مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

29 MARCH 2021

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 412)

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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 daily 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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Articles

Summary

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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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).

Public health response

Guideline for COVID19 Testing and quarantine of air travelers

Public health response

Mass-Vaccination Sites — An Essential Innovation to Curb the Covid-19 Pandemic

Public health response

Alternatives to conventional hospitalisation that enhance health systems' capacity to treat COVID-19

Public health response

School reopening without robust COVID-19 mitigation risks accelerating the pandemic

Public health response

Effectiveness of Mask Wearing to Control Community Spread of SARS-CoV-2

Vaccine

Acute Allergic Reactions to mRNA COVID-19 Vaccines

Mental health

Differential follow-up patterns in COVID-19 and comparison cohorts

Mental health

Adjuvantation helps to optimise COVID-19 vaccine candidate

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 28 MAR 2021

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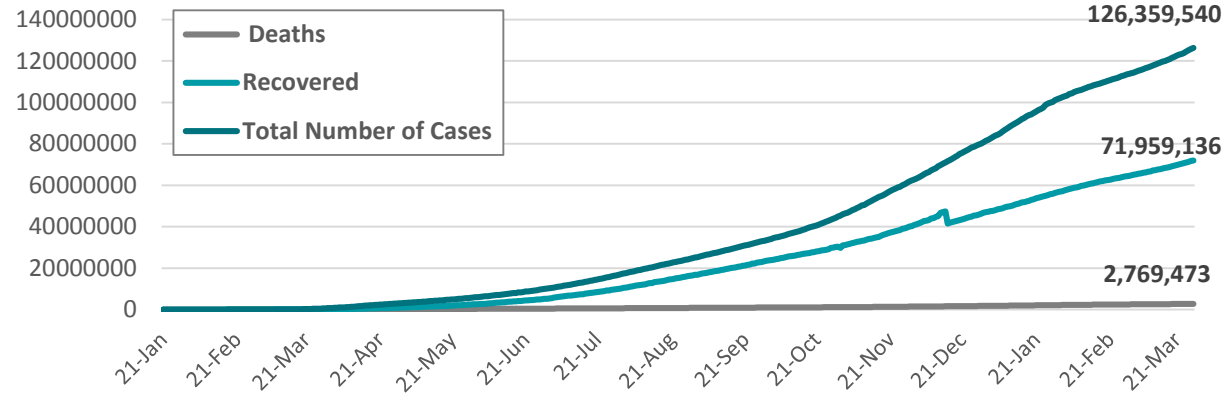
Figure 1: Total Number of Infected, Recovered, and Death Cases



Note: the number of recovered cases in 31th October recorrected from 30 million to 29 million, and in 15th December recorrected from 47 million to 41 million in Johns Hopkins website

Figure 2: Daily New Infected COVID-19 Cases (China and rest of the world)

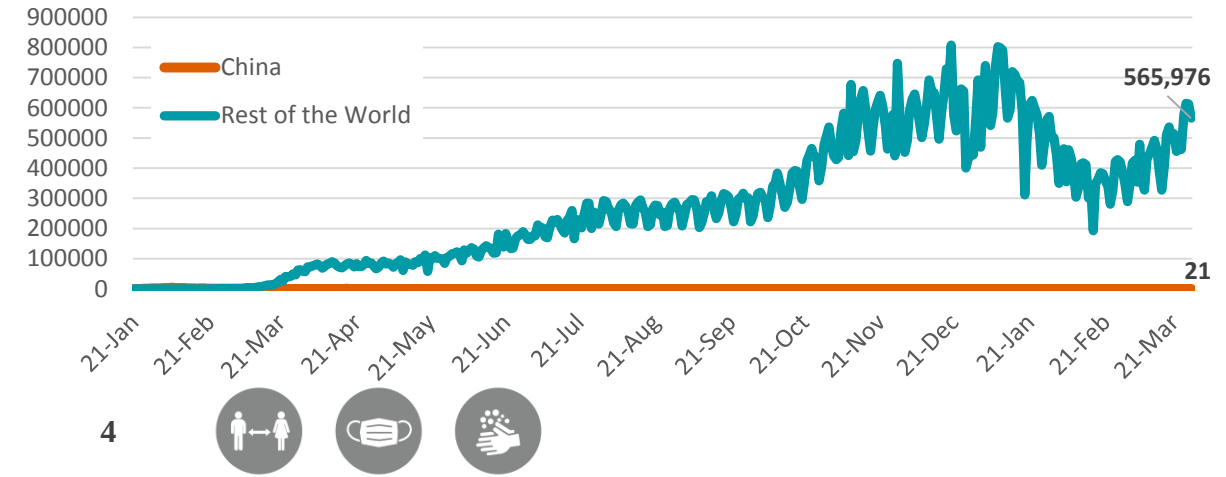


Figure 3: Total Number of Death Due to COVID-19 (china and result of the world)

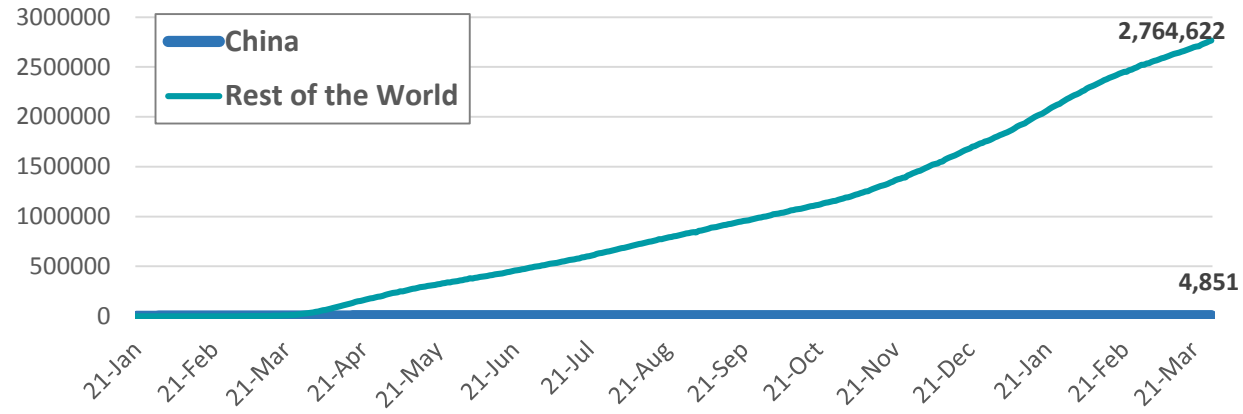
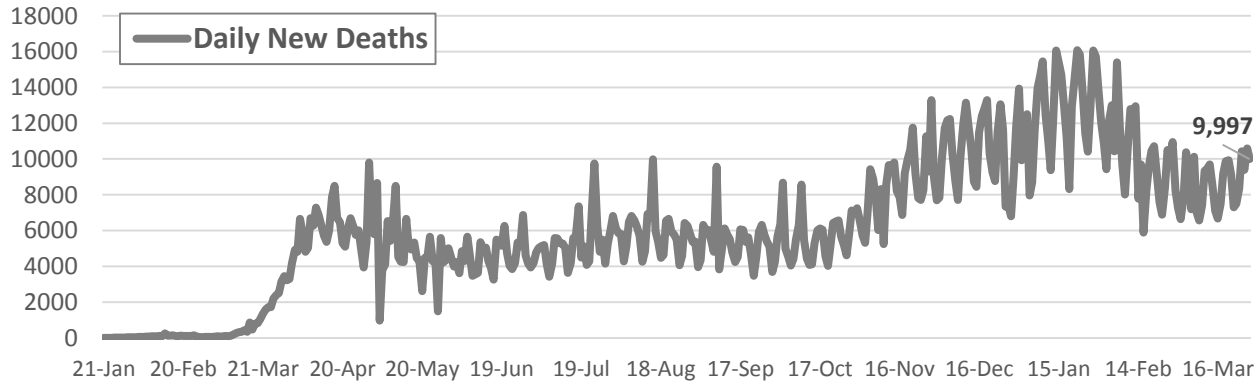


Figure 4: Global Daily New Deaths Due to COVID-19



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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 28 MAR 2021

