مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

29 SEPTEMBER 2022

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 444)

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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

The views and opinions expressed in this report are those of the authors and do not reflect the official policy or position of the Abu Dhabi Public Health Center (ADPHC).

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Long COVID symptoms in SARS-CoV-2-positive children aged 0–14 years and matched controls in Denmark (LongCOVIDKidsDK): a national, cross-sectional study

Risk of long COVID associated with delta versus omicron variants of SARS-CoV-2

Long COVID after breakthrough SARS-CoV-2 infection

EPIDEMIOLOGY

FROM 26 February 2020 TO 28 September 2022

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

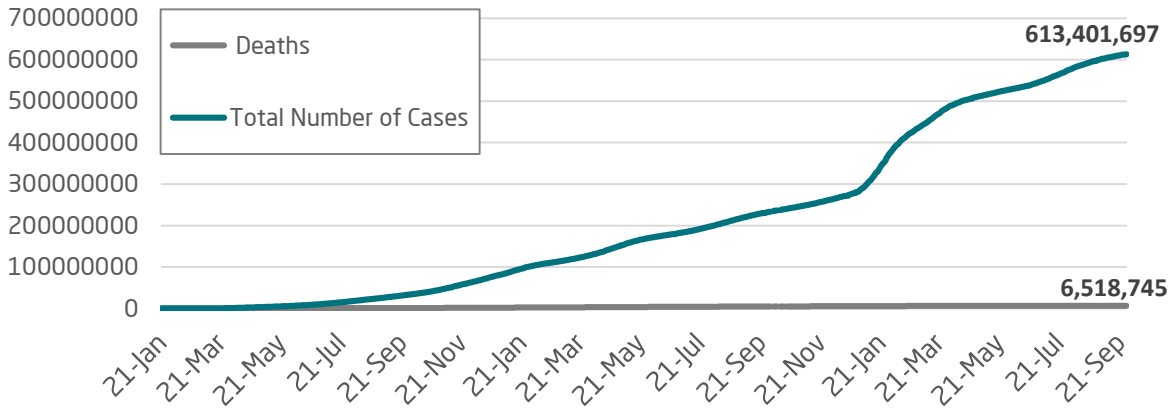


Figure 2: Daily New Infected COVID-19 Cases

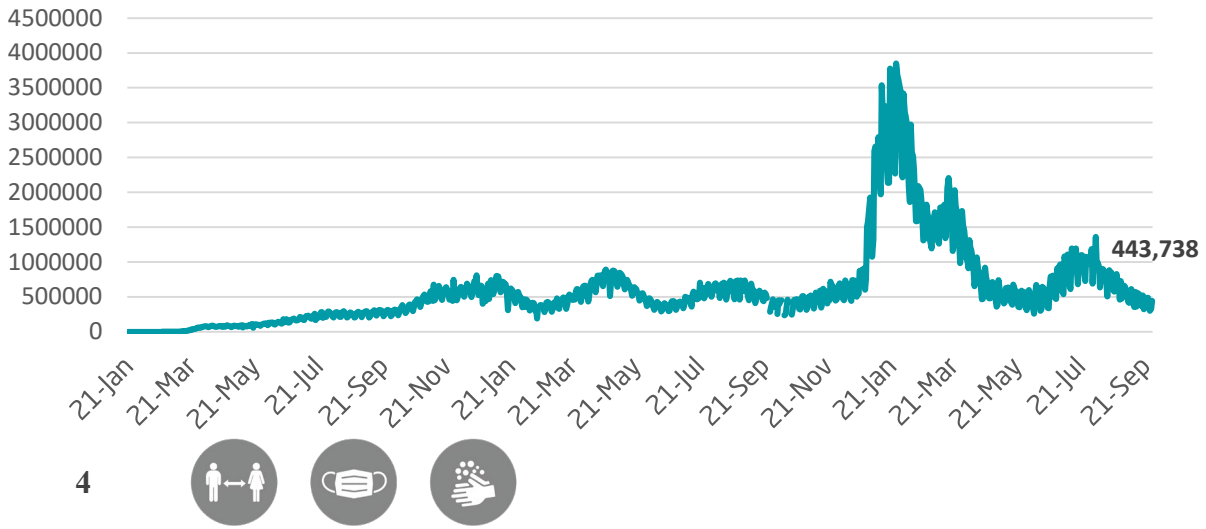
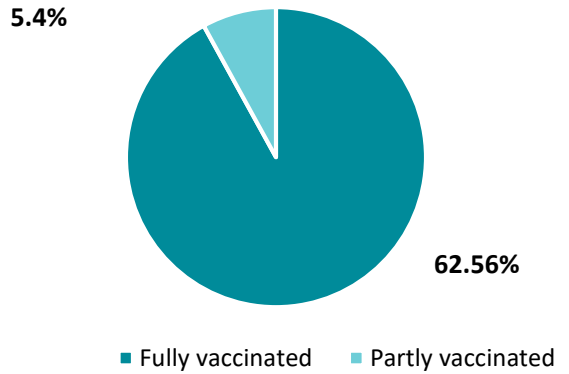
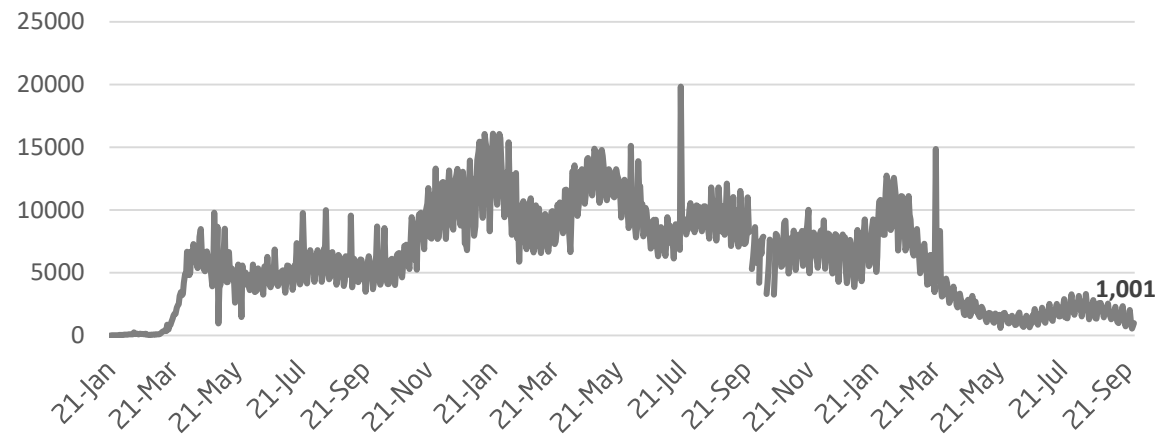


