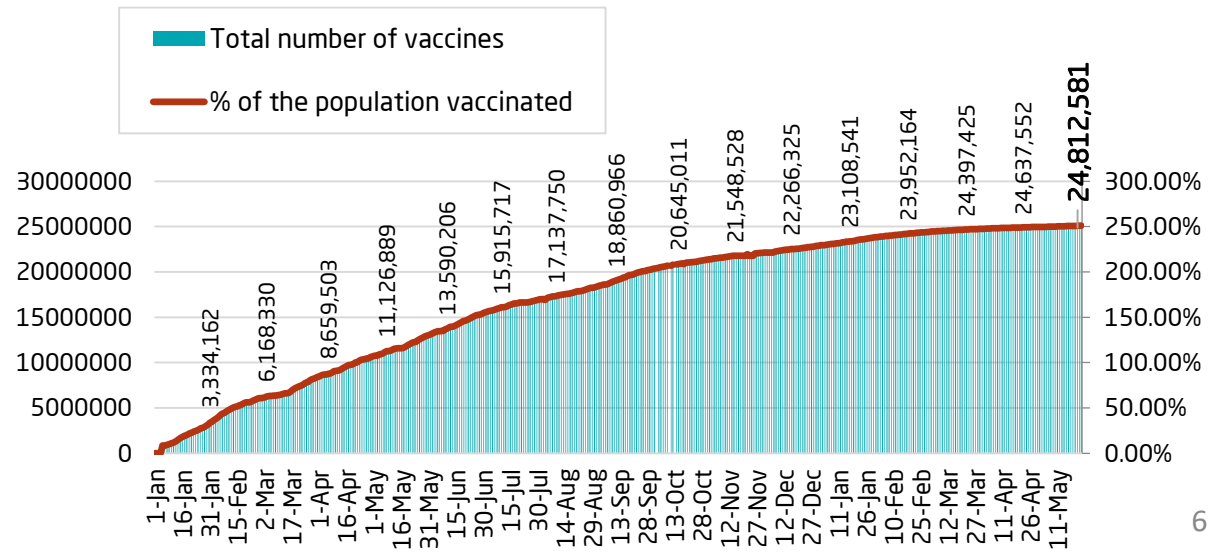


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: FCSA, WHO, John Hopkins, National Emergency Crisis and Disaster Management Authority

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 25 May 2022

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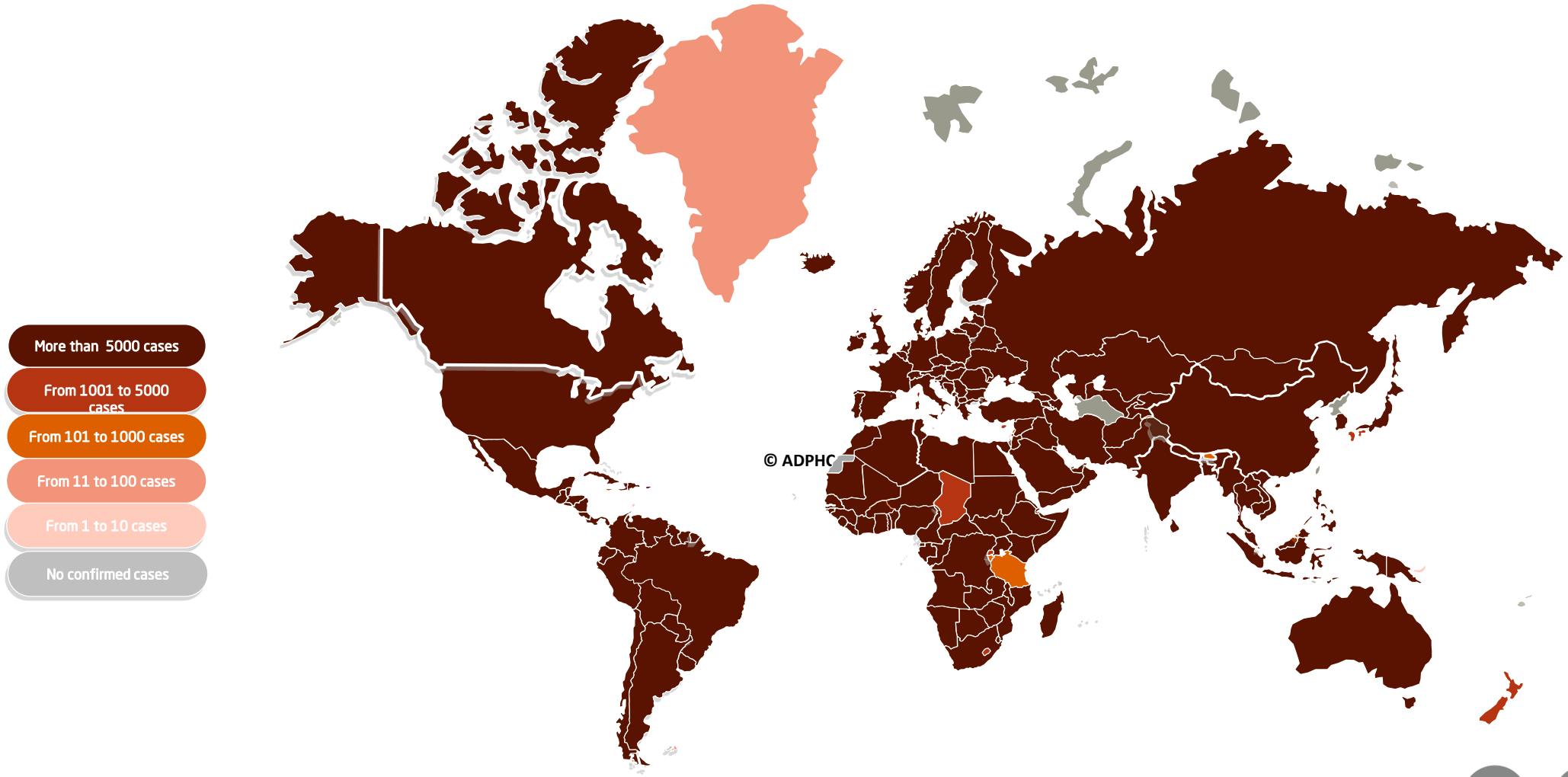
Figure 7A : Global Distribution of COVID-19 Cases



