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Original Article

The COVID-19 tale of the six European Microstates: How did these "overlooked" microstates fare?

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Abstract

Background: COVID-19 has impacted the European microstates of Andorra, Liechtenstein, Malta, Monaco, the Republic of San Marino, and Vatican City. Even though they have similar population sizes, they are rarely studied. The goal was to summarize the COVID-19 situation (January 2020–July 2021) for these microstates, as well as the outcome and immunization roll-out throughout the first 18 months. While researching COVID-19 incidence and mortality trends among microstates and their land bordering nations,

Methods: Epidemiological data was gathered from the database "Our World in Data," whereas COVID-19-related tactics were based on Ministry of Health webpages and local newspapers. Using COVID-19 data (where applicable), the six microstates and their adjacent nations were compared.

Results: From the start of COVID-19 until August 1, 2021, the microstates reported a total of 60,174 positive cases and 730 deaths. Andorra had the greatest rates of COVID-19 infection (190 per 1,000) and mortality (1.66 per 1,000). The microstates had similar COVID-19 results, but their bordering nations shared the most striking similarities. COVID-19 cases, fatality rates, and vaccine doses all have a bidirectional link.

Conclusion: Whether land borders exist, timely mitigation measures and vaccination rollouts appear to be the keys to pandemic containment. The greatest pandemic impact on a country, however, appears to be dependent on cross-border transmission rates.

Keywords: Coronavirus; COVID-19; Vaccination; Morbidity; Mortality; Andorra; Liechtenstein; Malta; Monaco; Republic of San Marino; Vatican City

Introduction

The European continent is divided into four subregions by forty-four countries (1). The microstates are a collection of six countries that make up Europe's smallest states. Andorra, Liechtenstein, Malta, Monaco, the Republic of San Marino, and the Vatican City are small European countries with limited populations and geographical areas (2). Except for Malta, all microstates have land borders with larger countries (3). Malta: Malta is the only microstate that is a member of the European Union, consisting of two inhabited islands in the midst of the Mediterranean Sea (EU). As demonstrated in "Supplement table 1" (4,5), the microstates have comparable demographic features. Despite their meager natural resources, all the microstates have developed service economies (3).

SARS-CoV-2, a novel coronavirus, emerged in the end of 2019, and the World Health Organization (WHO) declared it the COVID-19 pandemic in March 2020 (6). The virus quickly spread across countries, including microstates in Europe (2). The first COVID-19 case was reported on March 2nd in Andorra, March 3rd in Liechtenstein, March 7th in Malta, February 28th in Monaco, February 27th in the Republic of San Marino, and January 7, 2020, in Vatican City (7,8).

Even though these microstates share both similarities and variations in their societal, cultural, and political structures, they still have distinct characteristics resulting from their limited geographical and population sizes that are rarely studied (3). Understanding the evolution of the COVID-19 pandemic at a population level in these microstates is more achievable and may be a key to a better understanding of the pandemic situation

in their bordering larger countries or regions, since the COVID-19 pandemic is still progressing. It's important to remember that microstates have a lot in common with their larger neighbors, both in terms of population and dependence. This is the first study, as far as the authors are aware, to look at the influence of COVID-19 on Europe's microstates. Within the first 18 months of the pandemic, this study intends to give a descriptive account of the healthcare system's readiness, the COVID-19 advancement, public health mitigation initiatives, and vaccination roll-out across various microstates. This study will also look for any similarities in COVID-19 incidence and mortality between microstates and bigger surrounding countries (where applicable). Such observations would give evidence for policymakers at the national and international levels to employ in future pandemic control and response efforts.

Materials and methods

This is an observational study for the six European microstates based on COVID-19 epidemiological data and healthcare system preparation (Andorra, Liechtenstein, Malta, Monaco, San Marino, and the Vatican City). The research was limited to microstates on the European continent.

Data sources

The six microstates' Ministry of Health websites, published publications, and local newspapers were used to identify mitigation measures implemented from the start of the COVID-19 pandemic until August 1st, 2021. For the health systems data, the WHO European Observatory on Health Systems and Policies' COVID-19 Health System Response Monitor was used (9).

The primary COVID-19 indicators and immunization data were obtained using the 'Our World in Data' (OWID) database (10). Through an automatic scrape and manual collecting and verification procedure, the OWID is a continuously updated database that aggregates COVID-19 distribution data from all reporting countries around the world onto one digital platform (10). From the onset of COVID-19 until August 1st, 2021, the following main indicators were considered for all six microstates: I weekly COVID-19 cases and cumulative incidence of COVID-19; (ii) COVID-19 weekly mortality; (iii) weekly total COVID-19 vaccine doses administered; and (iv) weekly fully vaccinated population. It's worth noting that no vaccination data for the Vatican City could be found for this period.