Figure 3: % of people vaccinated fully & partly against COVID-19



Total:
68.00 %

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 28 September 2022

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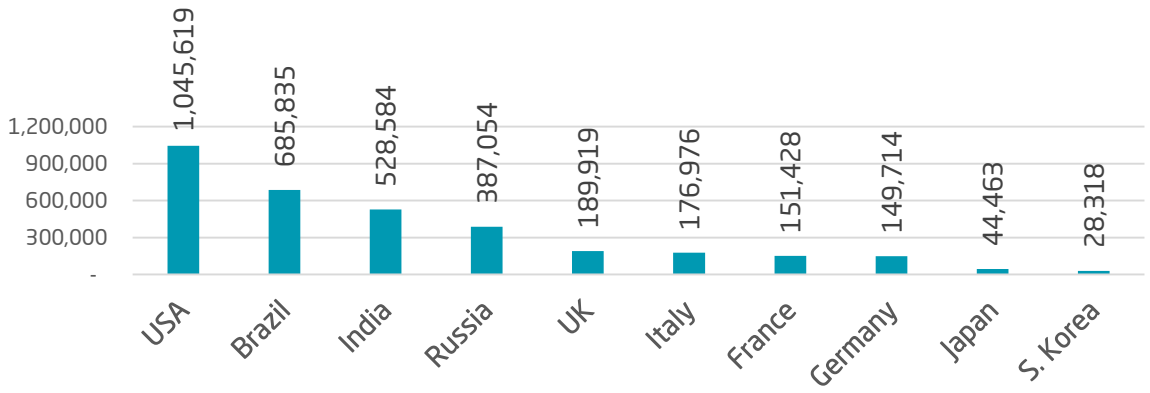
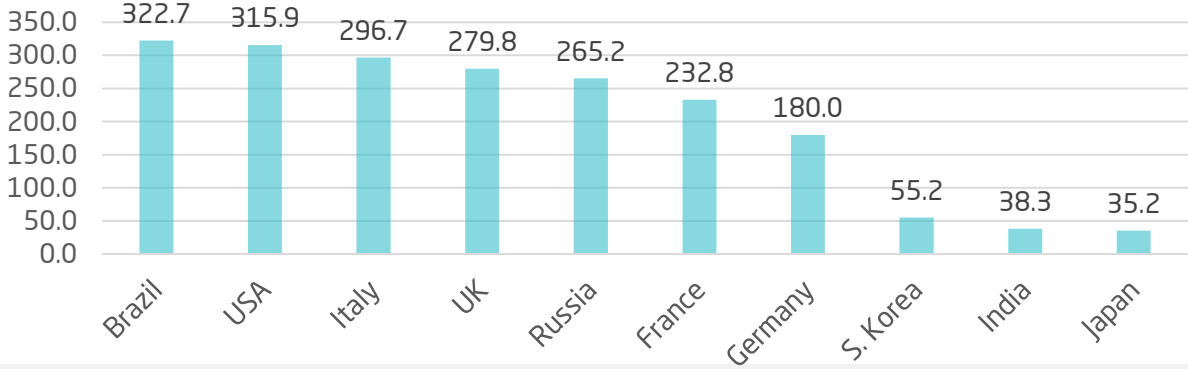
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

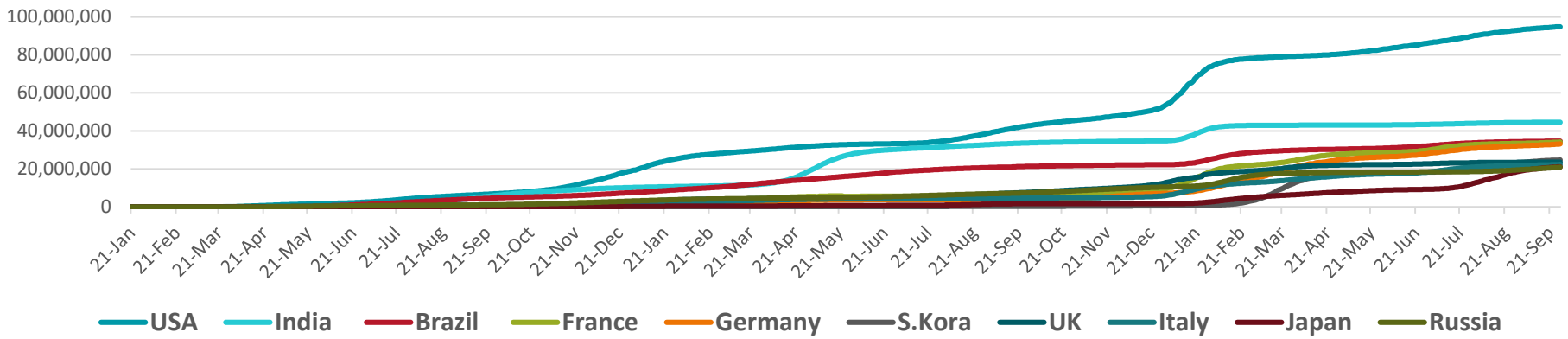
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	94,833,079
India	44,579,088
Brazil	34,638,288
France	34,200,464
Germany	33,137,143
S. Korea	24,709,789
UK	23,621,956
Italy	22,358,487
Japan	21,118,325
Russia	20,909,731

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

EPIDEMIOLOGY

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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
334,275.9 Average Tests
3,379.8 per 100k population
0.2% Positive Rate

Daily Cases
617.6 Average Cases
6.2 per 100k population

Daily Recovered
247.9 Average Recovered
2.5 per 100k population

Daily Deaths
0.6 Average Deaths
0.0 per 100k population
0.1% Case Fatality Rate

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

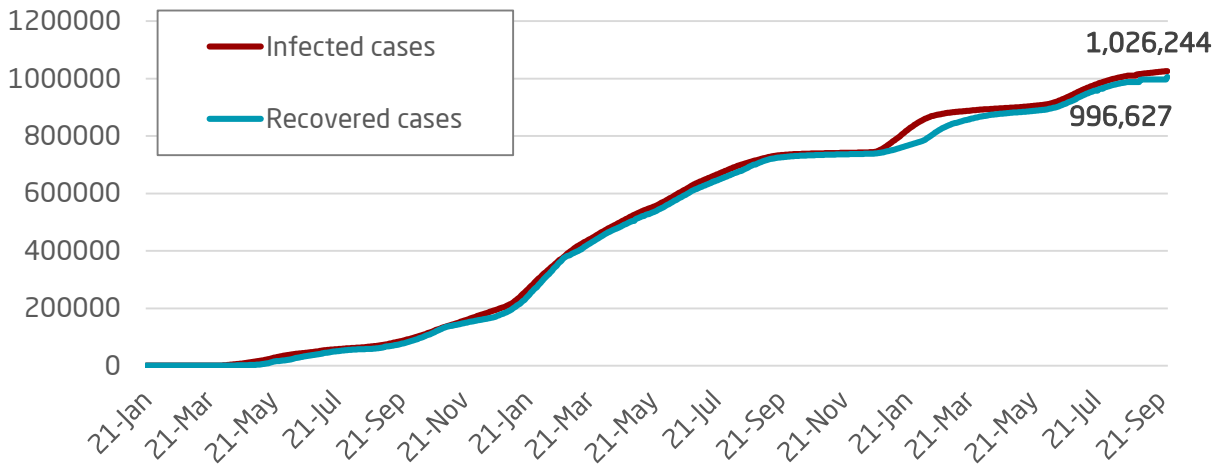
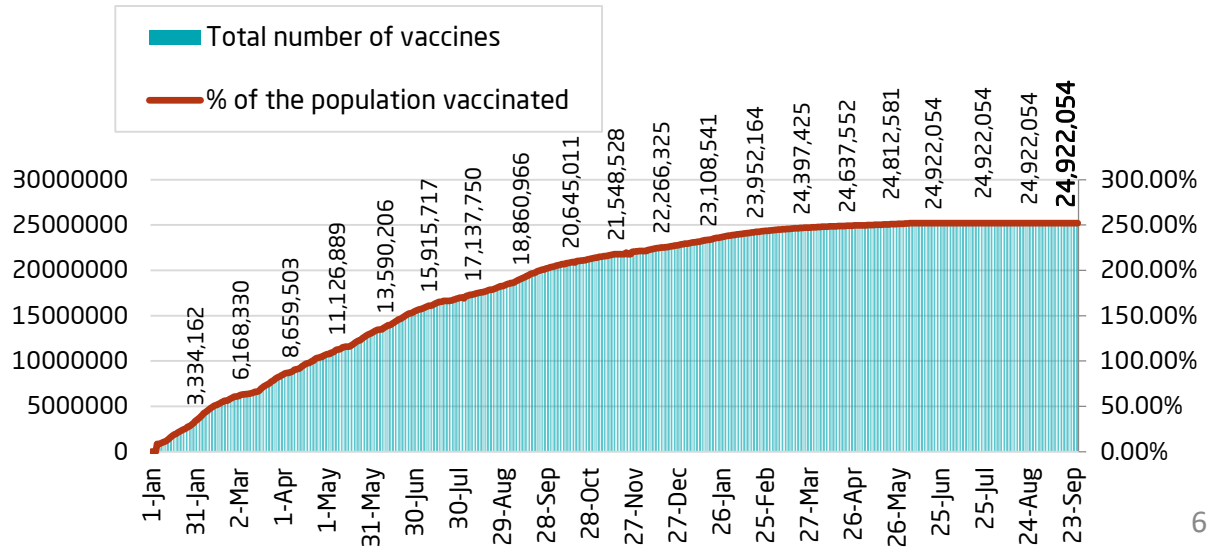