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

EPIDEMIOLOGY

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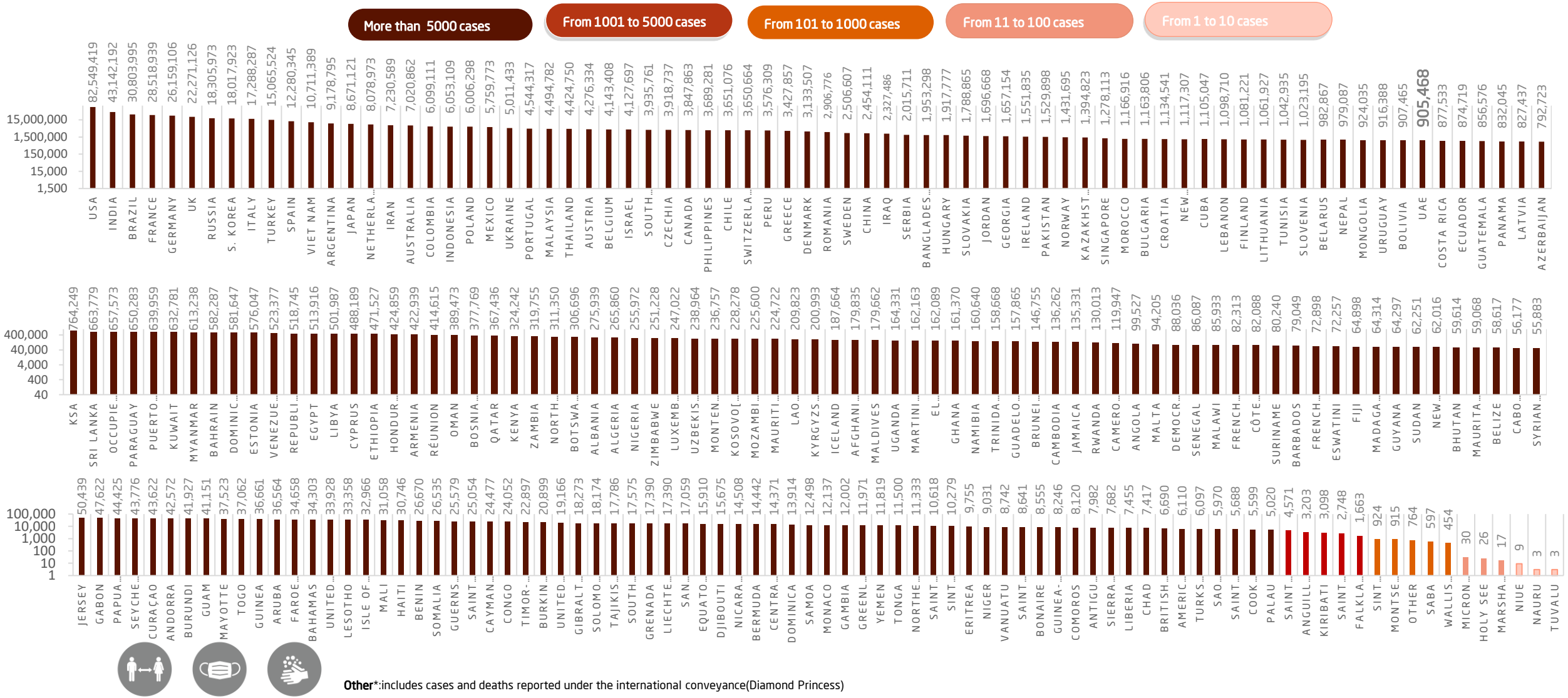
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



Other*:includes cases and deaths reported under the international conveyance(Diamond Princess)

Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

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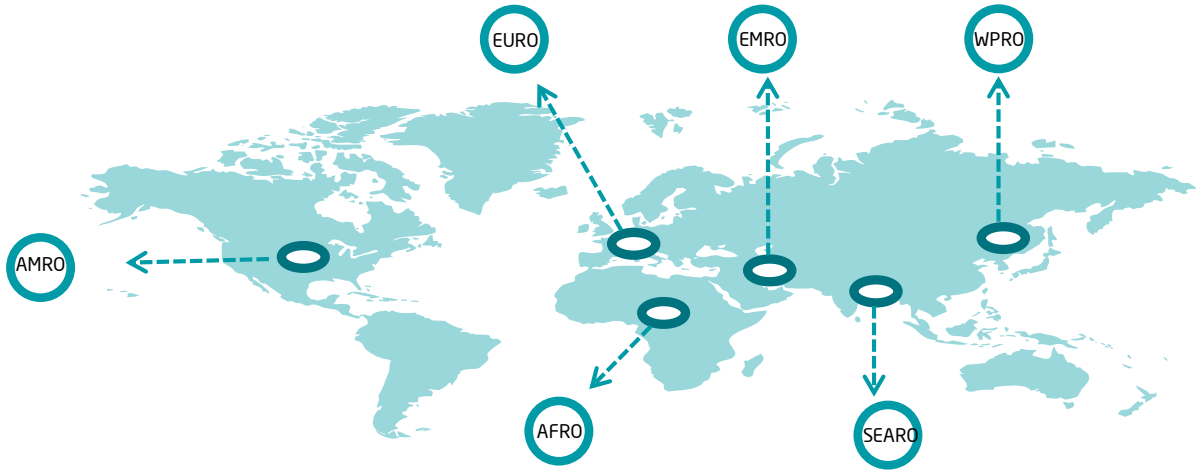
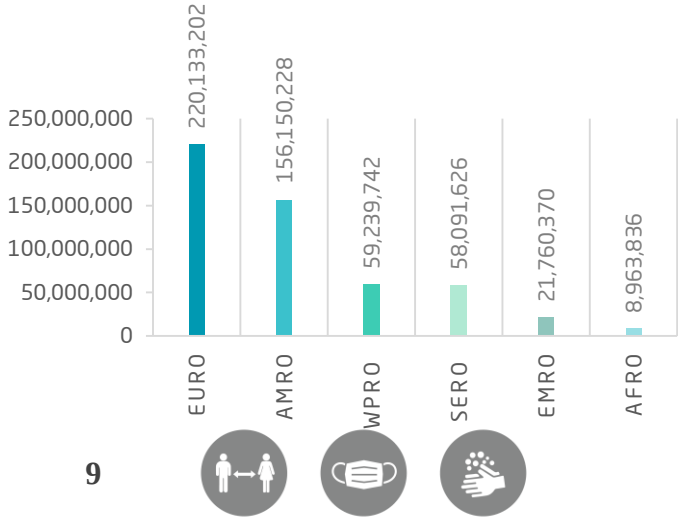
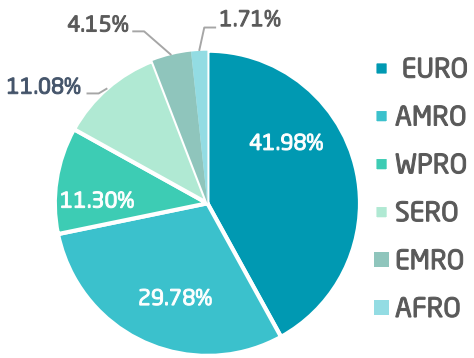
Figure 8: Global Distribution of COVID-19 Cases per Region