Because five of the six microstates share borders with other countries (Andorra with France and Spain; Liechtenstein with Switzerland and Austria; Monaco with France; San Marino with Italy; Vatican City with Italy), the OWID database was used to obtain weekly epidemiological data on COVID-19 cases and mortality for these larger countries.

Statistical methods

All data analysis and comparisons were done in Microsoft Excel®. Each microstate's monthly COVID-19 positive cases and cumulative incidence per 1,000 people were compared. Similar comparisons were conducted in relation to mitigating measures that had been put in place and vaccination rollouts (where data was available). Each microstate's infectivity fatality rates (IFR) every month were computed. The number of deaths was divided by the number of confirmed infectious cases (for each month) multiplied by 100. Comparative comparisons were conducted between the five microstates (Andorra, Liechtenstein, Monaco, San Marino, and the Vatican City) and the countries that bordered them on the land. Comparisons between the COVID-19 positive cumulative incidence per 100,000 population and the mortality incidence per 100,000 population across the study period were made. Since Malta is an island with no land borders, it was excluded from these comparative assessments.

Results

Epidemiological data

A total of 60,174 positive cases and 730 deaths have been documented across the six microstates from the start of COVID-19 to August 1, 2021. Although Liechtenstein had the greatest IFR, Andorra had the highest COVID-19 infectivity rate (190 per 1,000) and fatality rate (1.66 per 1,000). Table 1 shows a comparison snapshot for the major COVID-19 epidemiological data across the six microstates for week 30 of 2021 (July 26th to August 1st), whereas Figure 1A shows an overview of positive cases across the microstates from the commencement of COVID-19 to August 1st, 2021. During the first wave (January to May 2020), a similar low COVID-19 infectivity rate was recorded across the six microstates. During this time, however, the Republic of San Marino and Vatican City reported a higher total positive case rate (Figure 1B). Andorra (6.08) and the Republic of San Marino reported the highest IFR for the first wave (6.02). Since the commencement of COVID-19 till August 1st, 2021, the Vatican City has reported no COVID-19-related fatalities.

For all microstates, the second wave began in August 2020. Although there was a broad comparable pattern of positive cases from August 2020 to August 2021, as shown in Figures 1A and 1B, there were variances in infectivity and fatality rates between microstates. Indeed, Andorra had the most positive instances (178 per 1,000 people) over this time period (3 August 2020 to 1 August 2021), followed by the Republic of San Marino (129 per 1,000 population). For the same time period, Liechtenstein (1.97 IFR) had the highest IFR, followed by Malta (1.24). (3rd August 2020 to 1st August 2021).

Between the five microstates with land borders and their surrounding nations, the COVID-19 incidence and fatality cases per 100,000 population were compared. As shown in Figures 2A and 2B, there are clear similarities in COVID-19 incidence and death trends among microstates and their neighbors. Indeed,

Liechtenstein's COVID-19 incidence and mortality patterns were found to be nearly equivalent to those of its neighboring countries, Switzerland and Austria. Andorra and the Republic of San Marino were shown to have had considerably greater COVID-19 incidence rates than their neighboring countries at times (Spain and France for Andorra, Italy for the Republic of San Marino). Furthermore, during March and May 2020, the Republic of San Marino saw a larger peak in mortality incidence than Italy.

Preparedness and mitigation strategies

Healthcare systems

Pre-COVID-19 healthcare system set-up

Each of the six microstates has a government-funded healthcare system that provides universal health care to its citizens, as well as private healthcare systems. Citizens of Andorra, Malta, and Liechtenstein are enrolled in a national healthcare/social security system that covers state healthcare costs (11-13) (in exchange for financial payments). This system provides partial healthcare to Andorrans, most of medical services to Liechtensteiners, and all services to Maltese aged (11-13). In Andorra, Liechtenstein, and Malta (11-13), there is just one state-owned hospital. Like Vatican City, Liechtenstein has healthcare agreements with hospitals outside the country (13,14). Indeed, the Directorate of Health and Hygiene of Vatican City offers emergency aid, medical consultations, diagnostic tests, and radiological scans. Hospitalizations and surgical treatments, on the other hand, are provided by the "Fondo Assistenza Sanitaria" (14). Monaco's healthcare system is supervised by "The Caisses Sociales de Monaco," which covers the healthcare of those Monegasque citizens who contribute to the system. Sammarinese are registered with the state's "Azienda Sanitaria Locale" national health insurance fund, whereas Monaco's healthcare system is supervised by "The Caisses Sociales de Monaco," which covers the healthcare of those Monegasque citizens who contribute to the system. While the Republic of San Marino only has one governmental hospital, Monte Carlo is home to four separate specialty hospitals (15,16).