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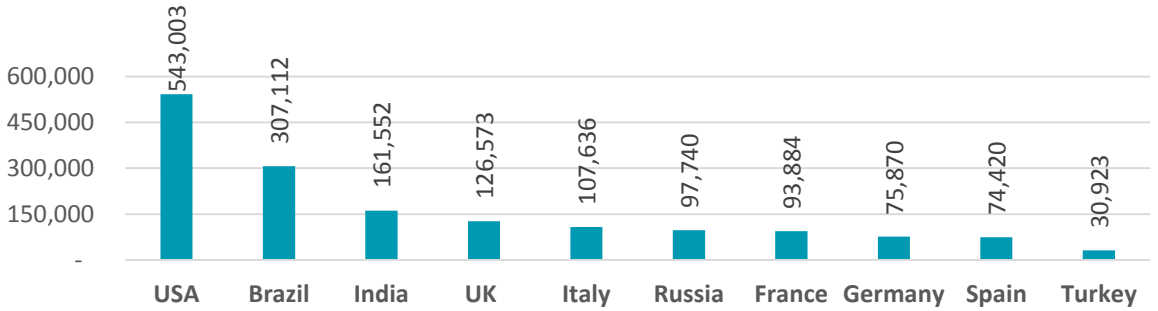
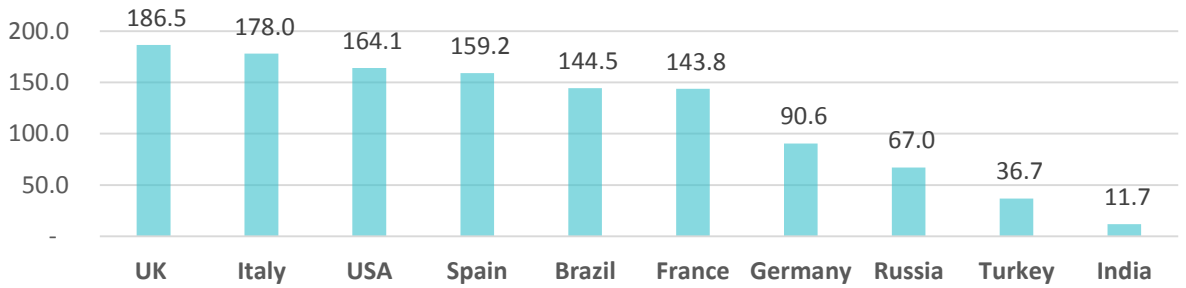
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

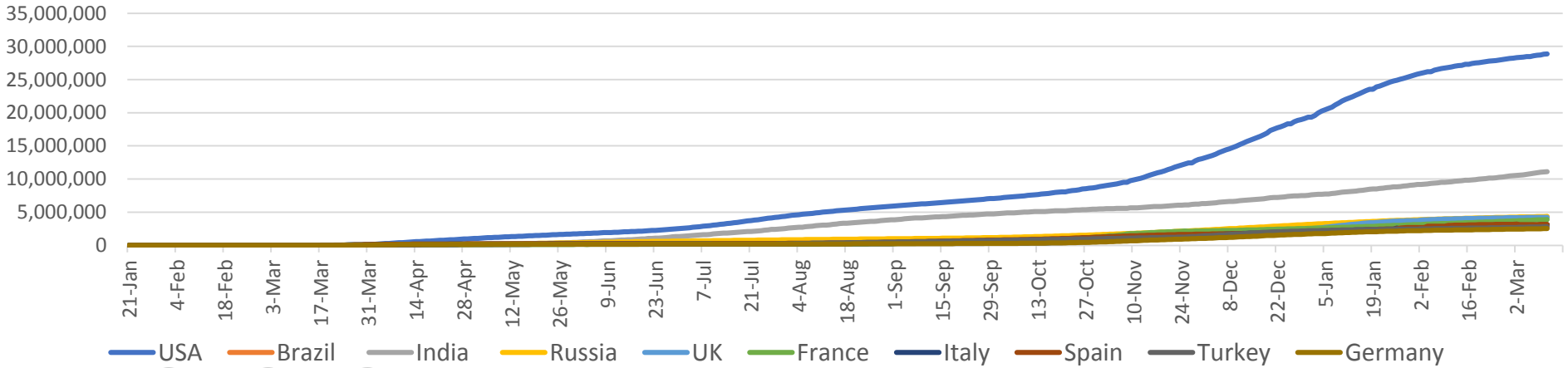
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	29,859,706
Brazil	12,404,414
India	11,971,624
Russia	4,519,832
France	4,435,057
UK	4,329,184
Italy	3,512,453
Spain	3,247,738
Turkey	3,179,115
Germany	2,772,401

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

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Figure 8: COVID-19 Status in the UAE (Federal Competitiveness and Statistics Authority Dashboard)

Daily Tests
224,619.6 Average Tests
2,271.1 per 100k population
0.9% Positive Rate

Daily Cases
2,120.3 Average Cases
21.4 per 100k population

Daily Recovered
2,287.1 Average Recovered
23.1 per 100k population

Daily Deaths
6.1 Average Deaths
0.1 per 100k population
0.3% Case Fatality Rate

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

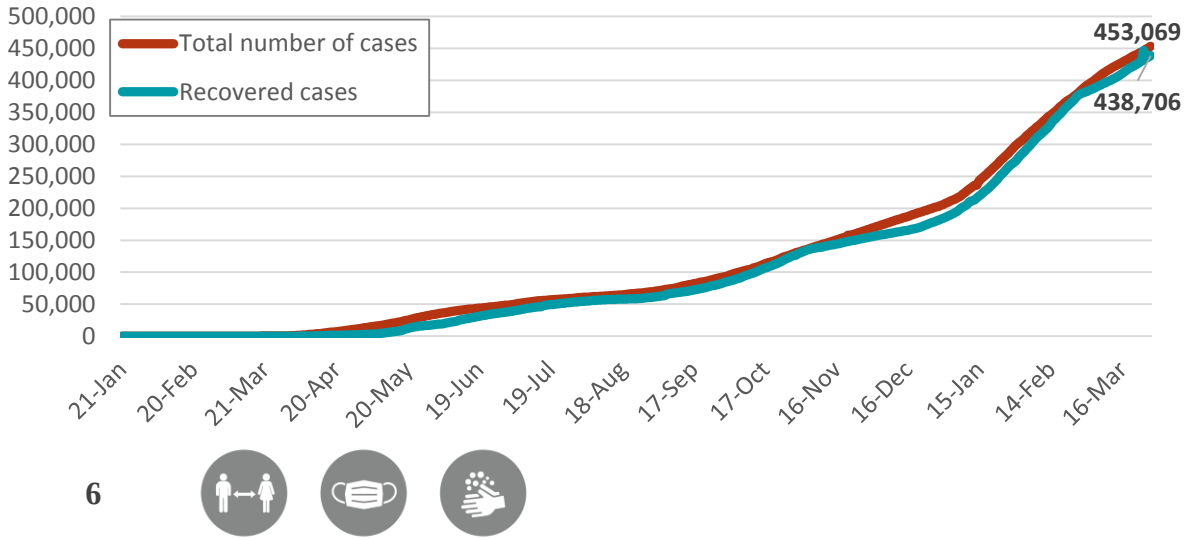
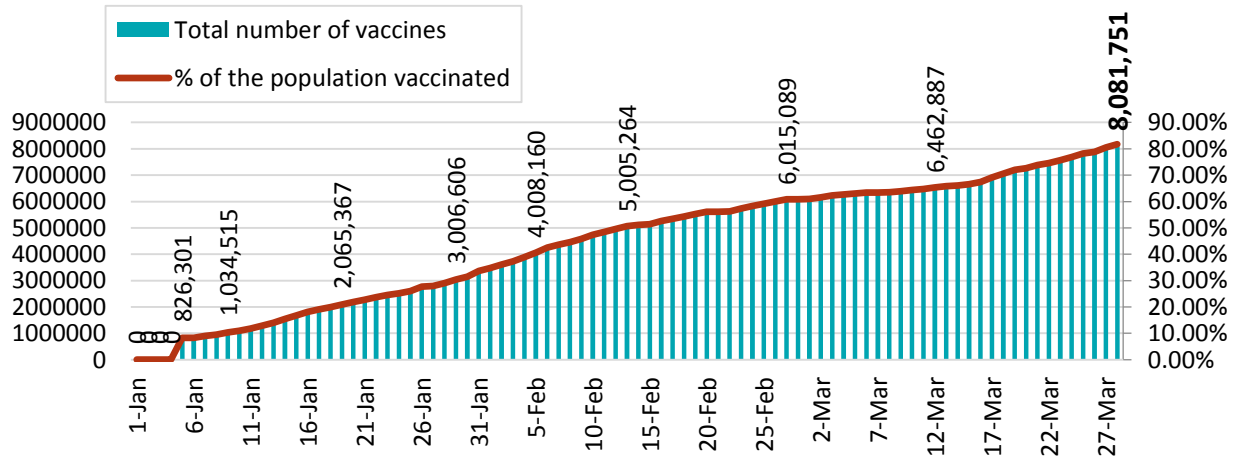