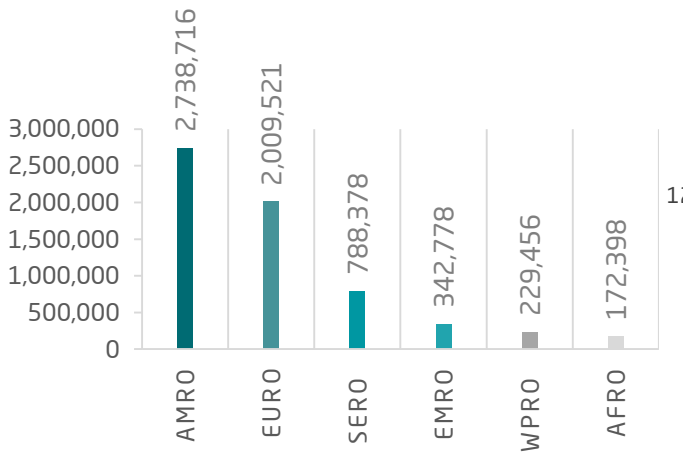


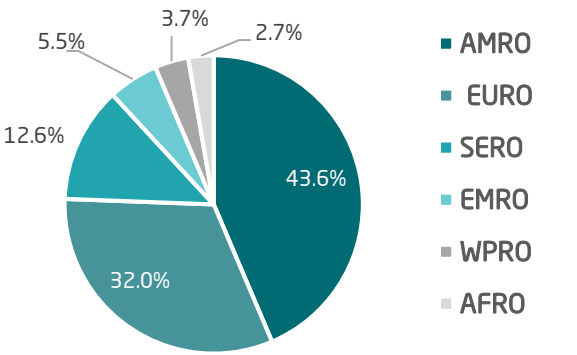
INFECTED





DEATHS





Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: John Hopkins, WHO

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FROM 21 JAN 2020 TO 25 May 2022

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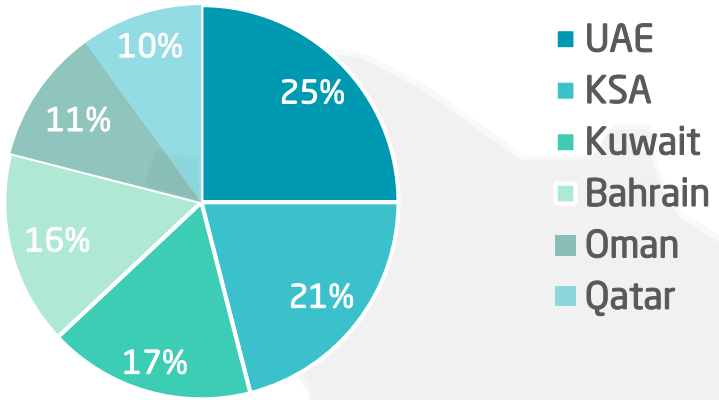
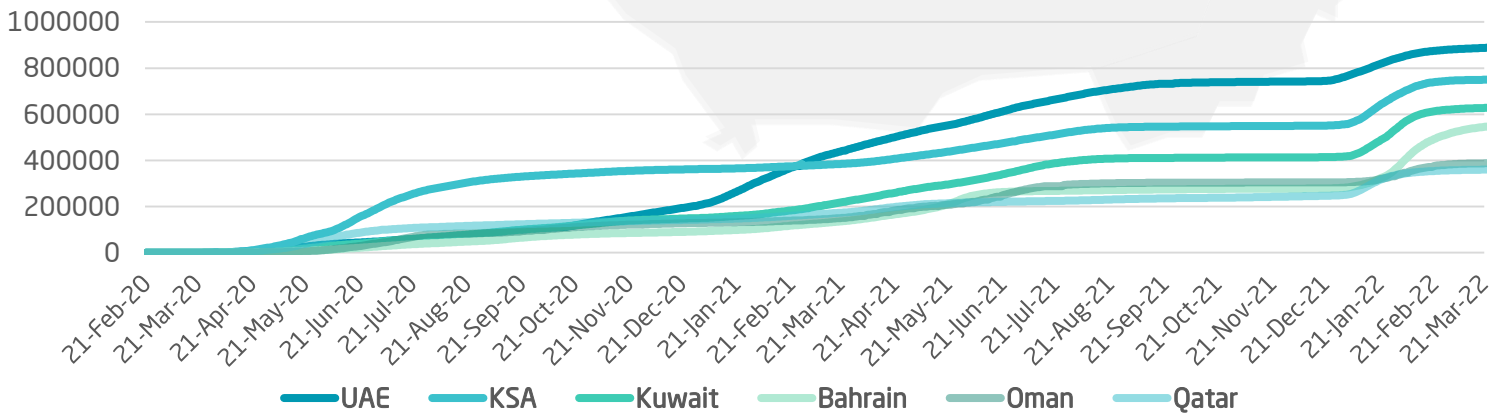
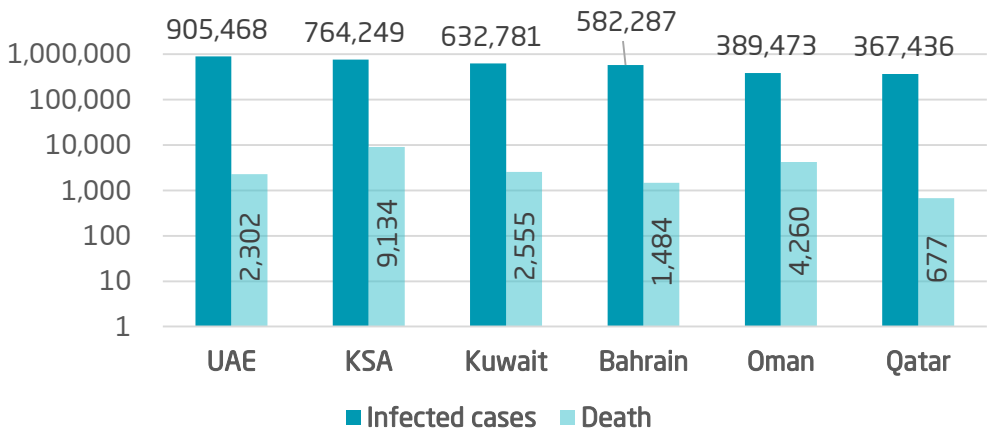
Figure 9: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