COVID-19 healthcare system preparedness

As a result of the COVID-19 pandemic, most of the microstates' healthcare systems underwent infrastructure upgrades and undertook specific strategic measures. Andorra increased its intensive care unit (ICU) capacity from 10 to 37 beds (17), Malta increased its ICU capacity from 20 to 100 beds (18), and the Republic of San Mario increased its ICU capacity from 6 to 20 beds (9). A rise in hospital beds has also been noted (9, 17,18). To meet the influx of cases, non-medical spaces were also created up. Non-clinical facilities such as the hospital staff canteen and lecture rooms were turned into hospital wards in Malta, and oxygen points were constructed in corridors and public open areas in preparation for a possible significant increase of COVID-19 cases (18-20). External mobile clinic facilities were established up in Vatican City to cater for the medical needs of suspected positive cases as well as to conduct further examinations (21). Elective surgery and outpatient healthcare services were also suspended or canceled in Malta and Vatican City during the first wave (14,18).

Swabbing and testing sites

Throughout the pandemic, nasopharyngeal swab polymerase chain reaction (PCR) and antigen tests for COVID-19 were available. Andorra established 59 StopLabs (17); Liechtenstein established one swabbing site in Vaduz, with rapid antigen tests available at local pharmacies (22); Malta established seven swabbing sites across the islands (23); Monaco established two PCR test sites, with 23 pharmacies carrying our antigen testing and another 20 pharmacies providing Rapid Diagnostic Orientation Test (TROD) (24). San Marino, on the other hand, provided testing in hospitals and at patients' homes (25), Testing methods differed between microstates and at different times of the pandemic. During the first wave (17), Andorra did mass serological screening, while the Vatican City conducted anti-SARS-CoV-2 antibody testing on inhabitants and staff regardless of any interaction with positive patients or symptoms (26). Random swabbing tests were performed on healthcare personnel in Malta during the first wave, including those working in nursing homes and an immigrant center (18).

Containment measures

The first wave (which began in March 2020) saw the closure of schools, non-essential shopping outlets, the entertainment industry, religious activities, travel restrictions, and lockdowns across the microstates, as it did in most other countries around the world. However, as demonstrated in “Supplement figures 1 to 13”, these containment efforts, including mask-wearing mandates, varied among the COVID-19 phases. In March 2021, only Malta was subjected to an additional lockdown.

COVID-19 vaccination

The European Medical Agency (EMA) has licensed four vaccinations for public administration (as of August 2021) (27). Only Malta purchased doses of all four vaccines that had been approved (28). Pfizer BioNTech, Moderna, and AstraZeneca dosages (29, 30) were acquired by Andorra. Pfizer BioNTech and Moderna were used to inoculate Liechtenstein's population (31). Monaco, the Republic of San Marino, and the Vatican City, on the other hand, each ordered eight, thirty, and thirty-two Pfizer BioNTech vaccines (8, 30, 32).

Only Malta is a member of the European Union (EU), and it has profited from EU joint procurement (30). The vaccines were secured in various ways by the other microstates. Andorra and the Republic of San Marino used a hybrid method, obtaining vaccines bilaterally

from adjacent EU nations (France and Spain for Andorra, Italy for San Marino), as well as directly from vaccine manufacturers. Andorra bought ChAdOX1-S (AstraZeneca) through COVAX, while the Republic of San Marino bought the Pfizer/BioNTech vaccine directly from Pfizer (30).

The COVID-19 vaccination campaign began on January 19th, 2021 (33), Liechtenstein on January 21st, 2021 (34), Malta on December 27th, 2020 (28), Monaco on December 31st, 2020 (35), the Republic of San Marino on January 25th, 2021 (36), and Vatican City on January 13th, 2021. (37). Despite having a comparable vaccination strategy that targeted the elderly, the most vulnerable, and healthcare workers, "Supplement table 2" shows that there were some variances. Only the Republic of San Marino's vaccination plan emphasized people who had already been infected with COVID-19 within the previous six months (30).