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



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

EPIDEMIOLOGY

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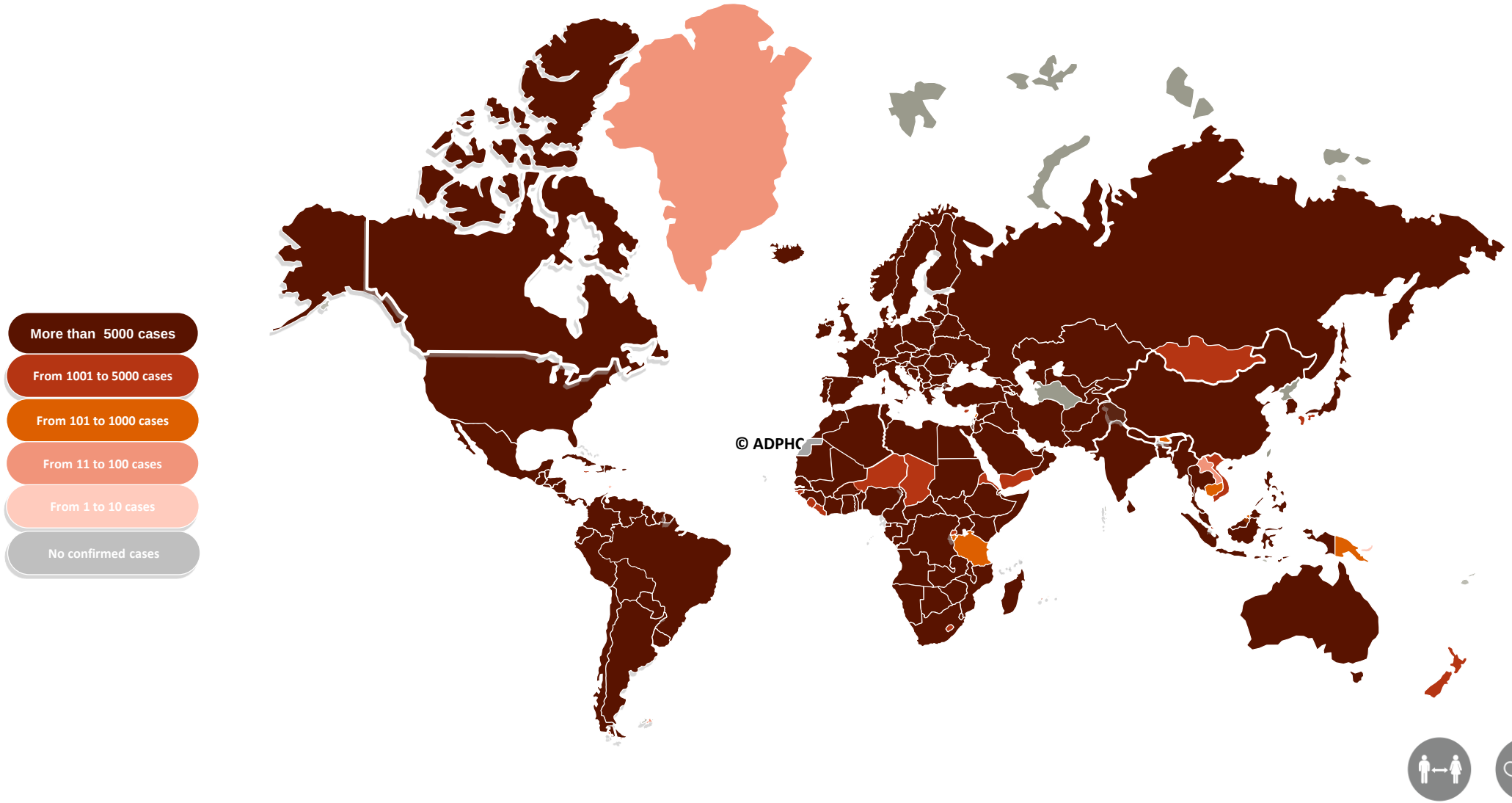
Figure 7A : Global Distribution of COVID-19 Cases



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

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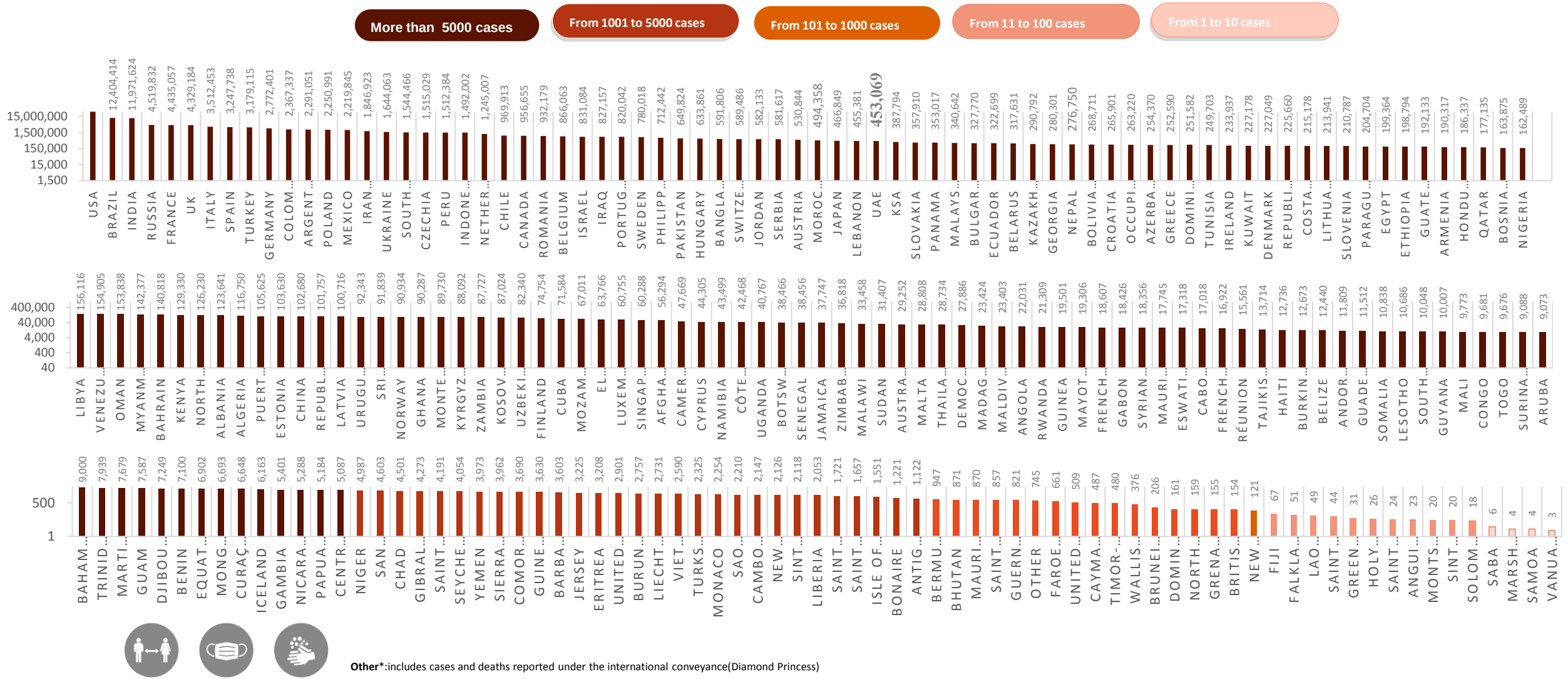
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