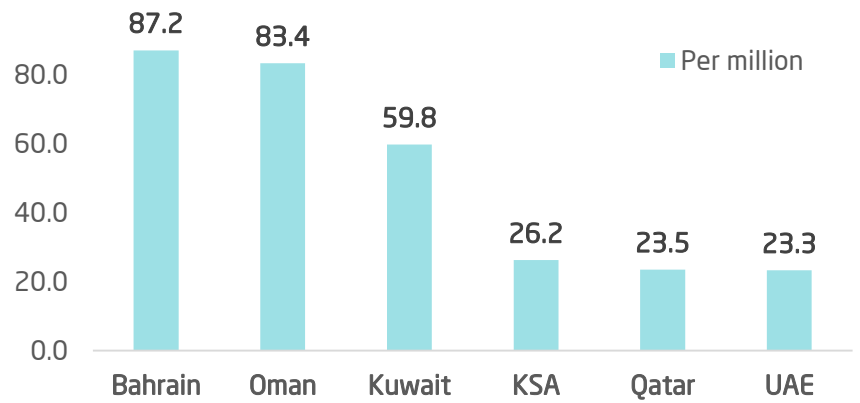




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS

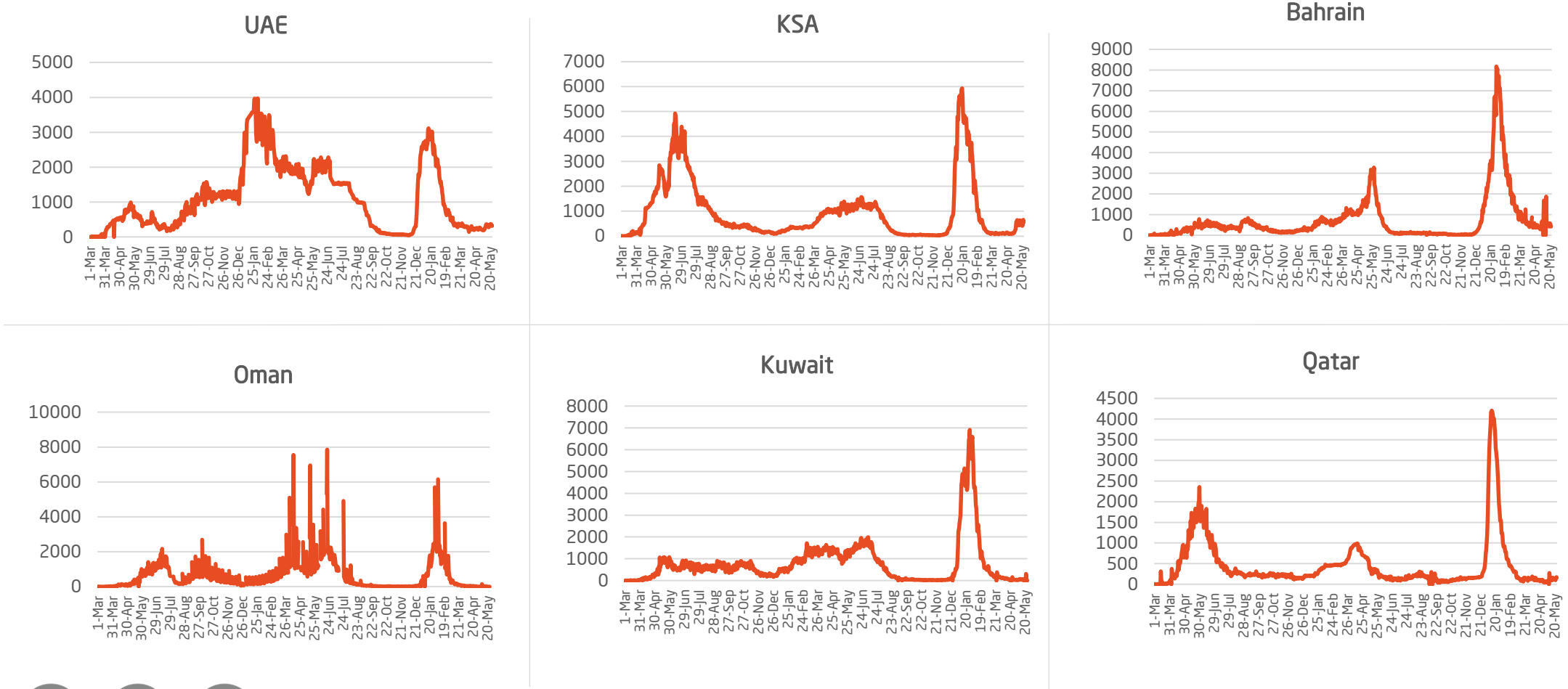


DEATHS PER MILLION



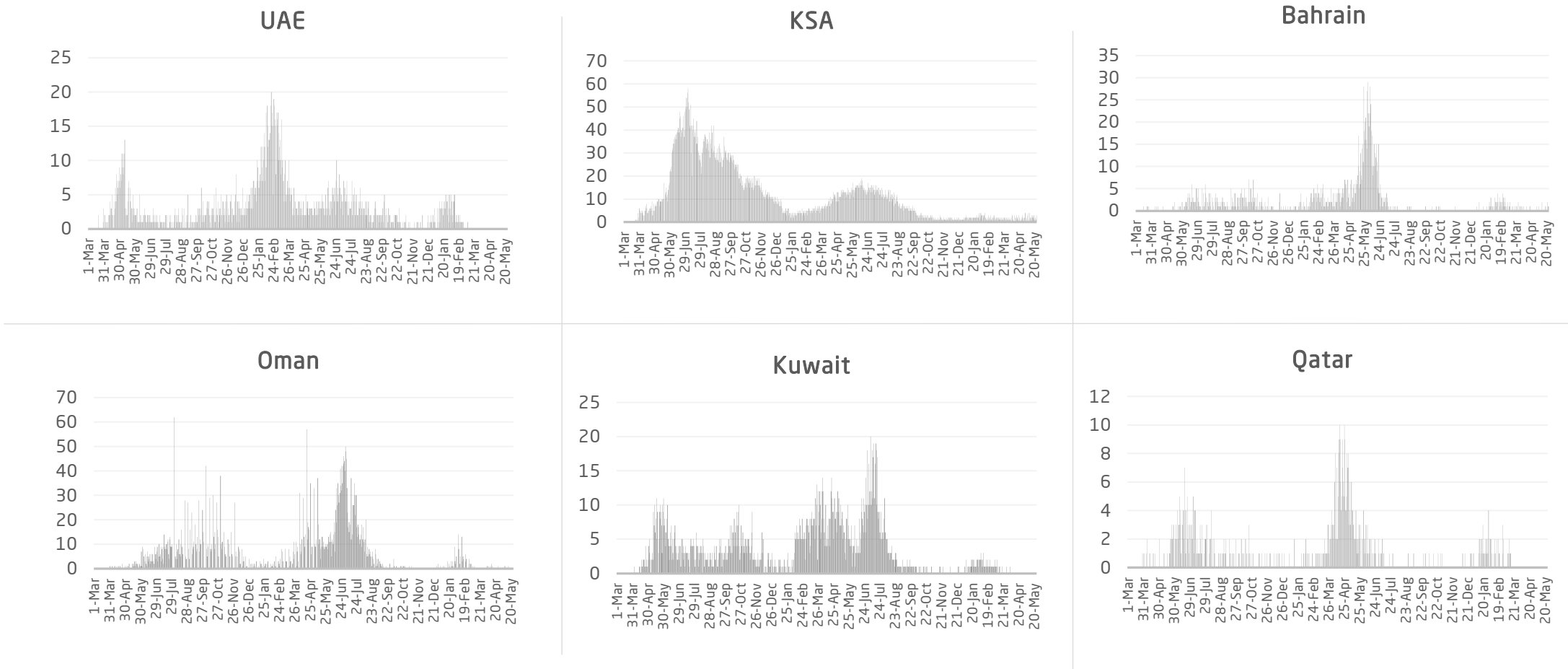
Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: John Hopkins, WHO

Figure 10: Comparative Analysis of the Distribution of COVID-19 New Cases in GCC Countries



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

Figure 11: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

SCHOOL HEALTH

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Article 1

Risk of SARS-CoV-2 reinfections in children: a prospective national surveillance study between January, 2020, and July, 2021, in England

Published

March 28, 2022 at The Lancet

- Objective Since reinfection with SARS-CoV-2 is not common in adults, it is unknown in children. This study used SARS-CoV-2 national testing data for England to estimate the risk of SARS-CoV-2 reinfection at least 90 days after primary infection in children and compare it to the risk in adults. National surveillance study was from January 27, 2020, to July 31, 2021, which covered the alpha (B.1.1.7) and delta (B.1.617.2) variant waves.

- Methods Children up to the age of 16 who met the criteria for reinfection (at least 90 days after primary infection) were included in the study. Reinfection cases were linked to national hospital admission data, intensive care admission data, and death registry databases to determine disease severity. Exclusion criteria were negative PCR within 3 days of primary infection. The difference in proportion between primary infection patients and reinfection cases who did not report any symptoms at the time of testing was assessed using a $\chi 2$ test.