A total of 999,220 doses have been provided in Andorra, Liechtenstein, Malta, Monaco, and the Republic of San Marino as of August 1st, 2021. From the beginning of the vaccination rollout until August 1st, 2021, Figure 3A depicts the cumulative fully vaccinated population per 1,000 throughout these 5 microstates. Malta appeared to have the fastest vaccination rollout among the four microstates at the time of writing (10), with 87 percent of the population fully vaccinated (at the time of writing) (10). The Republic of San Marino's vaccine rollout ranked second among the five microstates at the time of writing (10), with 69 percent of the population fully vaccinated, compared to 49 percent of Liechtenstein's population, 47 percent of Monaco's population, and 44 percent of Andorra's population (10). As the fraction of the population fully vaccinated grew, the number of reported COVID-19 cases decreased, as indicated in Figure 3B. It should be emphasized that seasonality and implemented mitigation measures could have influenced this association. COVID-19 instances began to rise in Andorra, Malta, and Monaco as the summer proceeded and non-essential cross-border travel became permissible, as seen in Figure 3B.

Discussion

According to the current study, European microstates were afflicted by the COVID-19 pandemic in the same way that the rest of the world was. COVID-19 outcomes are similar across microstates when universal COVID-19 containment mechanisms (social distancing, gathering regulations, lockdowns, etc.) are used. Indeed, the initial COVID-19 wave saw a similar COVID-19 spread across the six microstates as uniform mitigation measures, including lockdowns, were implemented. Despite this, infectivity rates in the Republic of San Marino and Vatican City were greater than in the other microstates. When compared to their larger neighboring country, Italy, this was also true. This could be explained by the fact that these two microstates had inadequate pandemic preparedness prior to COVID-19's emergence, making them strongly reliant on Italy and resulting in significant cross-border infectivity. In comparison to other large European countries, Italy, particularly the Emilia Romagna area, was reported to be substantially afflicted by COVID-19 during this period (38,39). Indeed, microstates are well-known for relying heavily on their larger neighbors for the majority of their goods, including labor (3). Andorra, which had the greatest COVID-19 impact of all microstates during the 1.5-year COVID-19 epidemic, could have experienced something similar. Indeed, it is widely accepted that the microstates rely heavily on their larger neighbors for most of their supplies and even labor (3). A similar occurrence could have occurred in Andorra, which had the largest COVID-19 impact of all microstates over the 1.5-year period of the COVID-19 pandemic. Andorra is strongly reliant on tourism and, as a result, requires cross-border migration to maintain economic stability. As a result, cross-border transmission from France and Spain, both of which have been severely damaged by COVID-19, is thought to have contributed to the observed COVID-19 impact (40, 41).

Malta, as the only microstate island with no land borders, did the best out of all the microstates in Europe during the first wave (18). The scenario in Malta demonstrates that travel limitations, in combination with other early public health initiatives and behavioral changes, can reduce virus transmission (42). Diverse relaxation measures, on the other hand, result in different consequences. This was the case in Malta, where measures were entirely loosened over a few weeks at the start of summer 2020, allowing enormous gatherings, resulting in the early arrival of the second wave in August 2020. (43). By the end of summer 2020, the other microstates had begun to face elevated infectivity rates on par with their areas bordering larger countries. However, different mitigation measures were implemented by different microstates in the second and previous waves, resulting in different COVID-19 outcomes. Except for Malta (in March 2021), lockdowns were not implemented again, and borders remained open, increasing the likelihood of cross-border transmission. As a result, challenging a particular country to maintain a low infectivity rate and advocating for a pan-European commitment to limit viral transmission are both viable options (44). In fact, only lockdowns appear to fully lower infectivity rates, as seen in Malta, where a second lockout dramatically reduced COVID-19 case counts after a very high infectivity rate and a healthcare system on the verge of failure (45). Small countries are confronted with inadequate public health resources, which must be addressed. As a result, when the caseload surpasses the capacity of surveillance and contact tracing systems, an increase in cases is expected. In such a case, shifting from a containment to a rapid mitigation phase is warranted (46). This demonstrates the importance of prompt public health response and mitigation efforts (47).

The long-term control of this pandemic is expected to be COVID-19 vaccine, albeit this is very contingent on an efficient worldwide vaccination strategy and the introduction of new variations of concern (48).