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 MAR 2021

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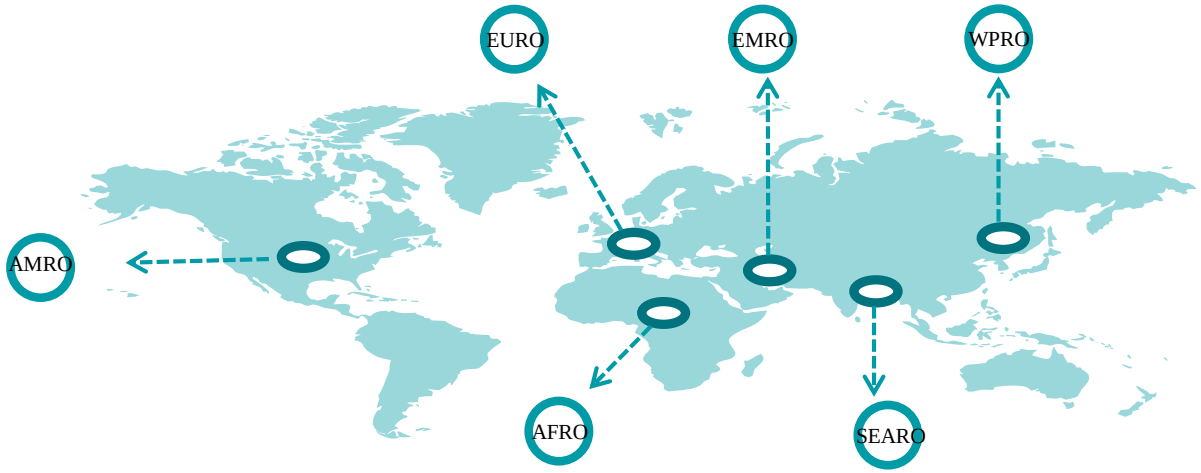
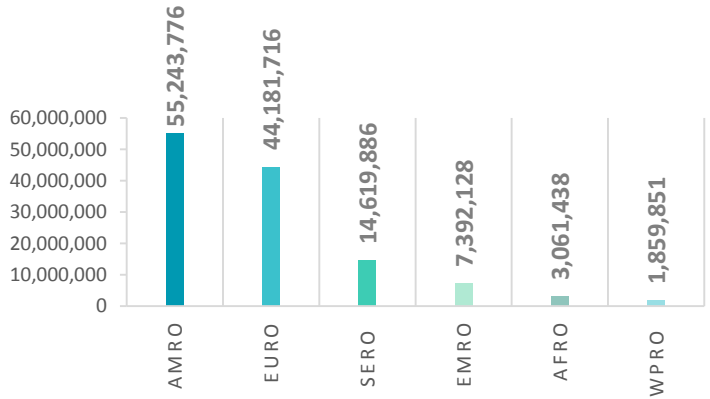
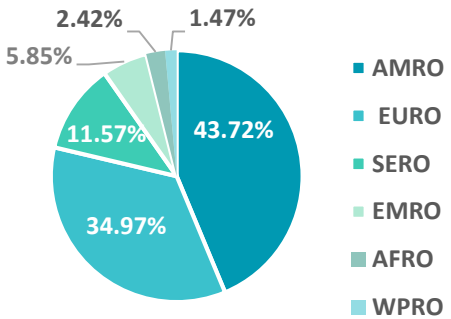
Figure 6: Global Distribution of COVID-19 Cases per Region

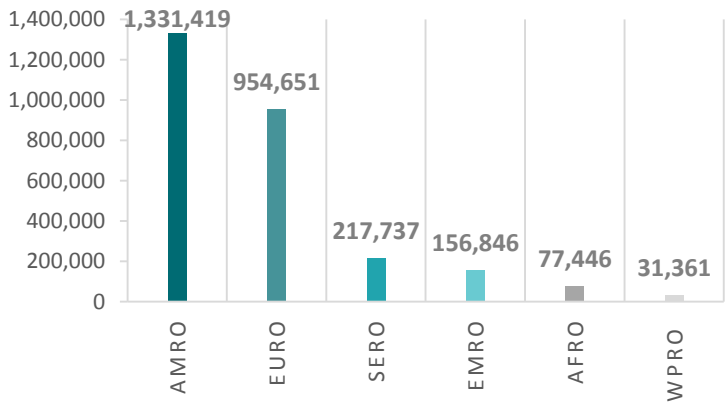


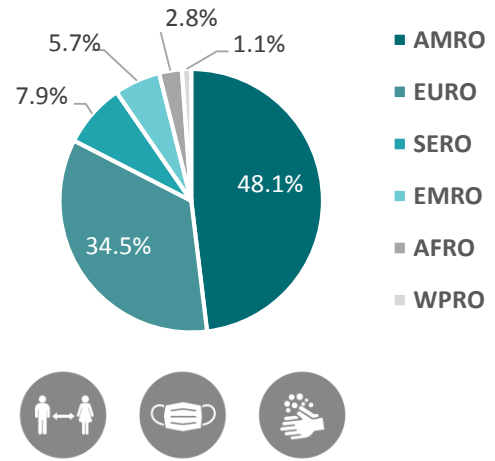
INFECTED





DEATHS





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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 28 MAR 2021

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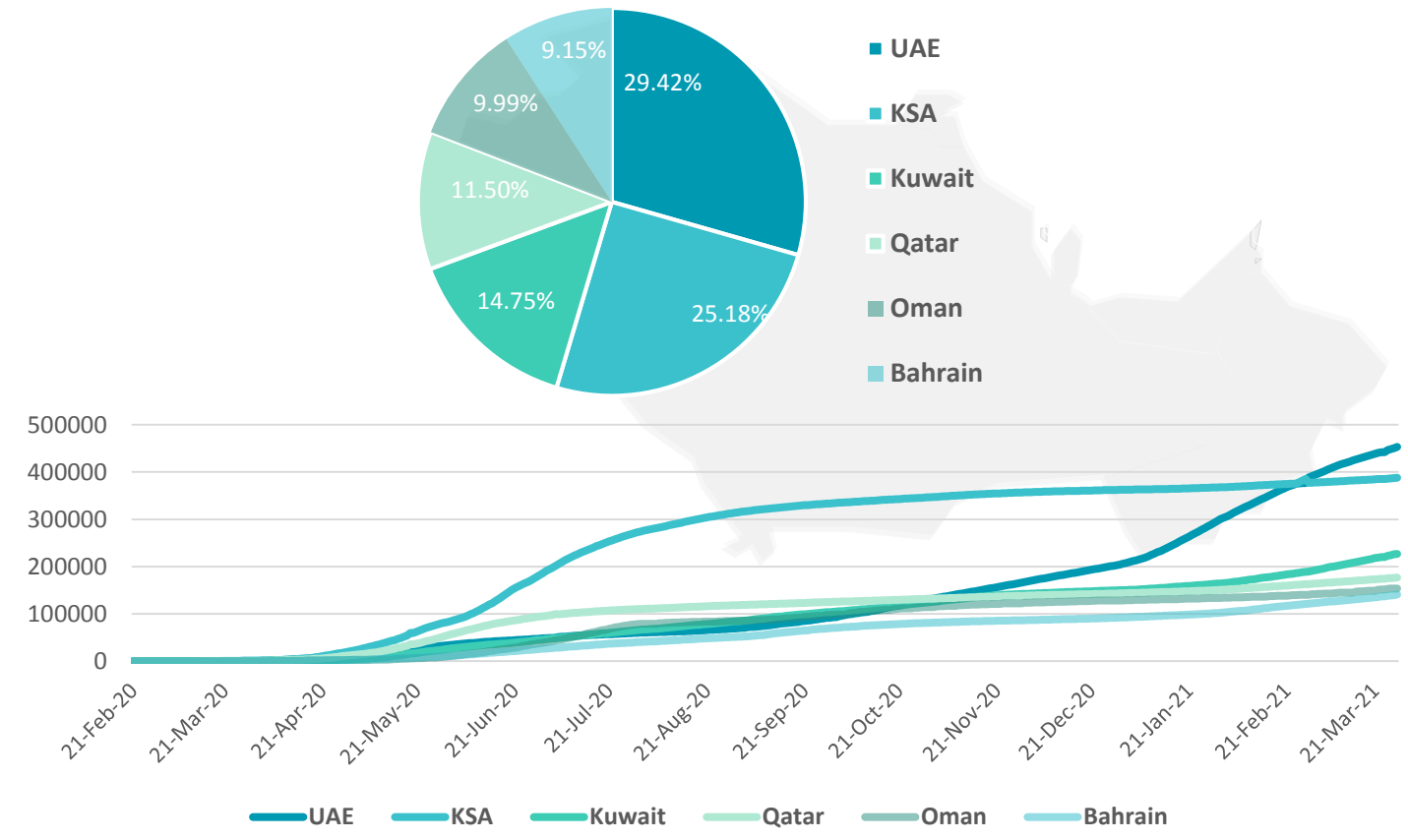
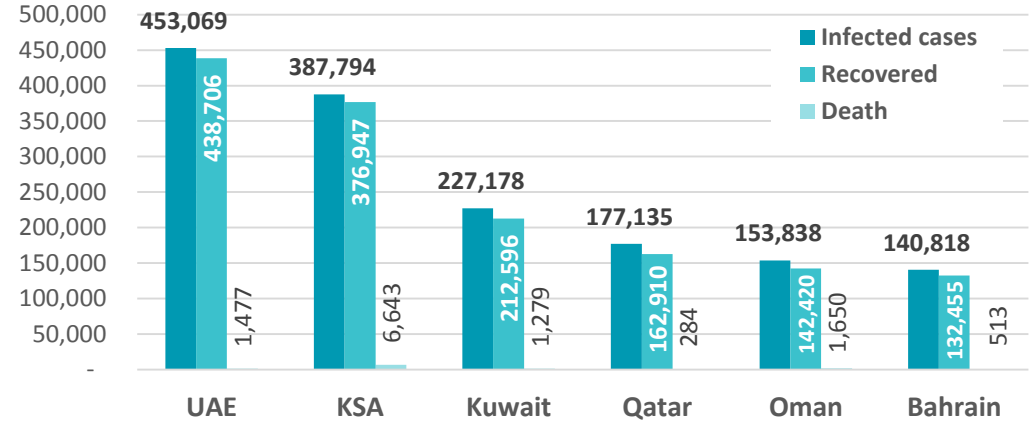
Figure 7: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