- Results With a minor rise during the alpha wave and a greater peak during the delta wave, reinfection rates closely tracked community infection rates. There were 688,418 initial infections and 2,343 reinfections in ≤16 years-old children. The overall reinfection rate was 6,688 per 100 000 people, with adults (7,253 per 100 000) having a higher rate than children (2,153 per 100 000). The total reinfection rate was 0.68%, with 0.73% in adults, compared to 0.18% in children under the age of 5, 0.24% in those aged 5–11 years, and 0.49% in those aged 12–16 years. 78 (72%) of the 109 children admitted to the hospital with reinfection had comorbidities. The first (64 [27%] of 2,343) and second (57 [24%] of 2,343) episodes both had similar hospital admission rates, and intensive care hospitalizations were uncommon (7 children for the first episode and 4 for reinfections). Within 28 days of original infection, 44 people died (0.01%), but none died after reinfection.

- Conclusion The risk of SARS-CoV-2 reinfection is strongly related to exposure due to community infection rates, especially during the delta variant wave. Children had a lower risk of reinfection than did adults, but reinfections were not associated with more severe disease or fatal outcomes.

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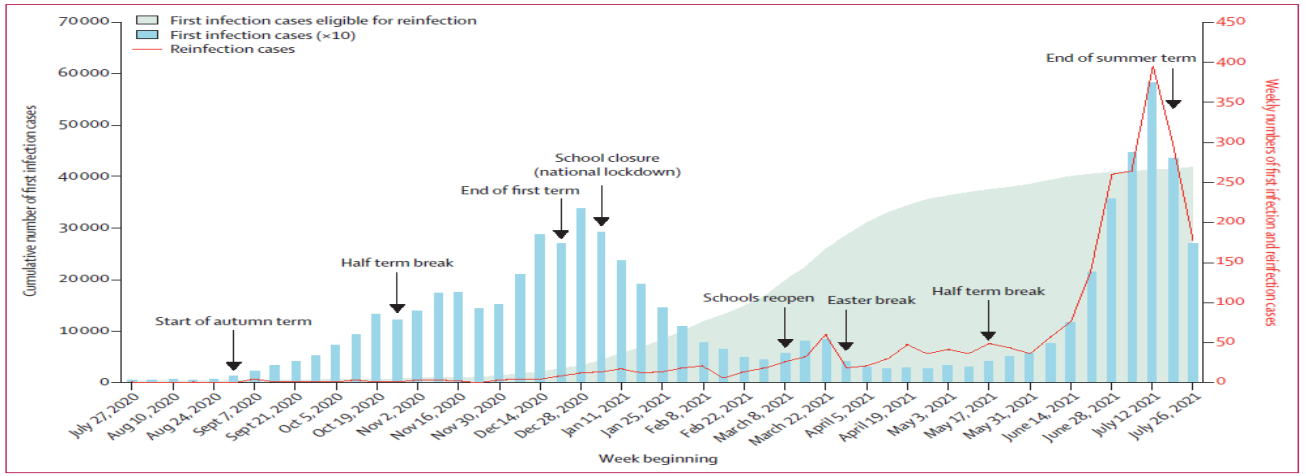