Table 1. Comparisons of the main COVID-19 epidemiological data across the six microstates for the 30th Week of 2021 (July 26th to August 1st)

	Andorra	Liechtenstein	Malta	Monaco	San Marino	Vatican City
Total population (n)	77,265	38,137	442,772	39,525	34,017	800
Total positive cases (n)	14,678	3,085	34,380	2,913	5,091	27
% cases of total population infected	19.00%	8.09%	7.76%	7.37%	14.97%	3.36%
Total deaths (n)	128	59	423	33	90	0
% mortality of total population	0.17%	0.15%	0.10%	0.08%	0.26%	0%
Recovered (n)	14,550	3,026	33,957	2,880	5,001	27
IFR	0.87	1.91	1.23	1.13	1.77	0

IFR – infectivity fatality rate

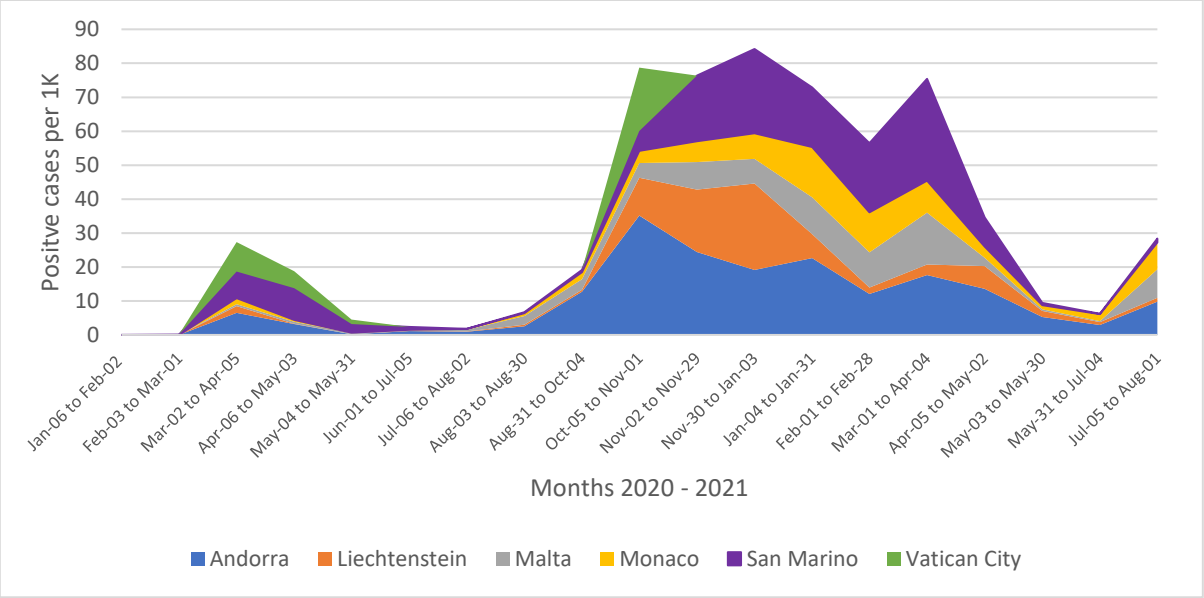

Figure 1A. Stacked area representation of COVID-19 positive cases per 1,000 population across the six microstates from February 2020 till 1st August 2021