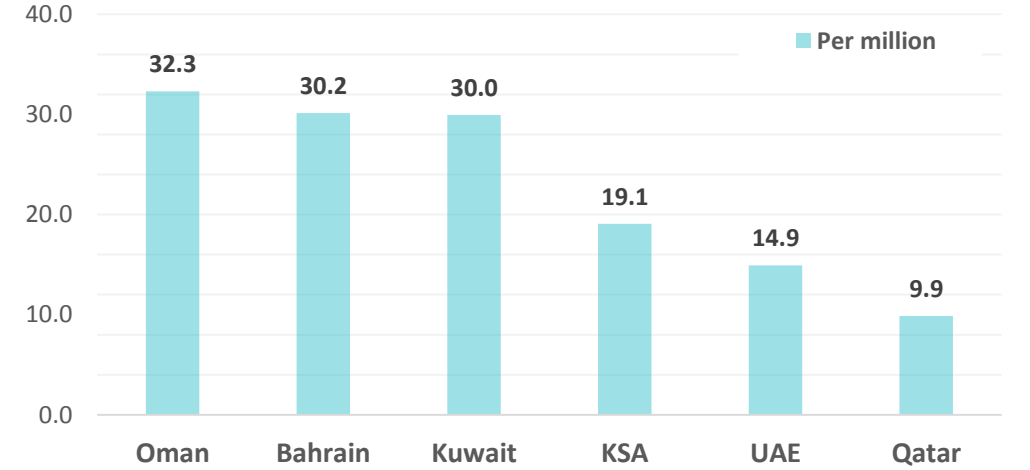
TOTAL NUMBER OF INFECTED CASES



TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS



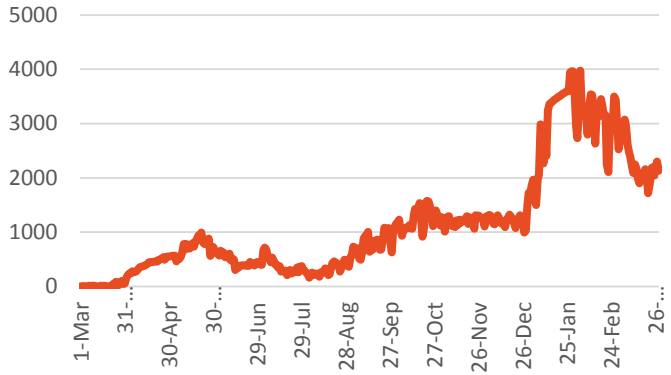
DEATHS PER MILLION



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

UAE

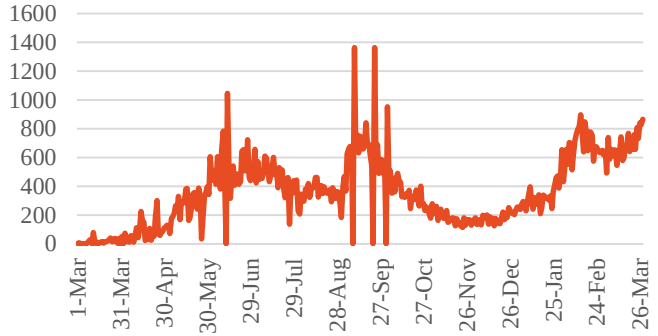


Source : National Emergency Crisis and Disaster Management Authority

KSA

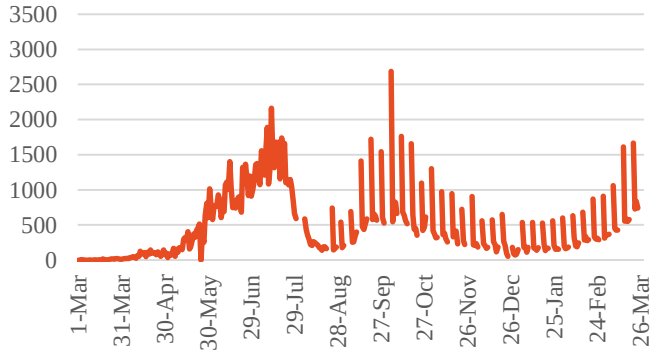
Source : KSA ministry of health

Bahrain



Source :WHO

Oman

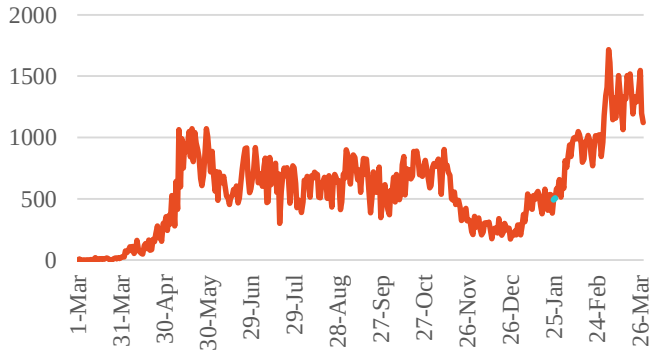


Source :Oman ministry of health

*No announced statistic data on weekends and official holidays.

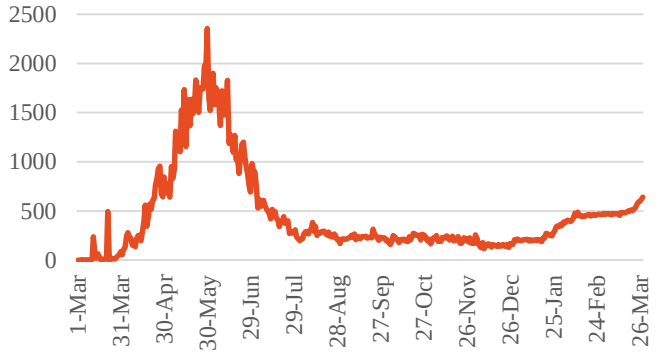
*No announced statistic data from 31 JUL to 4 AUG, 21,23,28,30 AUG 2,4- 5,11,12,18,19,25 ,26,30 SEP,1,2,9,10,16,17,23,24,30,21 OCT, 6,7,13,14,17,20,21, ,27,28 NOV,4,5,11,12,18,19,25,31 DEC 2020, 1,2,9,10,15,16,22,23,29,30,JAN, 5,5 FFB 2021

Kuwait



Source : Kuwait ministry of health

Qatar



Source : Qatar ministry of health

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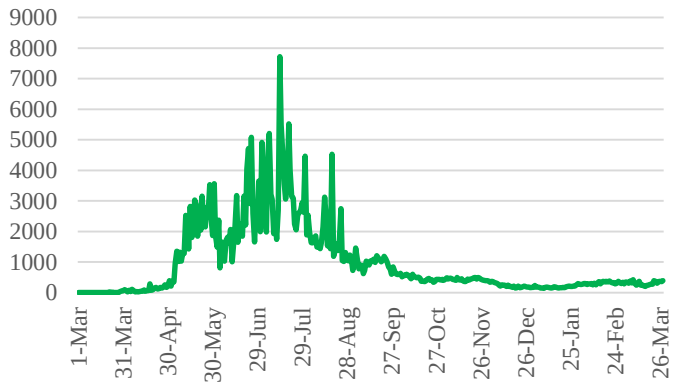
Figure 11: Comparative Analysis of the Distribution of COVID-19 Recovered Cases in GCC Countries

UAE

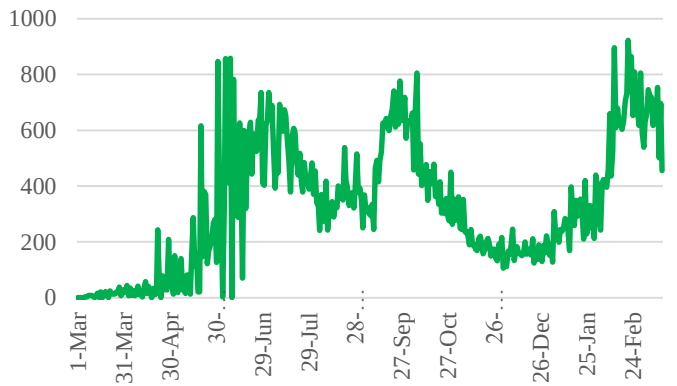
Source : National Emergency Crisis and Disaster Management Authority