Figure 1: Weekly cumulative count of SARS-CoV-2 primary infections eligible for reinfection (allowing for 90 days interval), weekly count or primary infections (multiplied by 10), and weekly count or possible reinfection cases, in children up to age 16 years in England

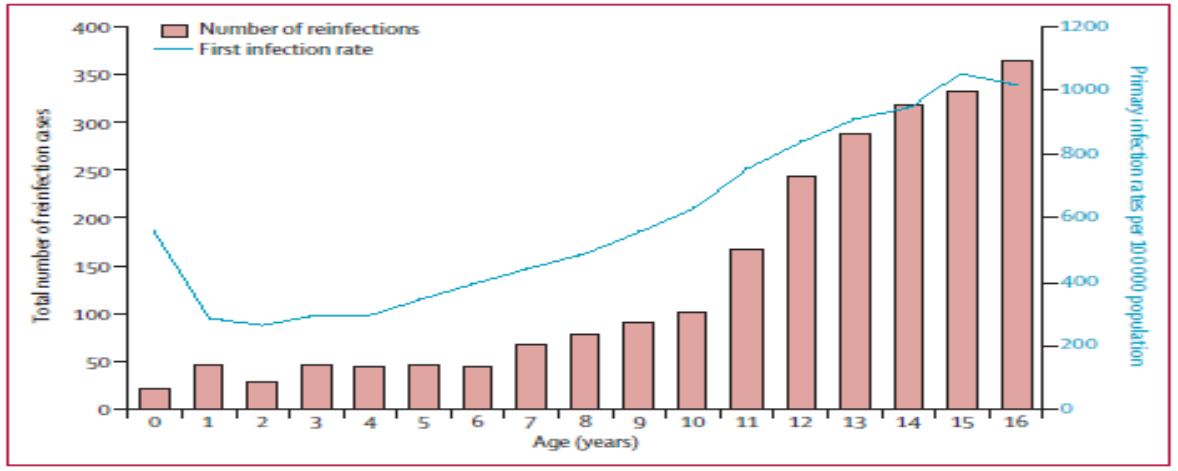

Figure 3: Total count of possible SARS-CoV-2 reinfection cases and SARS-CoV-2 primary infection rates by year of age from Jan 27, 2020, to July 31, 2021

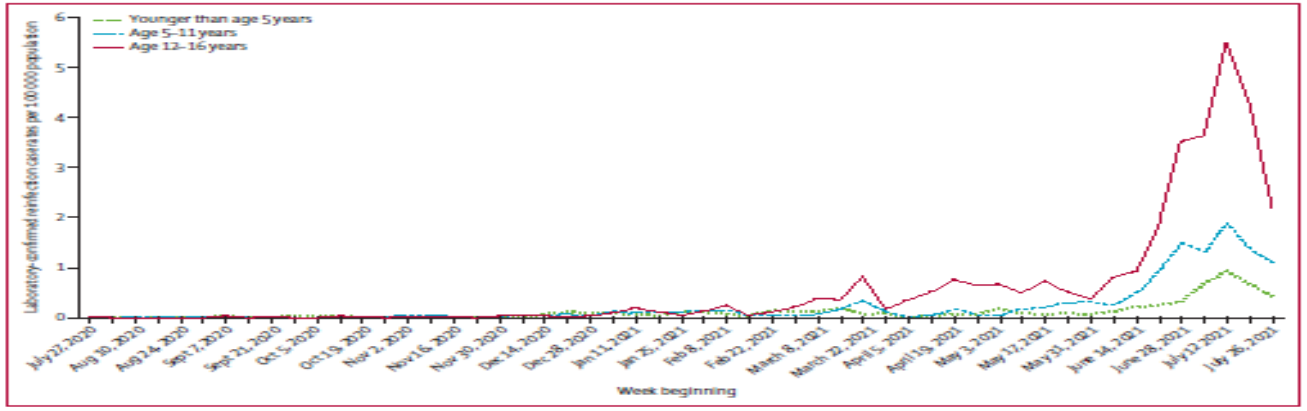

Figure 2: Weekly rates of SARS-CoV-2 possible reinfection cases per 100 000 population in different age groups in children

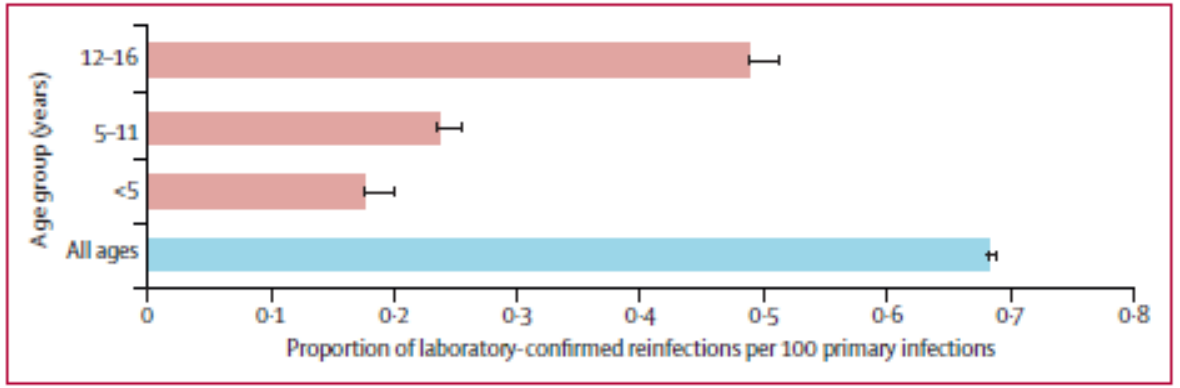

Figure 4: Laboratory-confirmed reinfection rates with 95% CIs by age group from Jan 27, 2020, to July 31, 2021

SCHOOL HEALTH

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Article 2

Estimated Transmission Outcomes and Costs of SARS-CoV-2 Diagnostic Testing, Screening, and Surveillance Strategies Among a Simulated Population of Primary School Students