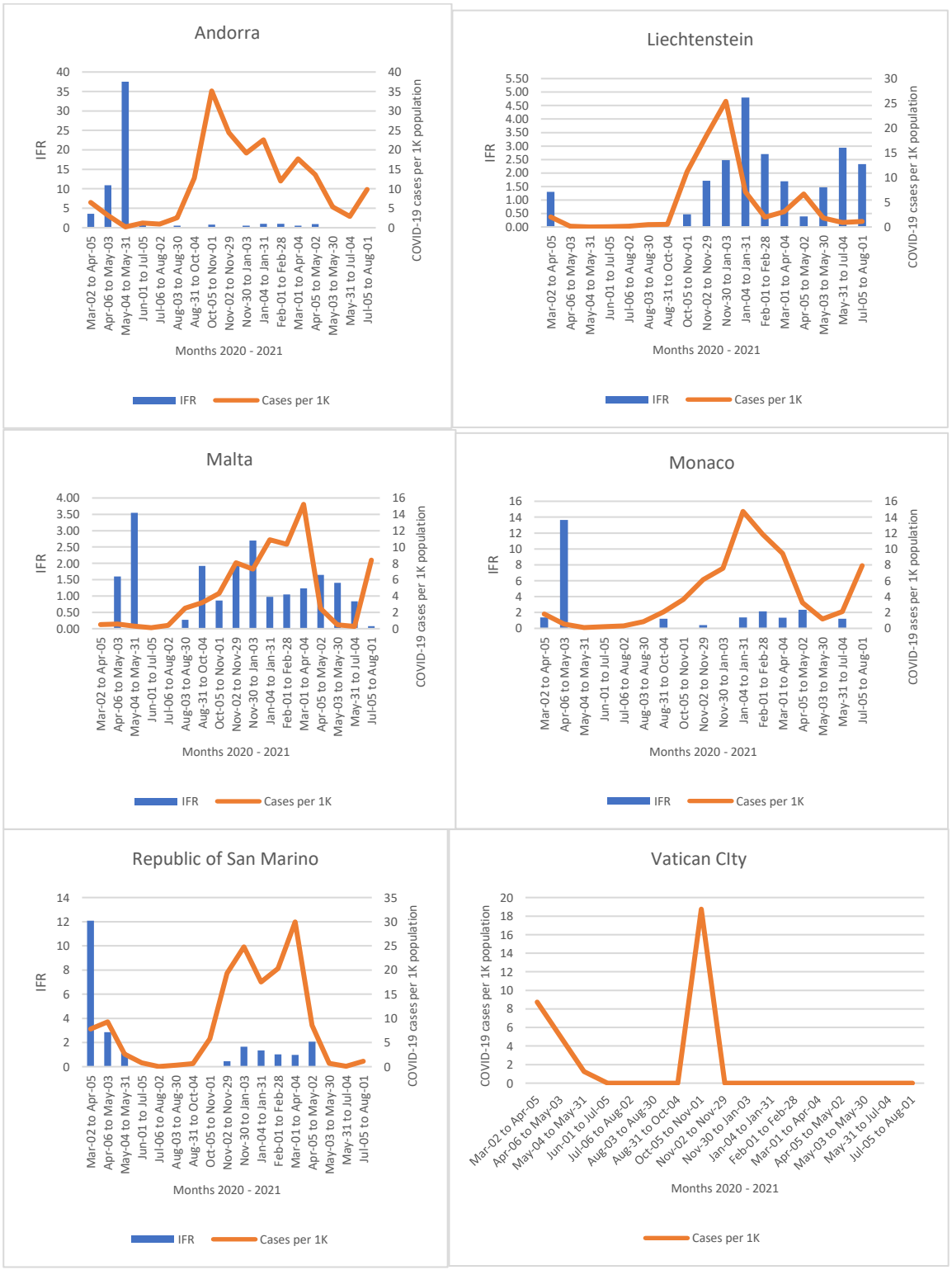

Figure 1B. COVID-19 infectivity and infectivity-fatality-ratio (IFR) between March 2020 till 1st August 2021 across the six European microstates