KSA



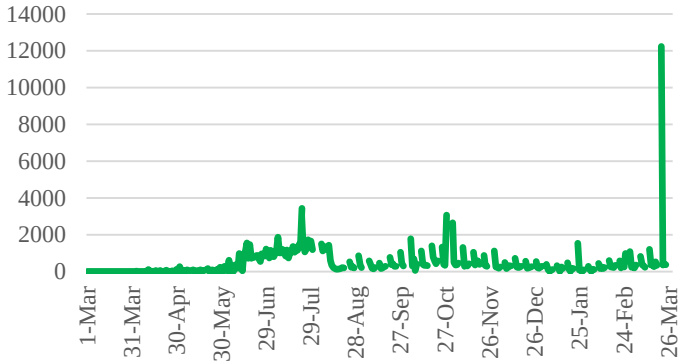
Source : KSA ministry of health

Bahrain



Source : Bahrain ministry of health

Oman



Source :Oman ministry of health

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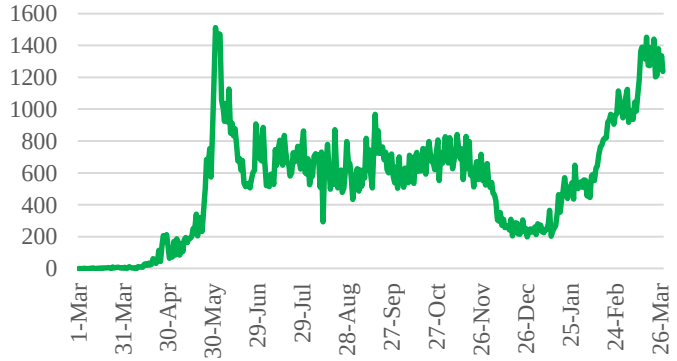
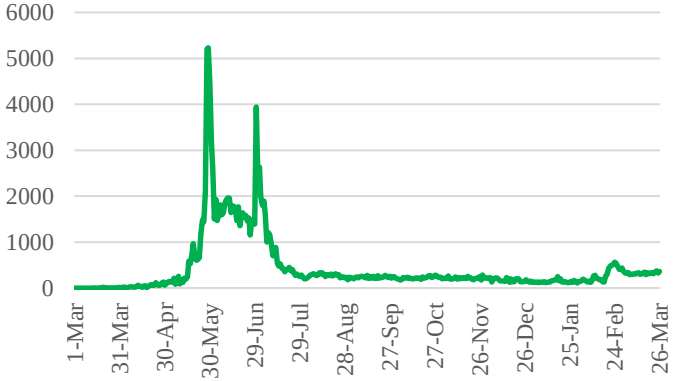
Kuwait



Source : Kuwait ministry of health

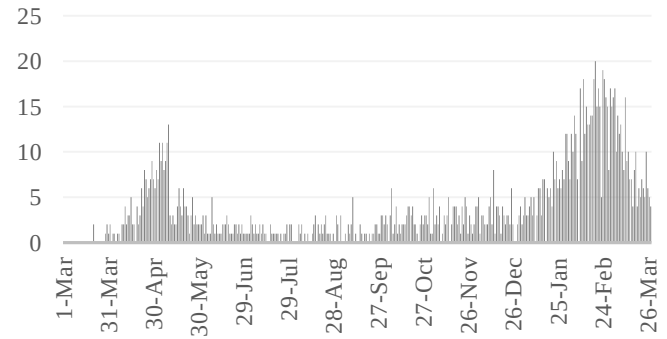
QATAR



Source : Qatar ministry of health

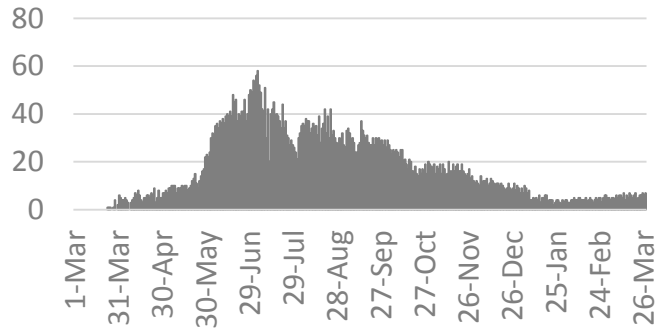
Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries

UAE



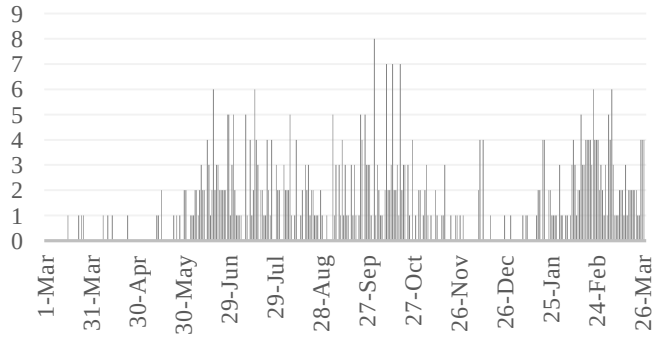
Source : National Emergency Crisis and Disaster Management Authority

KSA



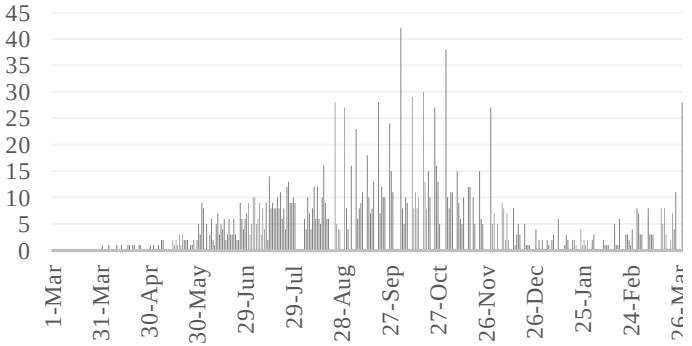
Source : KSA ministry of health

Bahrain



Source :WHO

Oman



Source :Oman ministry of health

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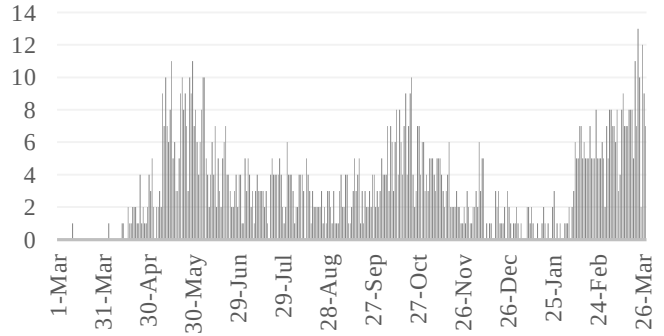
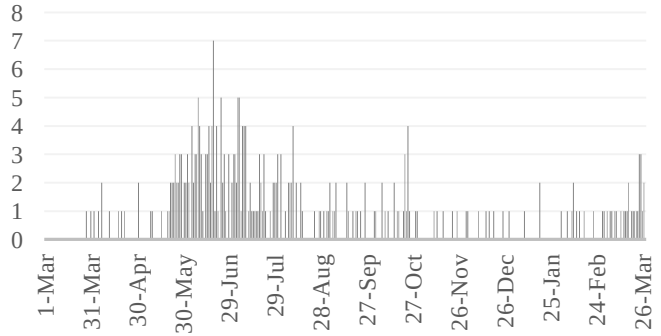
Kuwait



Source : Kuwait ministry of health

Qatar



Source : Qatar ministry of health

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Article 1 Guideline for COVID19 Testing and quarantine of air travelers

Published December 12, 2020 in Eurpean CDC

European CDC recommendation

- In the current epidemiological situation, where SARS-CoV-2 is established in all EU/EEA countries and the UK,
- imported cases account for a very small proportion of all detected cases and are unlikely to significantly increase the rate of transmission.
- In the current epidemiological situation quarantine or systematic testing for SARS-CoV-2 of air travelers is not recommended.