Published April 20, 2022 in JAMA

- **Background:** In addition to illness, the COVID-19 pandemic has led to historic educational disruptions. In March 2021, the federal government allocated $10 billion for COVID-19 testing in US schools.
- **Objective:** In this study published in JAMA Pediatric, the costs and benefits of COVID-19 testing strategies were evaluated in the context of full-time, in-person kindergarten through eighth grade (K-8) education at different community incidence levels.
- Design, Setting, and Participants: An updated version of a previously published agent-based network model was used to simulate transmission in elementary and middle school communities in the United States. Assuming dominance of the delta SARS-CoV-2 variant, the model simulated an elementary school (638 students in grades K-5, 60 staff) and middle school (460 students grades 6-8, 51 staff).
- **Exposures:** Multiple strategies for testing students and faculty/staff, including expanded diagnostic testing (test to stay) designed to avoid symptom-based isolation and contact quarantine, screening (routinely testing asymptomatic individuals to identify infections and contain transmission), and surveillance (testing a random sample of students to identify undetected transmission and trigger additional investigation or interventions).
- **Main Outcomes and Measures:** Projections included 30-day cumulative incidence of SARS-CoV-2 infection, proportion of cases detected, proportion of planned and unplanned days out of school, cost of testing programs, and childcare costs associated with different strategies. For screening policies, the cost per SARS-CoV-2 infection averted in students and staff was estimated, and for surveillance, the probability of correctly or falsely triggering an outbreak response was estimated at different incidence and attack rates.
- **Results:** Compared with quarantine policies, test-to-stay policies are associated with similar model-projected transmission, with a mean of less than 0.25 student days per month of quarantine or isolation. Weekly universal screening is associated with approximately 50% less in-school transmission at one-seventh to one-half the societal cost of hybrid or remote schooling. The cost per infection averted in students and staff by weekly screening is lowest for schools with less vaccination, fewer other mitigation measures, and higher levels of community transmission. In settings where local student incidence is unknown or rapidly changing, surveillance testing may detect moderate to large in-school outbreaks with fewer resources compared with schoolwide screening.
- **Conclusions and Relevance:** In this modeling study of a simulated population of primary school students and simulated transmission of COVID-19, test-to-stay policies and/or screening tests facilitated consistent in-person school attendance with low transmission risk across a range of community incidence. Surveillance was a useful reduced-cost option for detecting outbreaks and identifying school environments that would benefit from increased mitigation.

Article 3

Screening and vaccination against COVID-19 to minimize school closure: a modelling study

Published April 1, 2022 in The Lancet

- School closure has been extensively used worldwide during the COVID-19 strict lockdowns pandemic. Students lost from 10 weeks to almost 50 weeks
- The investigators developed an agent-based model of SARS-CoV-2 transmission in schools using previous data during the alpha variant (B.1.1.7) wave in March-June, 2021, in France
- The authors fitted the model to observed school prevalence so they can estimate the school-specific effective reproductive number for the alpha (Ralpha) and delta (B.1.617.2; Rdelta) variants and further performed a cost-benefit analysis
- The estimated Ralpha was 1.40 (1·35-1·45) and 1.46 (1·41-1·51), while the estimated Rdelta was 1.66 (1·60-1·71) and 1.10 (1·06-1·14) in primary and secondary schools respectively
- Weekly testing of 75% of unvaccinated students plus symptom-based testing could reduce cases by 34% (95% CI 32-36) and 36% (35-39) in primary and secondary schools respectively when compared to symptom-based testing Further, the investigators found that regular testing would reduce student-days lost up to 80% compared with reactive class closures
- Further, moderate vaccination coverage in students would still benefit from regular testing for additional control
- The authors concluded that, the COVID-19 pandemic will probably continue to pose safety risk to schools recommending to extend vaccination coverage in students in addition to regular testing. These would be the essential steps to keep schools open when highly transmissible variants are circulating

SCHOOL HEALTH

Continued

Figure 1: Predicted case reduction relative to symptom-based testing only for selected protocols (regular testing is performed weekly)