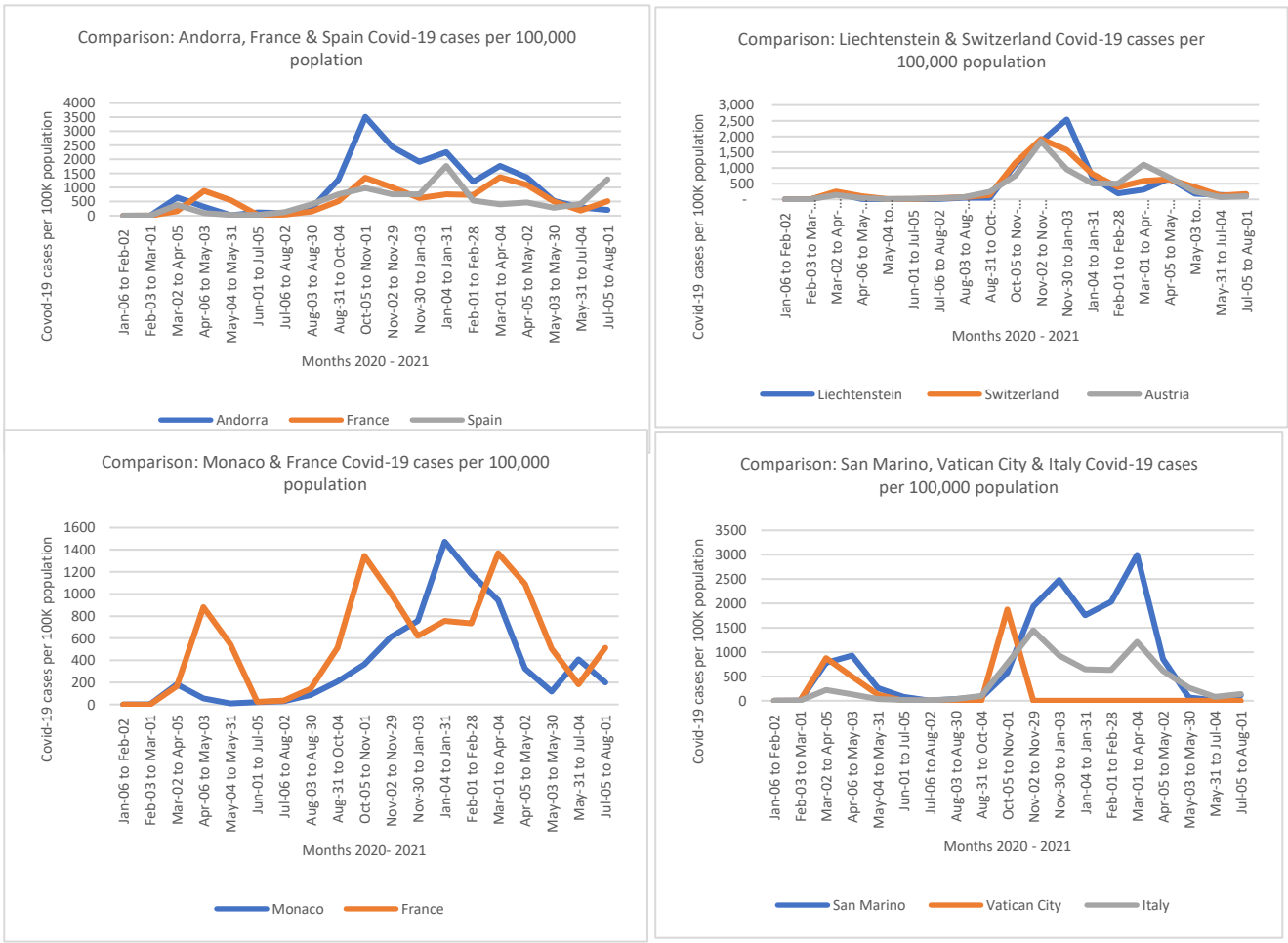

Figure 2A. Comparison assessment of the COVID-19 incidence per 100,000 population across the five inland microstates and their land border countries