Travel-related risks in the COVID-19 pandemic

- A modelling study (in preprint) estimates that imported COVID-19 cases, using the May 2019 travel volumes, would have accounted for less than 1% of the total of cases in 48 countries and less than 10% in 142 countries around the world in May 2020 .
- Models estimated that a 90% reduction of the number of passengers would only delay the arrival of the outbreak in a country by approximately 10 days.
- Studies have shown that the prevalence of COVID-19 in household contacts ranges from 4.6 to 49.5% , while data from contact tracing activities in Ireland show an overall positivity rate of 15%. In contrast, prevalence in travelers is estimated by modelling studies to be much lower, closer to the estimated prevalence of COVID-19 in the general **population at less than 1%.**

- The current average estimated point prevalence of COVID-19 in general populations in the **EU/EEA countries and the UK is thought to be less than 2.5%.**

Testing and quarantine measures for air travel

- According to modelling studies, testing can help shorten the duration of quarantine.
- According to modelling studies, performing a single RT-PCR test **immediately upon arrival would prevent only 40% to 50% of local transmission from imported cases** .
- Furthermore, modelling studies have shown **that pre-flight testing is less effective** in preventing the importation of the virus than a similar test performed upon arrival. However, pre-departure testing may reduce the chances of transmission during travel, especially from areas with very high transmission levels.

Quarantine of air travelers

- Many EU/EEA countries and the UK have adopted quarantine as a measure for incoming travelers.
- Some of the EU countries are making exceptions for short-term travelers (i.e. expected return within 72 hours).
- Decreasing the duration of quarantine could, in theory, facilitate compliance.
- Quarantine of travelers may be an effective public health measure to delay the importation and/or limit reintroduction of SARS-CoV-2, if implemented comprehensively and very early in the evolution of the epidemic situation or when a country has reduced transmission levels to close to zero. E.g, Taiwan and New Zealand.
- Imported cases account for a very small proportion of all detected cases and are unlikely to contribute significantly to increased transmission.

PUBLIC HEALTH RESPONSE

Continued

Combination of testing and quarantine for air travelers

- According to data provided by 30 countries in the EU/EEA and the UK until 16 October 2020, 12 countries (40%) require 14-day quarantine or a combination with testing at one, five or seven days after arrival for travelers from certain countries.
- Five out of 30 countries require 10 days quarantine and/or testing after arrival; one Member State recommends a seven-day quarantine and testing before release and one requires two tests 48 hours apart.
- **Lack of harmonization and frequent, sometimes sudden, changes in national policies are causing confusion and having a deterrent effect on travel**.
- Based on studies, a 14-day quarantine period **appears to be most effective in reducing the risk of transmission from travelers, although this creates logistical and financial challenges.**
- A 10-day quarantine (without testing at day 10) seems to be the next most effective alternative.
- The combination of quarantine and a single test at around day 7 after arrival appears to offer a reasonable balance of risks and benefits as an alternative to longer quarantine without testing.
- Testing twice (upon arrival and after a few days to release from quarantine) does not seem to significantly increase effectiveness - compared to testing only once to release from quarantine - and it is logistically challenging and more resource intensive.

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Article 2

Published MARCH 20, 2021 in NEJM

Mass-Vaccination Sites — An Essential Innovation to Curb the Covid-19 Pandemic

This article demonstrated that hybrid approach using conventional vaccination sites and high-throughput, large-venue mass-vaccination sites stadiums, arenas, convention centers has proven essential.

Mass-vaccination sites offer a logical solution that addresses each of seven challenges that complicate the traditional reliance on primary care delivery:

1. Quarter of residents lack of primary care provider.
2. Few electronic health record systems are enabled for patient-friendly self-enrollment.
3. Routine medical vaccinations rely on having a shelf stable standby supply in order to permit providing vaccination as a convenient add-on to existing appointments.
4. Recipients of two-dose vaccines all need to have their second dose scheduled, and there must be follow-up for no show
5. Smaller practices that have limited space and clinical staffing.
6. Cold storage requirements for the first approved vaccines
7. The limited reimbursement for vaccinations may prevent smaller practices from developing financially viable models for administering

Mass-vaccination sites should be part of an overall plan, rather than operating independently. State, regional, and local officials should convene public and private stakeholders for vaccine-site planning meetings aimed at a coordinated, effective, and comprehensive vaccination deployment plan.

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Article 3

Published MARCH 9, 2021 in the Lancet

Alternatives to conventional hospitalisation that enhance health systems' capacity to treat COVID-19

This article explains how Adequate strategies for clinical assessment of patients according to disease severity should be better characterized. Developing standardized criteria for allocating patients to the best fitting strategy should be a priority, although there is probably room for hybrid approaches. In addition, international guidance is required for the adaptation of civil buildings, especially with respect to staff safety and logistical needs.

When hospital capacity is particularly under stress, alternatives are needed to provide essentially the same care as in hospital wards for example:

- Patients with non-severe COVID-19 can be treated in civil buildings or receive acute hospital care at home.
- Patients with moderate COVID-19 might rapidly worsen; therefore, other than optimizing admission criteria, these alternatives should be able to provide adequate intermediate care and prioritized transfer to hospital within hours
- In-person visits by nursing and medical staff can be combined with telemedicine to increase capacity while preserving the quality of care.
- Medicalised hotels can provide complex care to patients with COVID-19, including those with severe baseline conditions or solid organ transplant recipients.

PUBLIC HEALTH RESPONSE

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Article 4

Published March 10, 2021 in THE LANCET

School reopening without robust COVID-19 mitigation risks accelerating the pandemic

Background

- Returning to school as soon as possible is imperative for the education, social development, and mental and physical welfare of children, not enough has been done to make schools safer for students and staff. Yet, arguments that schools do not contribute to community transmission and that the overall risk to children from COVID-19 has serious limitations.
- Both modelling and real-world data in preprint showing rising cases in regions where the SARS-CoV-2 B.1.1.7 variant was prevalent during the lockdown in November, 2020 (when schools were open), suggest that opening all schools now without robust mitigatory measures in place will probably lead to Rt rising above 1 in almost all scenarios. Modelling data by the University of Warwick and Imperial College London suggest that at least 30 000 more deaths from COVID-19 are estimated under the proposed reopening scenarios.
- Studies shows that although COVID-19 is unlikely to cause severe disease in children, estimates of the prevalence of long COVID symptoms 13% of children aged 2–10 year and 15% of those aged 12–16 years have at least one persistent symptom 5 weeks after testing positive. Given uncertainty around the long-term health effects of SARS-CoV-2 infection, it would be unwise to let the virus circulate in children, with consequent risk to their families.

Recommendations

In the panel we summarise a set of recommendations that are in line with guidelines from the CDC. Making schools safer goes hand in hand with reducing community transmission and is essential to allow schools to safely reopen and remain open.

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Continued

Recommendations

Physical distancing	Protections for students and staff	Ventilation and face coverings	Support children and families
General • Traffic light system of risk • Use remote or blended learning to reduce footfall	**Hand and surface hygiene** • Provide hand washing stations and hand sanitizers • Wash hands regularly and at key points (eg, after using the toilet)	**Ventilation** • Open windows and doors • Teach outdoors (or in large halls) wherever possible • Use CO2 monitors to assess air quality • Install High Efficiency Particulate Air filters with air cleaning devices • All physical education outdoors • No high-risk lessons (eg, singing, brass or wind instruments), except remotely	**Support blended and remote learning** • Allow optional remote learning • Support remote learning with technologies, funding, practical support, and skills training • Provide for safe delivery or pick-up of free school meals • Ensure safeguarding of at-risk children
During travel • Keep travel bubbles constant • Stagger start and finish times • Avoid mixing (eg, at school gates) • Open windows and wear masks on transport	**Vaccination** • Account for exposure alongside age and disease-related risk in vaccine prioritization • Prioritizing school staff reduces educational disruption due to staff illness	**Face coverings** • Encourage children aged 5 years or older to use a mask (with exemptions) • Teach correct mask fitting and use • Remove masks only when outdoors or eating • Consider transparent face coverings to improve communication • Safe disposal or washing of masks	**Address the harms of educational disruption** • Support with isolation • Record educational disruption alongside grades • Provide mental health support to children • Enhanced skills provision (eg, summer schools)
In classrooms • Keep bubble size small • Reduce movement among bubbles • Deploy additional staff to reduce class sizes • Use large spaces (eg, halls) • Quarantine applies to whole bubbles	**Testing** • Do not assume tests are 100% accurate • Testing complements other measures rather than replacing them		

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Article 5

Effectiveness of Mask Wearing to Control Community Spread of SARS-CoV-2

Published

February 10, 2021 in THE JAMA

- Community mask wearing substantially reduces transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 2 ways.
  - First, masks prevent infected persons from exposing others to SARS-CoV-2 (termed source control).
  - Second, masks protect uninfected wearers.
  - Epidemiological investigations have helped quantify the benefit of mask wearing to prevent the spread of SARS-CoV-2 (Table). In one of the studies, persons who wore masks experienced **a 70% lower risk of testing positive for SARS-CoV-2 infection.**
- An increasing number of ecological studies have also provided evidence that universal mandatory mask wearing policies have been associated with reductions in the number or rate of infections and deaths (Table). These studies did not distinguish the types of masks (cloth, surgical, or N95) used in the community.
- Covering the nose and mouth may inhibit verbal and nonverbal communication, particularly for children and deaf individuals. However, **children aged 7 to 13 years have been shown to be able to make accurate inferences about the emotions of others with partially covered faces, and the US Food and Drug Administration recently approved a transparent surgical mask that may be useful in such circumstances.**