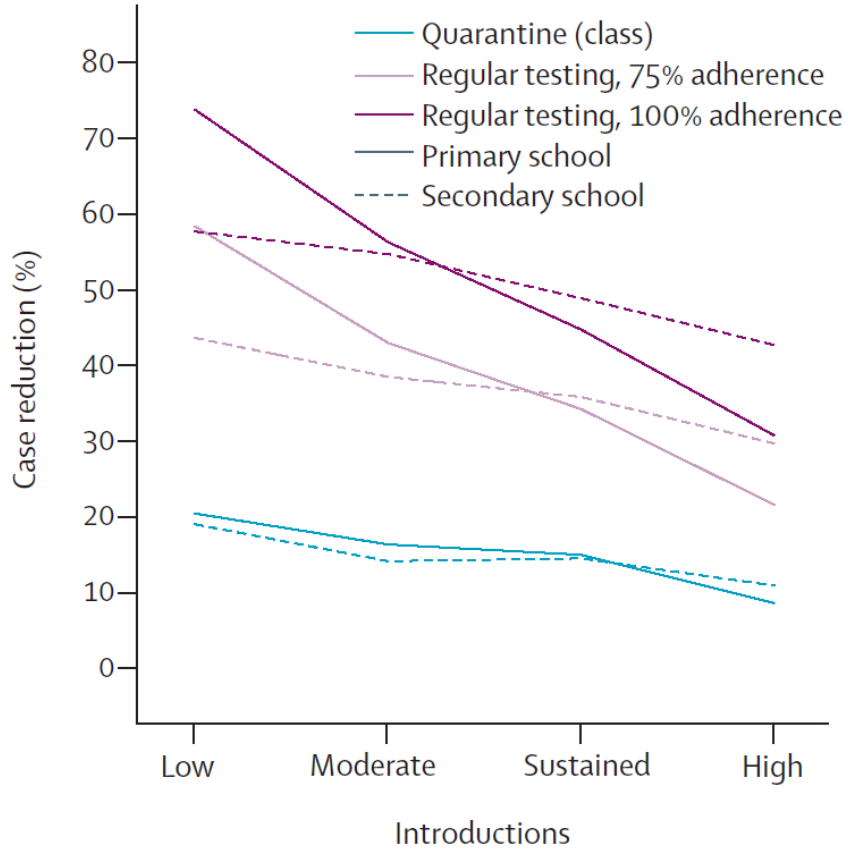
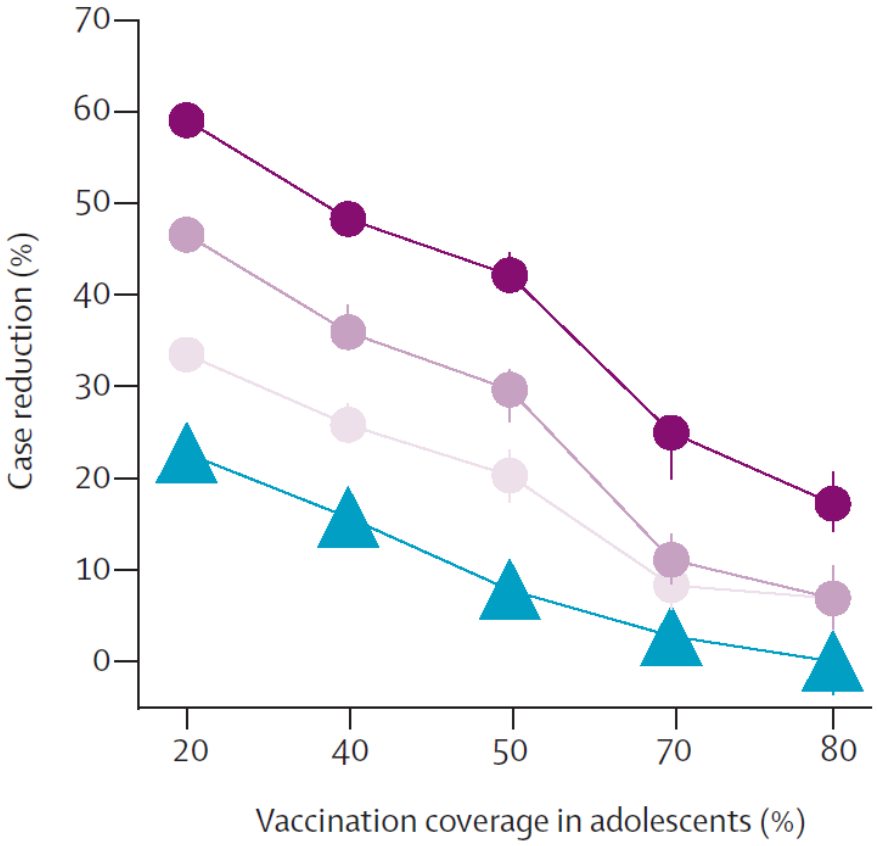


Figure 2: Predicted case reduction relative to symptom-based testing alone for selected protocols as a function of vaccination coverage inç adolescents in the secondary school



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Article 4

Importance of understanding the reinfection risk of COVID-19 in children

Published

March 28, 2022 in The Lancet

- Crawford raises the issue of the importance of well understanding the risk of reinfection in children.
- Crawford addresses the previously raised issue regarding the important question of COVID-19 in children and the risk of reinfection over time in England. In addition to the existing difference of COVID-19 data between children and adults.
- The risk of SARS-CoV-2 reinfection was strongly related to exposure, it is attributed to community infection rates, especially during the delta variant wave.
- Children had a lower risk of reinfection than adults; fortunately, reinfections were not associated with more severe morbidity or mortality.
- It is of crucial importance to notice the indirect effects of the pandemic on children, including the impact of COVID-19 on household family members, schooling, and mental health.
- In children, the risk of reinfection increased with age (i.e., 0·9, 1.9, and 5.5 per 100000 population among children <5, 5–11, and 12–16 years, respectively.
- Certain developed countries such as Australia, Canada, the USA, and the UK commenced an mRNA vaccination program in children aged 5–11 years.
- A single COVID-19 vaccine dose has reduced the number of the multisystem inflammatory syndrome in children (MIS-C) cases, according to publications from France and the USA, and
- Further studies are required to investigate the COVID-19 vaccine protective effect on reducing MIS-C cases and to verify the readmission causes.
- According to Crawford's comment, reinfection with SARS-CoV-2 was not associated with fatal pediatric cases.
- Crawford has raised several important issues that need to be addressed and solved by future research such as the role that rapid antigen testing might play in identifying cases of reinfection, especially asymptomatic reinfection cases and how to pick them as early as possible and monitor them as well, and the potentiality in transmission, particularly if new variants of concern emerge. In addition, the possibility of multiple reinfections impact the immune system in vaccinated individuals (interplay between infection and vaccine), with a particular focus on the development of B cell and T cell immune memory.

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Article 5

Modelling results on the impact of COVID-19 testing in schools

Published April 01, 2022 in The Lancet

- According to Dyson's comment on the importance of COVID-19 testing in schools.
- Since April 2020, education has been suffering from the COVID-19 pandemic, and there is an urgent need to contain the pandemic.
- Different models of school-based testing for COVID-19 were carried out in many countries and concluded asymptomatic testing could reduce school transmission:
- In France (during the alpha (B.1.1.7) and delta (B.1.617.2)).
- In the USA, Canada, and the UK (SARS-CoV-2).
- Such models help in reducing infections and school days missed.
- The difficulty in quantifying a reduction in transmission accurately could be attributed to using different strategies, the different setup among schools, and lack of comprehensive data to inform the modeling.
- However, the previous models have some limitations; they can be used for establishing baseline data for future research.
- With further availability of more data from different settings hopefully modeling will help in adopting appropriate SARS-CoV-2 testing strategies in schools.

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ABU DHABI PUBLIC HEALTH CENTRE

ACKNOWLEDGMENT

EDITORS

Dr Shereena Al Mazroui . MBBS, MPH – (**ADPHC**).
Dr Maha Al Safi – MBBS – **(ADPHC).**

TEAM

Hanan Al Mutairi, BSPH - **(ADPHC).**
Shahad Al Shamlan, BSPH - **(ADPHC).**
Ahlam Al Maskari , BSPH- **(ADPHC).**

CONTRIBUTORS

Dr. Mumtaz Meeran, MPH – **(ADPHC).**
Dr. Wasim El Nekidy, PHD in clinical pharmacology – **(CCAD).**
Dr. Zohour Anouassi, MHE, BCPS - **(CCAD).**
Dr. Ahmed Ali Hassan, MBBS, MSc, PhD **(University of Sunderland).**

ADPHC_AE ADPHCAE ADPHC.AE ADPHC-AE +971 56 231 2171 WWW.ADPHC.GOV.AE