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



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

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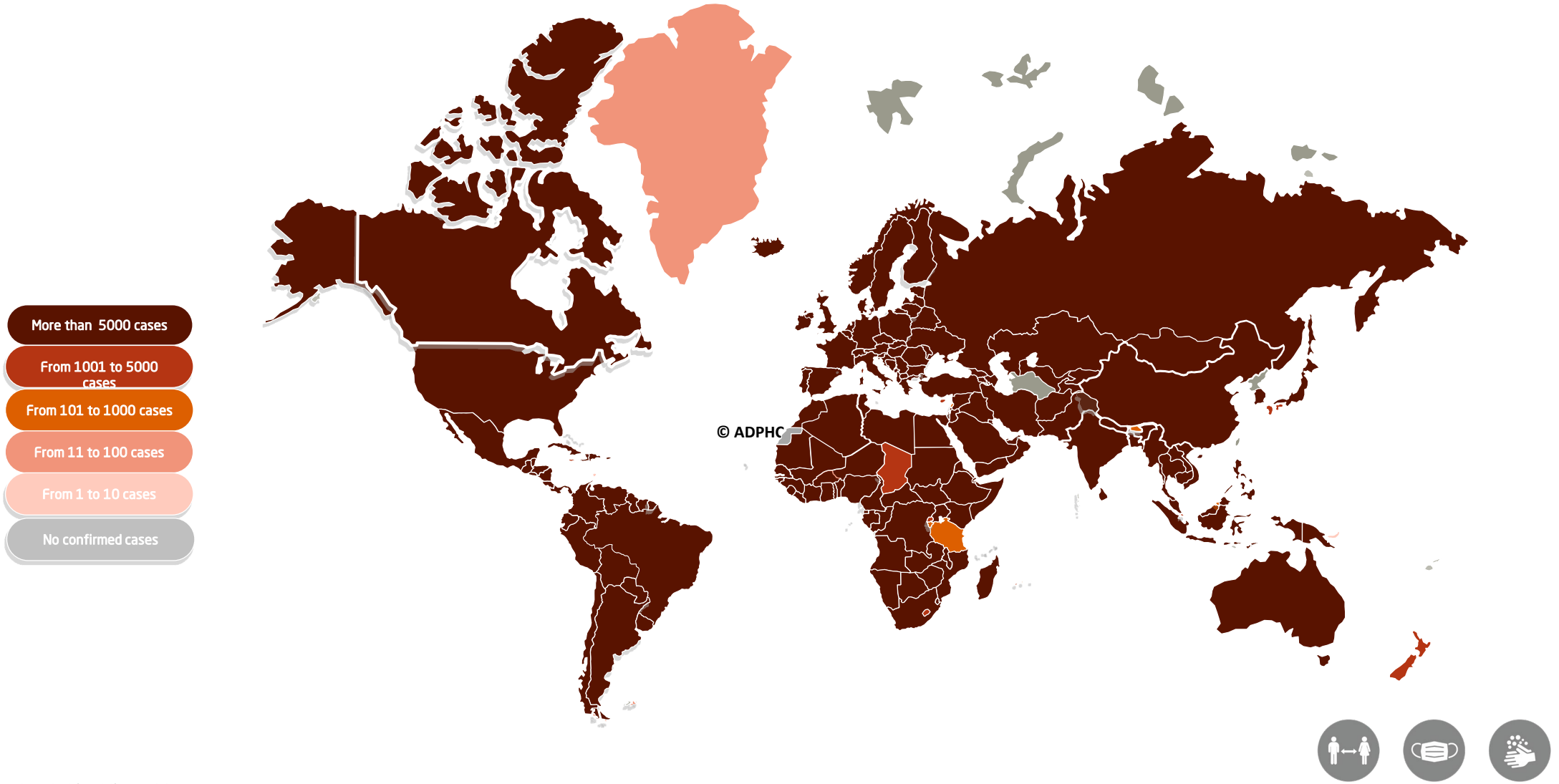
Figure 7A : Global Distribution of COVID-19 Cases



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

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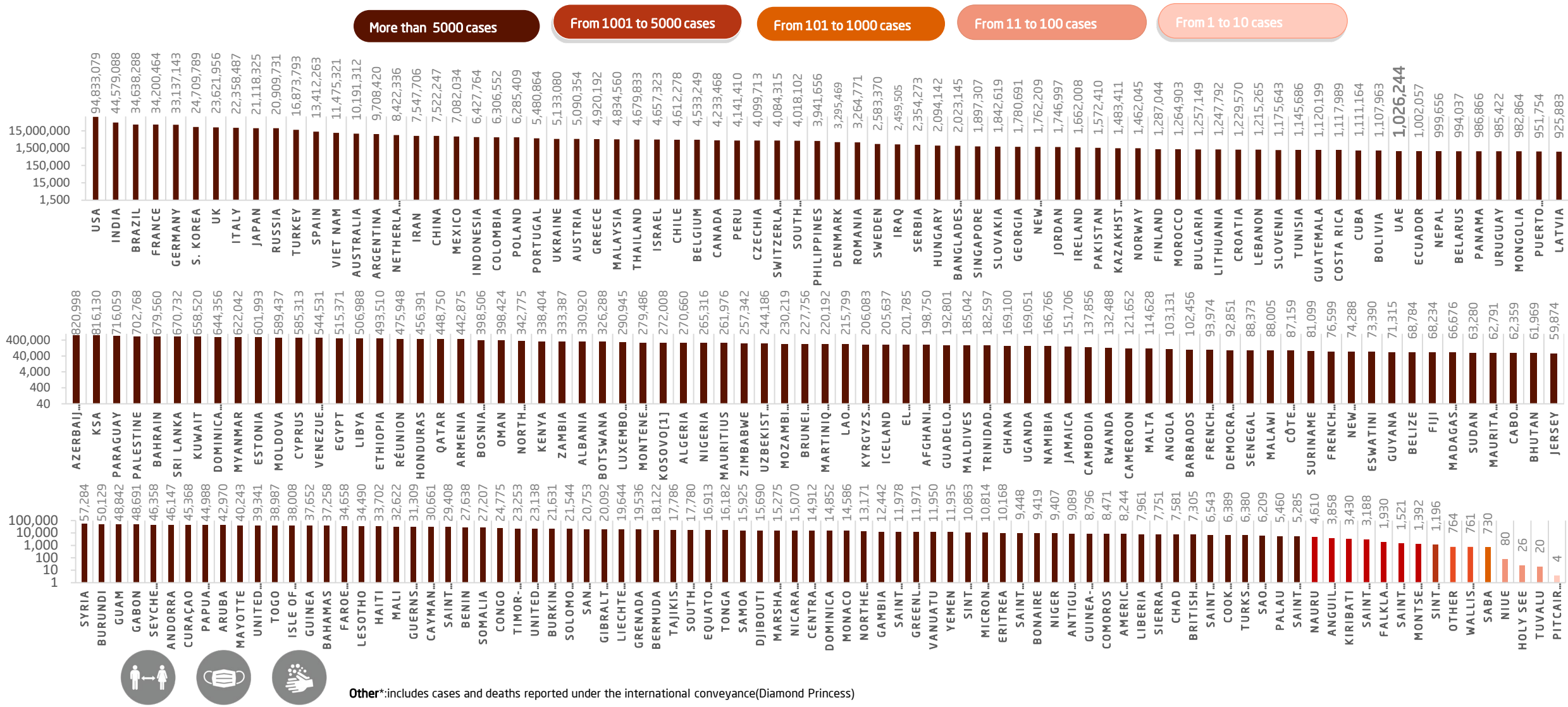
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