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Continued

Table. Studies of the Effect of Mask Wearing on SARS-CoV-2 Infection Risk[a]

Source	Location	Population studied	Intervention	Outcome
Hendrix et al	Hair salon in Springfield, Missouri	139 Patrons at a salon with 2 infected and symptomatic stylists	Universal mask wearing in salon (by local ordinance and company policy)	No COVID-19 infections among 67 patrons who were available for follow-up
Payne et al	USS Theodore Roosevelt, Guam	382 US Navy service members	Self-reported mask wearing	Mask wearing reduced risk of infection by 70% (unadjusted odds ratio, 0.30 [95% CI, 0.17-0.52])
Wang Y et al	Households in Beijing, China	124 Households of diagnosed cases comprising 335 people	Self-reported mask wearing by index cases or ≥1 household member prior to index case's diagnosis	Mask wearing reduced risk of secondary infection by 79% (adjusted odds ratio, 0.21 [95% CI, 0.06-0.79])
Doung-ngern et al	Bangkok, Thailand	839 Close contacts of 211 index cases	Self-reported mask wearing by contact at time of high-risk exposure to case	Always having used a mask reduced infection risk by 77% (adjusted odds ratio, 0.23 [95% CI, 0.09-0.60])
Gallaway et al	Arizona	State population	Mandatory mask wearing in public	Temporal association between institution of mask wearing policy and subsequent decline in new diagnoses
Rader et al	US	374 021 Persons who completed web-based surveys	Self-reported mask wearing in grocery stores and in the homes of family or friends	A 10% increase in mask wearing tripled the likelihood of stopping community transmission (adjusted odds ratio, 3.53 [95% CI, 2.03-6.43])
Wang X et al	Boston, Massachusetts	9850 Health care workers (HCWs)	Universal masking of HCWs and patients in the Mass General Brigham health care system	Estimated weekly decline in new diagnoses among HCWs of 3.4% after full implementation of the mask wearing policy
Mitze et al	Jena (Thuringia), Germany	City population aged ≥15 y	Mandatory mask wearing in public spaces (eg, public transport, shops)	Estimated daily decline in new diagnoses of 1.32% after implementation of the mask mandate
Van Dyke et al	Kansas	State population	Mandatory mask wearing in public spaces	Estimated case rate per 100 000 persons decreased by 0.08 in counties with mask mandates but increased by 0.11 in those without
Lyu and Wehby	15 US states and Washington, DC	State populations	Mandatory mask wearing in public	Estimated overall initial daily decline in new diagnoses of 0.9% grew to 2.0% at 21 days following mandates
Karaivanov et al	Canada	Country population	Mandatory mask wearing indoors	Estimated weekly 25%-40% decline in new diagnoses following mask mandates

[a] See the Supplement for the complete table.

Article 6 Acute Allergic Reactions to mRNA COVID-19 Vaccines

Published March 8, 2021 in JAMA

- A study published in JAMA investigated acute allergic reaction incidence after more than 60, 000 mRNA COVID-19 vaccine administrations. Current estimates suggest that anaphylaxis to the mRNA COVID-19 vaccines occur in 2.5 to 11.1 cases per million doses, largely in individuals with a history of allergy. Vaccine hesitancy is contributed to concerns regarding allergy.
- A prospective study was conducted on Mass General Brigham (MGB) employees who received their first dose of an mRNA COVID-19 vaccine for a period of 7 weeks (16/12/2021 – 12/02/2021). For 3 days after vaccination, employees completed symptom surveys through a multipronged approach including email, text message, phone, and smartphone application links. Acute allergic reaction symptoms solicited included itching, rash, hives, swelling, and/or respiratory symptoms.
- Of 64, 900 employees who received their first dose of a COVID-19 vaccine, 40% received the Pfizer-BioNTech vaccine and 60% received the Moderna vaccine. 81% of these employees completed at least 1 symptom survey. The mean age of individuals with anaphylactic reactions was 41 and 94% were female. 63% had previous allergic history and 31% had history of anaphylaxis.
- 98% of employees did not have any symptoms of an allergic reaction after receiving an mRNA COVID-19 vaccine. The remaining 2% reported some allergic symptoms; however, severe reactions consistent with anaphylaxis occurred at a rate of 2.47 per 10, 000 vaccinations. The incidence rate of confirmed anaphylaxis in this study is larger than that reported by the Centers for Disease Control and Prevention based on passive spontaneous reporting methods.
- The authors concluded that the overall risk of anaphylaxis to an mRNA COVID-19 vaccine remains extremely low and largely comparable to other common health care exposures

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Article 7

Differential follow-up patterns in COVID-19 and comparison cohorts

Published March 8, 2021 in THE LANCET

- This article investigated possible explanations for findings from a study by Maxime Taquet and colleagues which showed that the incidence of a first psychiatric diagnosis in the 14–90 days after a diagnosis of COVID-19 was considerably higher than the incidence in the six matched comparison cohorts (ie, with influenza, other respiratory tract infections, skin infection, cholelithiasis, urolithiasis, and fracture of a large bone).
- Daily numbers of new diagnoses and patients at risk of psychiatric diagnosis in each cohort were reconstructed. The analysis showed that the numbers of patients at risk were almost equal on day 14, but quite unequal already on day 15 and beyond. Of particular concern is that fewer than half of people who were at risk of psychiatric illness on day 14 were at risk on day 15. Additionally, an increasing absence of symmetry between cohorts in subsequent follow-up days was observed.
- Limitation : Factors such as missing or incomplete data due to the pandemic, start date of assembling cohort, differences in numbers within the different cohorts in comparison to COVID -19 as well as differences in the follow-up schedules for the seven cohorts were attributed for the above results .
- The study concluded that in each comparison, the numbers of first psychiatric diagnoses in the two initially equal-sized cohorts were quite close and further investigations were required to understand the difference in censoring patterns observed and whether these disparate patterns, and any other design aspects, could explain the large differences in cumulative incidences during this short-term follow-up.

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Article 8

Adjuvantation helps to optimise COVID-19 vaccine candidate

Published March 8, 2021 in THE LANCET

- This article discusses the potential benefits of Algel-IMDG adjuvanted vaccine over an aluminium-adjuvanted whole-virion inactivated vaccine using findings from the BBV152 SARS-COV2 vaccine trial .
- BBV152 is a whole-virion inactivated SARS-CoV-2 vaccine, formulated with a toll-like receptor (TLR) 7/8 agonist molecule (IMDG) adsorbed to alum (Algel), and manufactured and produced by Bharat Biotech (India). A double-blind, randomised, multicentre, phase 2 trial on the safety and immunogenicity showed a persistent immune response at 3 months follow-up from the double-blind, randomised, phase 1 trial where two intramuscular injections of 6 µg BBV152 with Algel-IMDG were administered 4 weeks apart. The vaccine was also well tolerated. The 6 µg with Algel-IMDG formulation has already received emergency use authorisation in India and is being evaluated in 25 800 volunteers in a phase 3 efficacy trial. Based on findings of high neutralising antibodies noted in the first two trials, there is an expectation that the BBV152 will show significant efficacy against COVID-19 in the ongoing phase 3 trial.
- In trials of two other alum-adjuvanted inactivated vaccines, the overall efficacy of BBIBP-CorV is approximately 79·3% and of CoronaVac is approximately 50·4%, and both vaccines reportedly provide 100% protection against severe COVID-19. Alum-adjuvanted vaccines have limitations, such as requiring multiple doses for induced protection, and driving a Th2-polarised response over a Th1-polarised response. The BBV152 vaccine, adjuvanted with alum and a TLR 7/8 agonist, is designed to enhance both humoral and Th1-skewed cellular immune responses after immunisation by optimising the inactivated vaccine formulation.
- The authors recommend a good pharmacovigilance system for BBV152 be established, particularly as Algel-IMDG is a new adjuvant and it is the first time that an Algel-IMDG adjuvanted vaccine has been approved for use in a large population.
- In conclusion, the Algel-IMDG-adjuvanted BBV152 appears to be safe, immunogenic, and able to induce Th1-biased T-cell responses, and could therefore be a potentially superior vaccine over the alum-adjuvanted inactivated COVID-19 vaccines.

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