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

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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 28 September 2022

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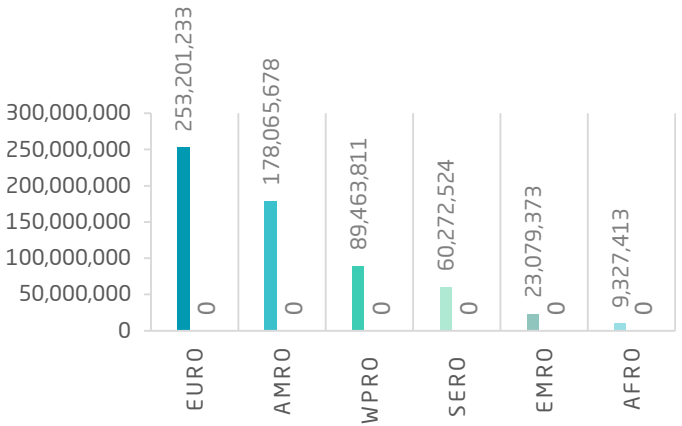
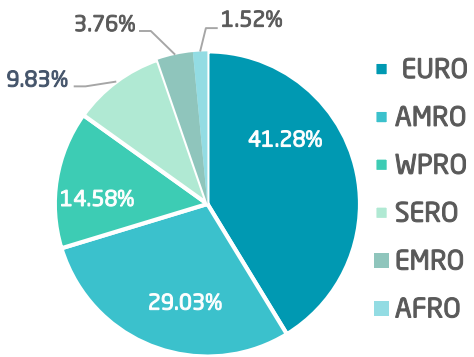
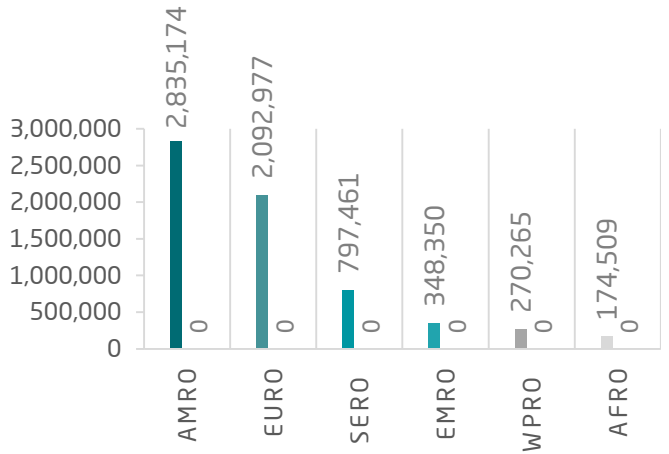
Figure 8: Global Distribution of COVID-19 Cases per Region

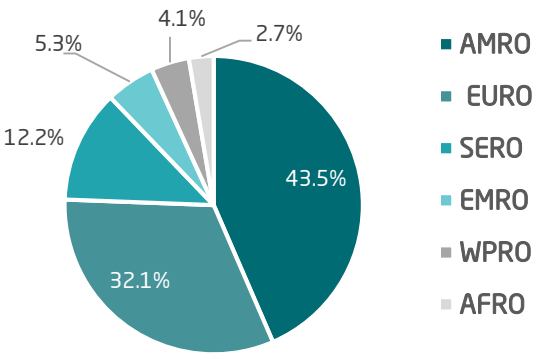
INFECTED





DEATHS





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

EPIDEMIOLOGY

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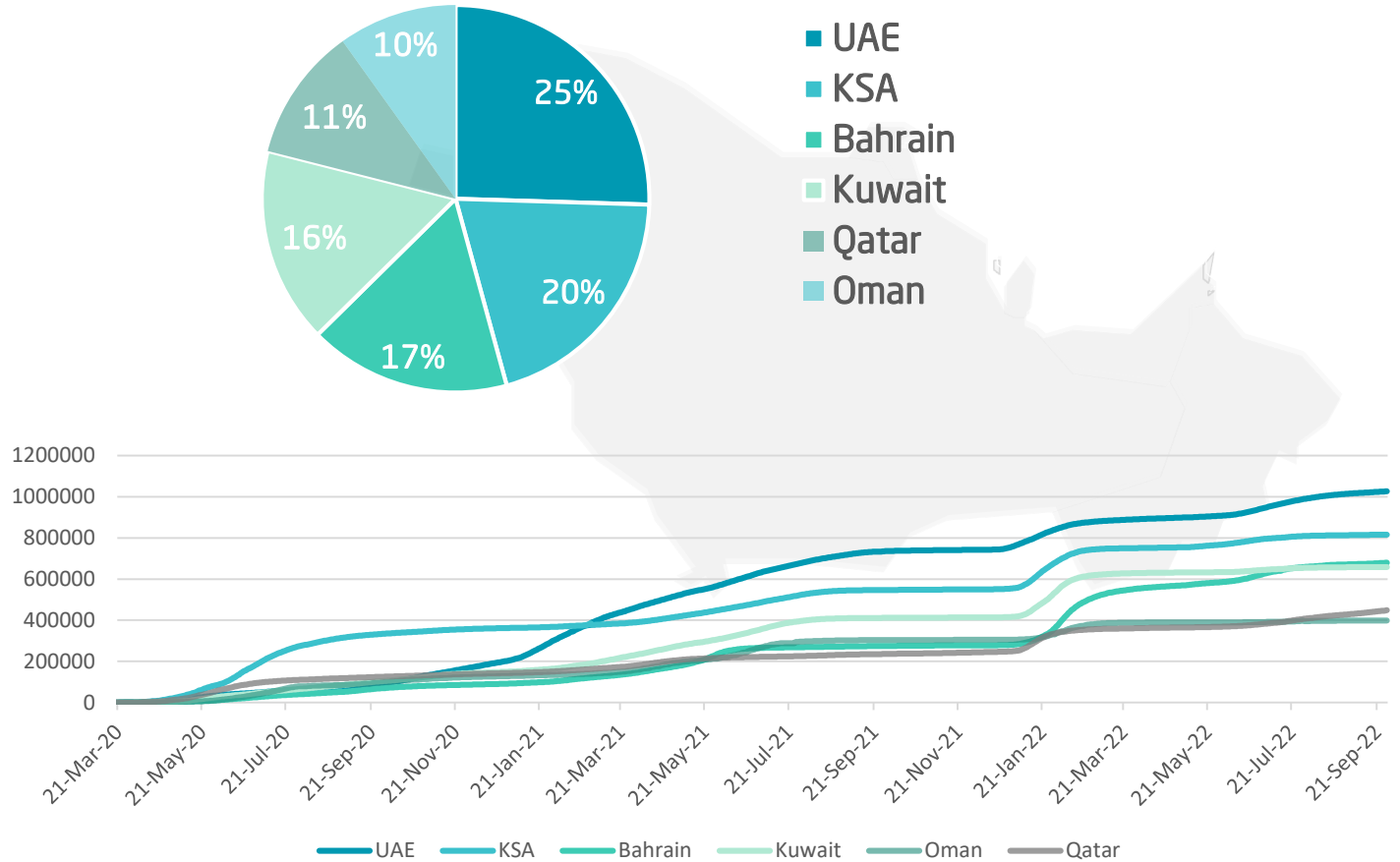
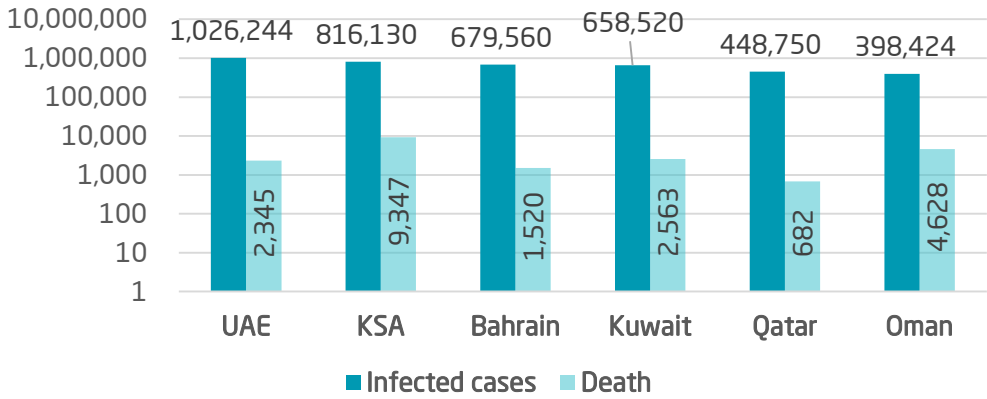
Figure 9: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

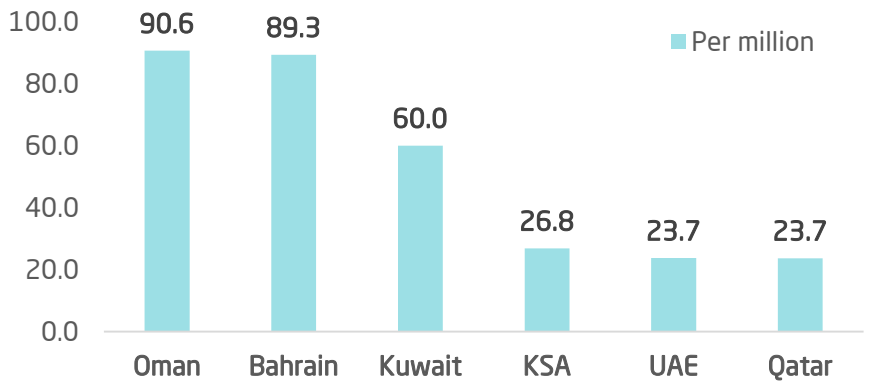
TOTAL NUMBER OF INFECTED CASES



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

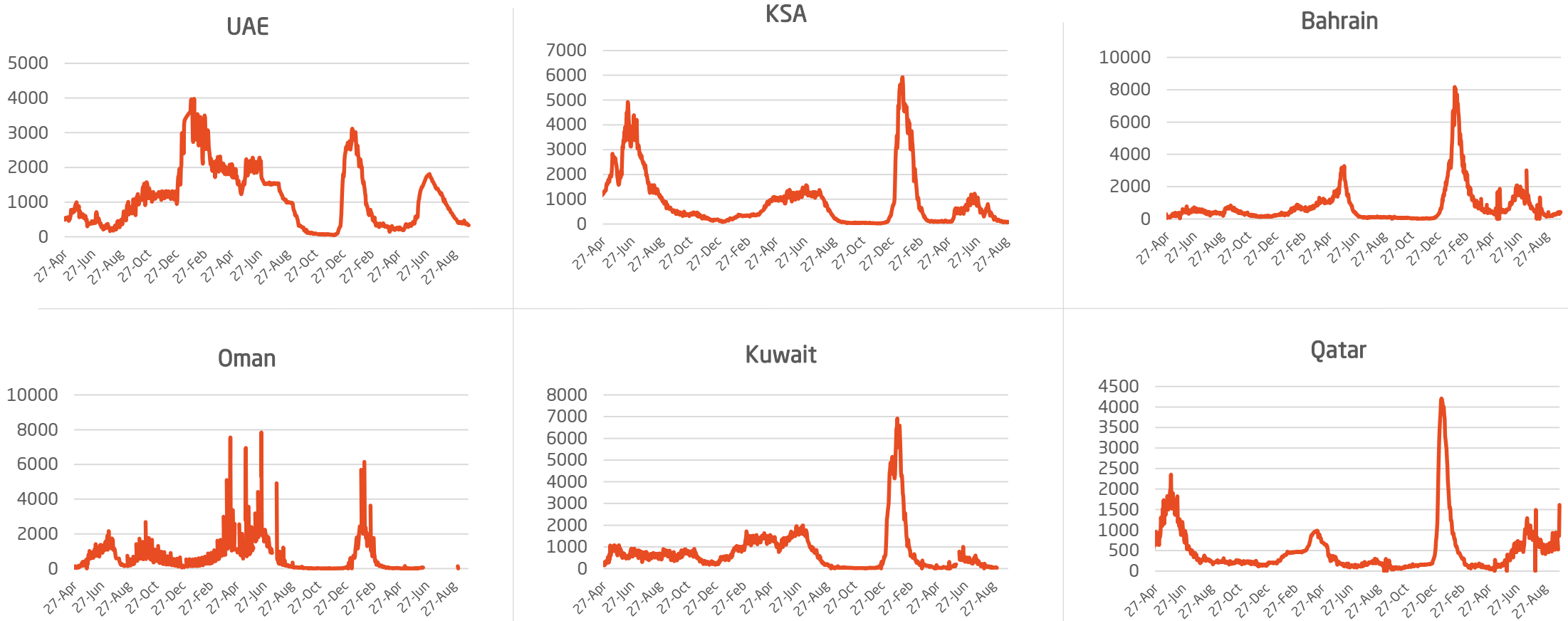


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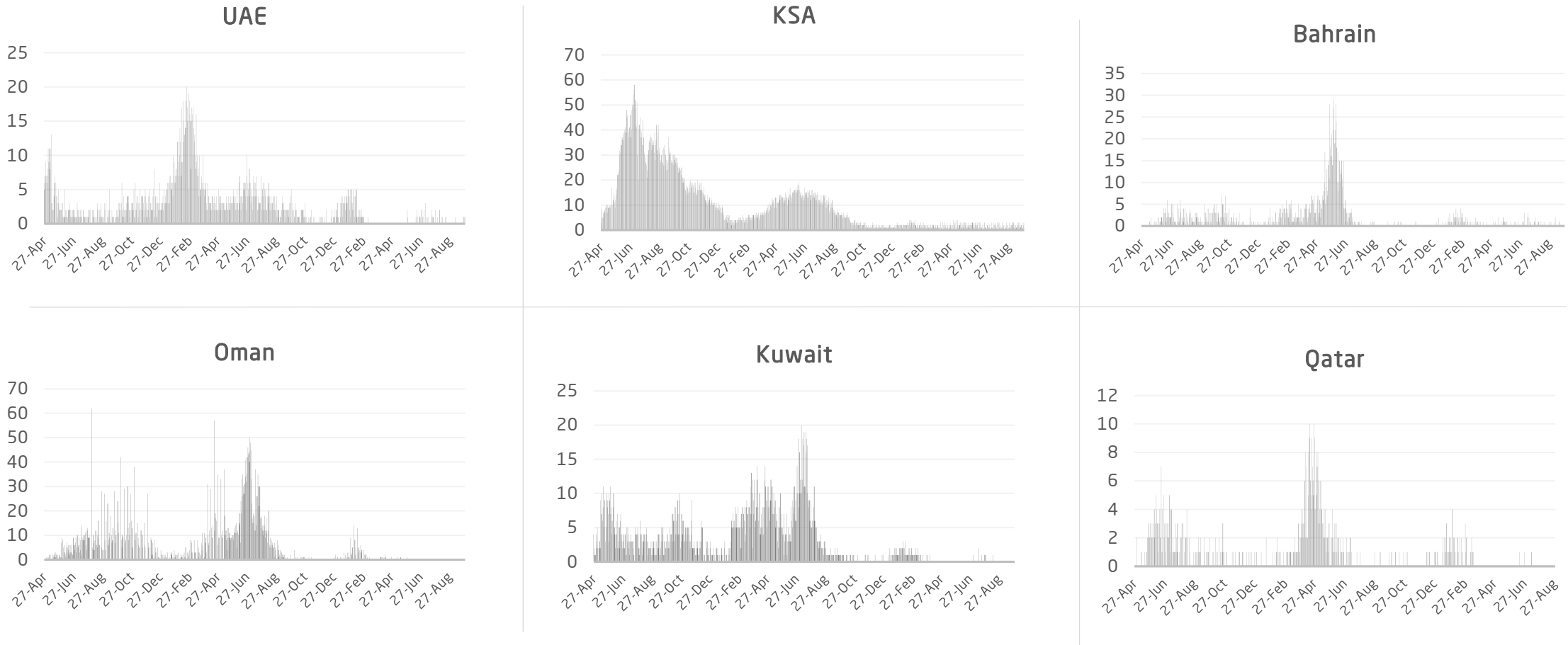
Figure 11: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries



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

LATEST UPDATES ON LONG COVID

Article 1

Long COVID symptoms in SARS-CoV-2-positive children aged 0–14 years and matched controls in Denmark (LongCOVIDKidsDK): a national, cross-sectional study

Published June 22, 2022 in Lancet

- **Background:** The most common COVID symptoms reported in children are headache (3–80%), fatigue (3–87%), sleep disturbance (2–63%), concentration difficulties (2–81%), and abdominal pain (1–76%). Currently, there is no approved vaccines for children aged 0–4 years while, few countries recommending vaccination for children aged 5–11 years

- **Methods:** In a study of Danish children with a history of SARS-CoV-2 infection, the investigators wish to explore the prevalence of long-lasting symptoms, the duration and intensity of symptoms, quality of life, number of sick days and absences from day-care or school, and psychological and social outcomes in children aged 0–14 years who had been infected with SARS-CoV-2 relative to controls with no history of SARS-CoV-2 infection matched (1:4) by age and sex.

- In this cross-sectional study children with a confirmed SARS-CoV-2-positive PCR test (cases) and matched controls from Danish national registers, then a survey was sent to mothers (proxy reporting) of children aged 0–14 years who had had a positive SARS-CoV-2 test between Jan, 2020, and July, 2021, and a control group.

- The survey contained the 23-common long COVID symptoms for the period since the SARS-CoV-2 infection was diagnosed, including questions about symptom intensity (never, almost never, sometimes, often, or almost always) and duration (e.g., 1 week, 1 month, 2 months), up to a duration of 12 months or longer.

LATEST UPDATES ON LONG COVID

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Continued

- **Results:** Responses to the survey were received from 10 997 (28·8%) of 38 152 cases and 33 016 (22·4%) of 147 212 controls 5267 (48·2%) cases.
- Cases had higher odds of reporting at least one symptom lasting more than 2 months than did controls.
- 0–3 years group (40·0% vs 27·2%; OR 1·78 [95% CI 1·55–2·04], p<0·0001).
- 4–11 years group (38·1% vs 33·7%; OR 1·23 [1·15–1·31], p<0·0001).
- 12–14 years group (46·0% vs 41·3%; OR 1·21 [1·11–1·32], p<0·0001).
- Differences in Children's Somatic Symptoms Inventory-24 (CSSI-24) symptom scores between cases and controls were statistically significant but not clinically relevant.
- Small clinically relevant differences in Pediatric Quality of Life Inventory (PedsQL) quality-of-life scores related to emotional functioning were in favour of cases in children 4–11 years (median score 80·0 [IQR 65·0–95·0]) in cases vs 75·0 [60·0–85·0] in controls; p<0·0001) and 12–14 years (90·0 [70·0–100·0] vs (85·0 [65·0–95·0], p<0·0001). PedsQL social functioning scores were also higher in cases (100·0 [90·0–100·0] than controls (95·0 [80·0–100·0]) in the 12–14 years age group (p<0·0001; Hedges g>0·2).
- **Conclusion:** Children aged 0–14 years who had a SARS-CoV-2 infection had more prevalent long-lasting symptoms. There was a tendency towards better quality-of-life scores related to emotional and social functioning in cases than in controls in older children. Long COVID must be recognized and multi-disciplinary long COVID clinics for children might be beneficial.

LATEST UPDATES ON LONG COVID

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Article 2

Risk of long COVID associated with delta versus omicron variants of SARS-CoV-2

Published June 18, 2022 at Lancet

- The omicron variant of SARS-CoV-2 (PANGO B.1.1.529) spread rapidly across the world, out-competing former variants soon after it was first detected in November 2021. This case-control observational study identifies the relative odds of long-COVID in the UK during the omicron period compared with the delta period.
- Self-reported data is used from the COVID Symptom Study app1 (King's College London Research Ethics Management Application System number 18210, reference LRS-19/20-18210). Data were extracted and pre-processed using ExeTera13 (version 0.5.5). The inclusion criteria in both periods are a positive real-time PCR or lateral flow antigen test for SARS-CoV-2 after vaccination, at least one log per week in the app for at least 28 days after testing positive and no previous SARS-CoV-2 infections before vaccination.
- 56,003 UK adults are identified first testing positive between Dec 20, 2021, and March 9, 2022, who satisfied the inclusion criteria. Moreover, using identical selection criteria, 41,361 UK adult cases are identified first testing positive between June 1, 2021, and Nov 27, 2021, referred to as delta cases as more than 70% of cases are attributable to the delta variant.
- Both symptomatic and asymptomatic infections are considered, and, for the omicron period, participants testing positive before Feb 10, 2022, are included, to ensure all participants had at least 28 days for symptom reporting after testing positive.
- In both periods, female participation was higher than male participation (55% for omicron and 59% for delta cases). Delta and omicron cases had similar ages (mean age of 53 years) and prevalence of comorbidities (around 19%). Considering the local area Index of Multiple Deprivation (IMD), a score ranging from 1 (most deprived) to 10 (least deprived) estimating relative locality deprivation, omicron cases were distributed in areas of slightly lower deprivation than delta cases (16.7% vs 17.5% for IMD 1-3). To assess the association between long COVID and the infection period, we applied a univariate logistic regression model adjusted by sex, IMD, age, the presence of comorbidities, vaccination status (one, two, or three doses), and body-mass index, all of which are related to the risk of long COVID.
- We stratified the analysis according to the time elapsed between infection and most recent vaccination considering three groups, 3 months, 3-6 months, and more than 6 months, to allow for the potential waning of immunity from vaccination.

LATEST UPDATES ON LONG COVID

Continued

- Among omicron cases, 2,501 (4.5%) of 56,003 people experienced long COVID, and, among delta cases, 4,469 (10.8%) of 41,361 people experienced long COVID.

- This is the first peer-reviewed study to report on the long COVID risk associated with infection by the omicron variant, highlighting that health surveillance using smartphone apps can produce rapid insights, which are consistently proven to be accurate and subsequently replicated. A major strength of the study in relation to long COVID is the prospective symptom logging of a wide range of symptoms. Limitations of the self-reported data include no direct testing of infectious variants (here assumed from national data) and no objective measures of illness duration. The samples, although not fully generalizable to the UK population on account of sex and socioeconomic bias, are similar in both periods, allowing comparison.

- There was insufficient data to estimate the odds of long COVID in unvaccinated individuals and did not estimate effects in children. Finally, to enable swift reporting, the period of assessment of omicron cases was slightly shorter than for the delta variant, and assessment of longer durations of long COVID (eg, >12 weeks) was not possible.

- Overall, a reduction in odds of long COVID was found with the omicron variant versus the delta variant depending on age and time since vaccination.

- However, the absolute number of people experiencing long COVID at a given time depends on the shape and amplitude of the pandemic curve. For example, given the high numbers of people infected with omicron in the UK from December 2021 to February 2022, the data are consistent with the UK Office for National Statistics, who estimated that the number of people experiencing long COVID increased from 1.3 million in January 2022, to 1.7 million in March 2022.

- Considering the UK omicron peak of more than 350,000 new symptomatic COVID-19 cases per day estimated on March 26, 2022, by the ZOE app model and 4% of cases being long COVID, future numbers with long COVID will inevitably rise.

LATEST UPDATES ON LONG COVID

Article 3

Long COVID after breakthrough SARS-CoV-2 infection

Published May 25, 2022 at Nature

- **Definitions and various groups** Breakthrough SARS-CoV-2 infection (BTI): vaccinated patients who got diagnosed with SARS-CoV-2 infection
- Post sequelae of SARS-CoV-2 (PASC) is known as long COVID-19
- Immunocompromised patients, per CDC definition, are those with a history of organ transplantation, advanced kidney disease, cancer, HIV or conditions with corticosteroids or immunosuppressants use for more than 30 days, including systemic lupus erythematosus and rheumatoid arthritis.
- Contemporary control group are participants who were exposed to the pandemic's overall effects but did not become infected with SARS-CoV-2.
- This paper is an observational study. The available data was obtained from the US Department of Veterans Affairs between 1 January 2020 and 1 December 2021. The vaccines utilized in the study are Janssen (Johnson&Johnson)(Ad26.COV2.S), Pfizer-BioNTech (BNT162b2), and Moderna (mRNA-1273).
- **Post-acute sequelae in BTI versus controls without SARS-CoV-2 infection (Fig.1).** Baseline characteristics are well balanced. The rate of BTI in fully vaccinated participants was 10.60 per 1,000 people at 6 months. PASC was more likely to occur in BTI patients (HR=1.5). The risk of PASC in the pulmonary (HR=2.48), and extrapulmonary disorder was higher in 30-day BTI survivors compared to the control group. In the 30-90 days, a higher risk of death and incident sequelae was observed. In the 90-180 days, a higher risk of death, incident sequelae, and recurrent or persistent sequelae but to a lesser extent. Immunocompromised patients prior to BTI had higher risk of death, at least one PASC, and organ system involvement than those who were not. The vaccinations did not significantly differ in risk of post-acute death. Moderna and Pfizer-BioNTech were linked to a lower risk of developing at least one PASC.

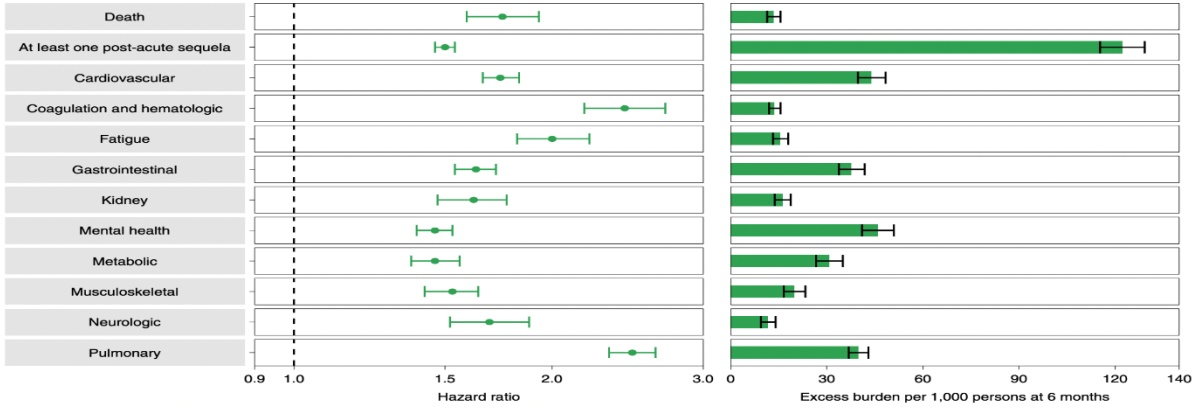

Fig. 1 | Risk and 6-month excess burden of post-acute sequelae in people with BTI compared to the contemporary control group. Risk and 6-month excess burden of death, at least one post-acute sequela and post-acute sequelae by organ system are plotted. Incident outcomes were assessed from 30 days after the positive SARS-CoV-2 test to the end of follow-up. Results are in comparison of BTI ($n = 33{,}940$) to the contemporary control group that consisted of those with no record of a positive SARS-CoV-2 test ($n = 4{,}983{,}491$). Adjusted HRs (dots) and 95% CIs (error bars) are presented, as are estimated excess burden (bars) and 95% CIs (error bars). Burdens are presented per 1,000 persons at 6 months of follow-up.

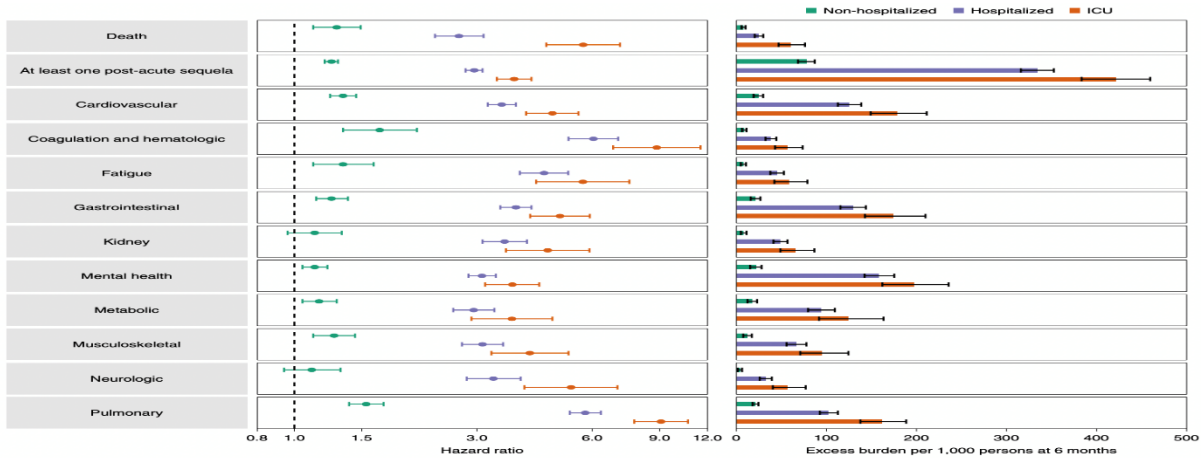

Fig. 2 | Risk and 6-month excess burden of post-acute sequelae in those with BTI by acute phase care setting. Risk and 6-month excess burden of death, at least one post-acute sequela and post-acute sequelae by organ system are plotted by care setting of the acute phase of the disease (not hospitalized, hospitalized and admitted to ICU). Incident outcomes were assessed from 30 days after the positive SARS-CoV-2 test to the end of follow-up. Results are in comparison of BTI (non-hospitalized $n = 30{,}273$; hospitalized $n = 3{,}667$; admitted to ICU $n = 811$) to the contemporary control group with no record of a positive SARS-CoV-2 test ($n = 4{,}983{,}491$). Adjusted HRs (dots) and 95% CIs (error bars) are presented, as are estimated excess burden (bars) and 95% CIs (error bars). Burdens are presented per 1,000 persons at 6 months of follow-up.

LATEST UPDATES ON LONG COVID

Continued

- **Post-acute sequelae in BTI by care setting of the acute phase of2 the disease.** Baseline characteristics are well balanced. Compared to negative SARS-CoV-2 infection, risk of death and developing at least one PASC increases with the increase in level of hospitalization in BTI group.
- **Post-acute sequelae in BTI versus SARS-CoV-2 infection without prior vaccination (Fig.3 & Fig.4).** Baseline characteristics are well balanced. Compared unvaccinated SARS-CoV-2 infection, BTI had lower risk of death (HR=0.66) and lower risk of PASC (HR=0.85). In comparison to unvaccinated SARS-CoV-2 infection, BTI was linked to lower risks of death, at least one PASC, hematologic and coagulation disorders, and pulmonary diseases across all care settings.
- **Post-acute sequelae in people hospitalized with BTI versus seasonal influenza.** Baseline characteristics are well balanced. Hospitalized BTI patients had a greater risk of death (HR=2.43), at least one PASC (HR=1.27), and PASC in all other organ systems compared to hospitalized seasonal influenza patients during the acute phase and alive for the first 30 days.
- **Positive and negative outcome controls.** Baseline characteristics are well balanced. Positive outcome control is fatigue, while negative outcome controls are atopic dermatitis, accidental poisoning, accidental injury, fitting of a hearing aid or contact lenses, ingrown toenail, scar. Unvaccinated SARS-CoV-2 infection showed a higher risk of fatigue compared to the contemporary control group (HR = 2.79). There was no significant correlation between risk of any of the negative outcome controls and BTI.

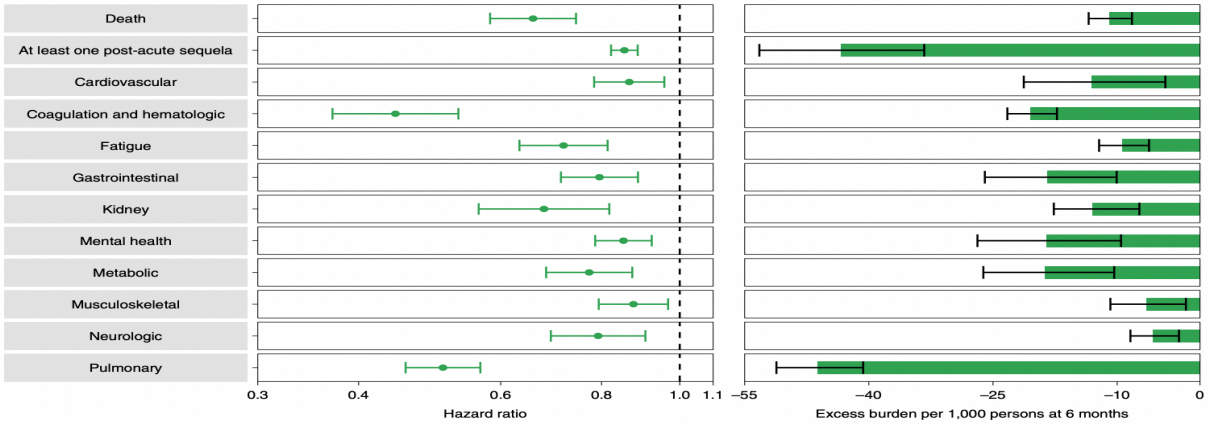

Fig. 3 | Risk and 6-month excess burden of post-acute sequelae in people with BTI compared to those with SARS-CoV-2 infection without prior vaccination. Risk and 6-month excess burden of death, at least one post-acute sequela and post-acute sequelae by organ system are plotted. Incident outcomes were assessed from 30 days after the positive SARS-CoV-2 infection test to the end of follow-up. Results are in comparison of BTI ($n = 33{,}940$) to those with SARS-CoV-2 infection without prior vaccination ($n = 113{,}474$). Adjusted HRs (dots) and 95% CIs (error bars) are presented, as are estimated excess burden (bars) and 95% CIs (error bars). Burdens are presented per 1,000 persons at 6 months of follow-up.

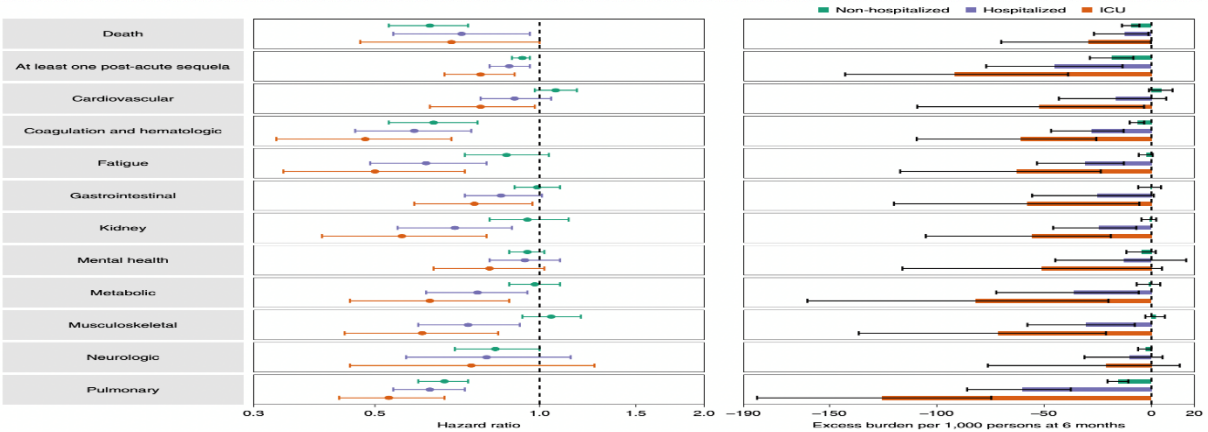

Fig. 4 | Risk and 6-month excess burden of post-acute sequelae in those with BTI compared to those with SARS-CoV-2 infection without prior vaccination by acute phase care setting. Risk and 6-month excess burden of death, at least one post-acute sequela and post-acute sequelae by organ system are plotted by care setting of the acute phase of the disease (not hospitalized, hospitalized and admitted to ICU). Incident outcomes were assessed from 30 days after the positive SARS-CoV-2 test to the end of follow-up. Results for a given care setting are in comparison of BTI (non-hospitalized $n = 30{,}273$; hospitalized $n = 3{,}667$; and admitted to ICU $n = 811$) to the SARS-CoV-2 infection without prior vaccination group (non-hospitalized $n = 100{,}700$; hospitalized $n = 12{,}774$; and admitted to ICU $n = 2{,}982$) with the same care setting during the acute phase of the disease. Adjusted HRs (dots) and 95% CIs (error bars) are presented, as are estimated excess burden (bars) and 95% CIs (error bars). Burdens are presented per 1,000 persons at 6 months of follow-up.

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