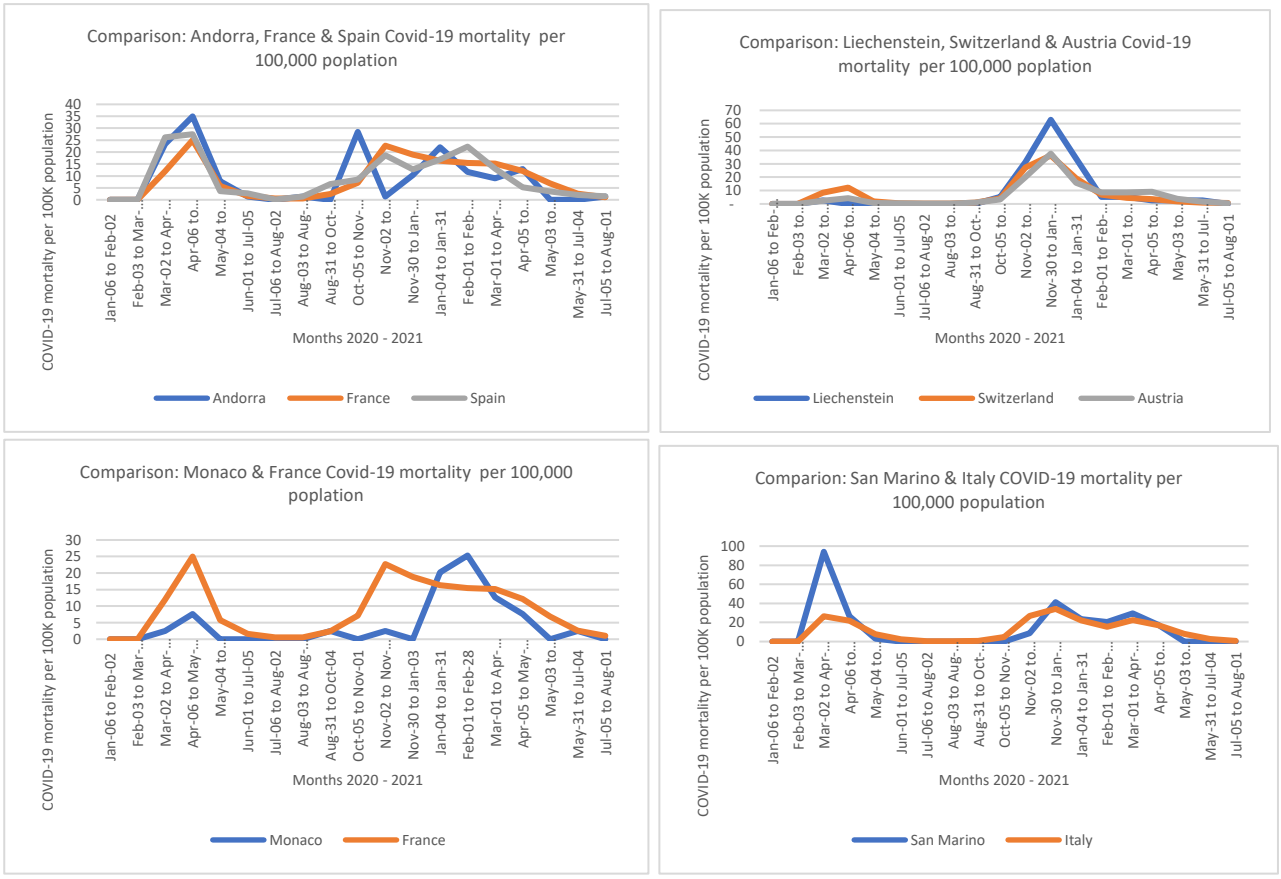

Figure 2B. Comparison assessment of the COVID-19 mortality per 100,000 population across the four inland microstates and their land border countries

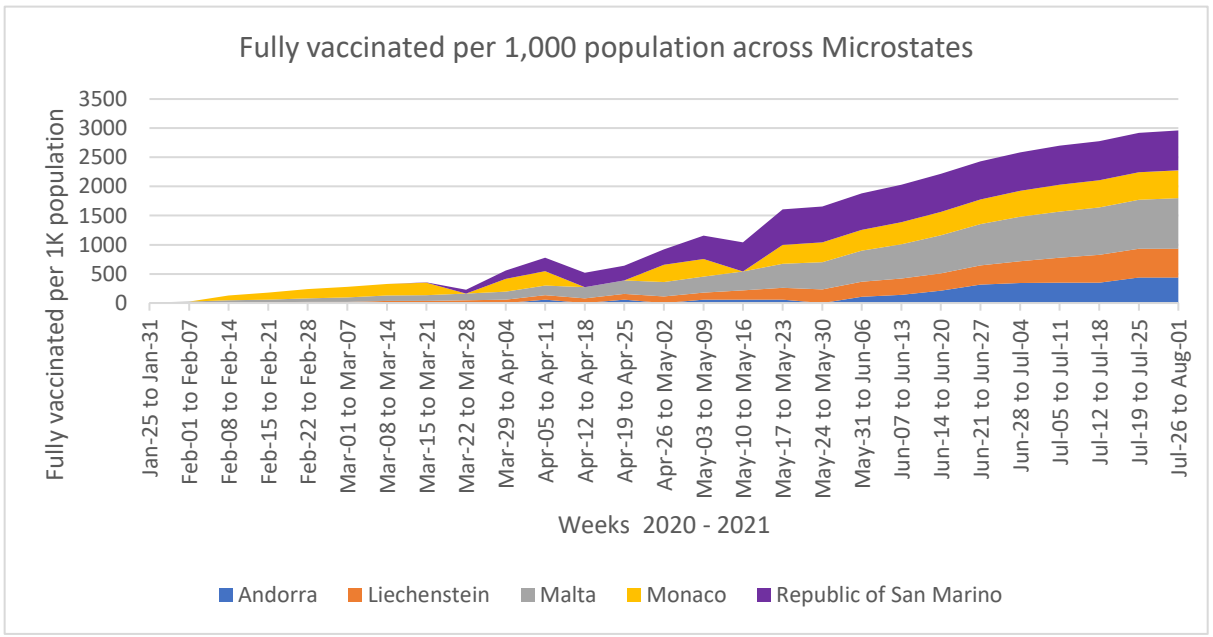

Figure 3A. Cumulative fully vaccinated population incidence across Andorra. Liechtenstein, Malta, Monaco and Republic of San Marino

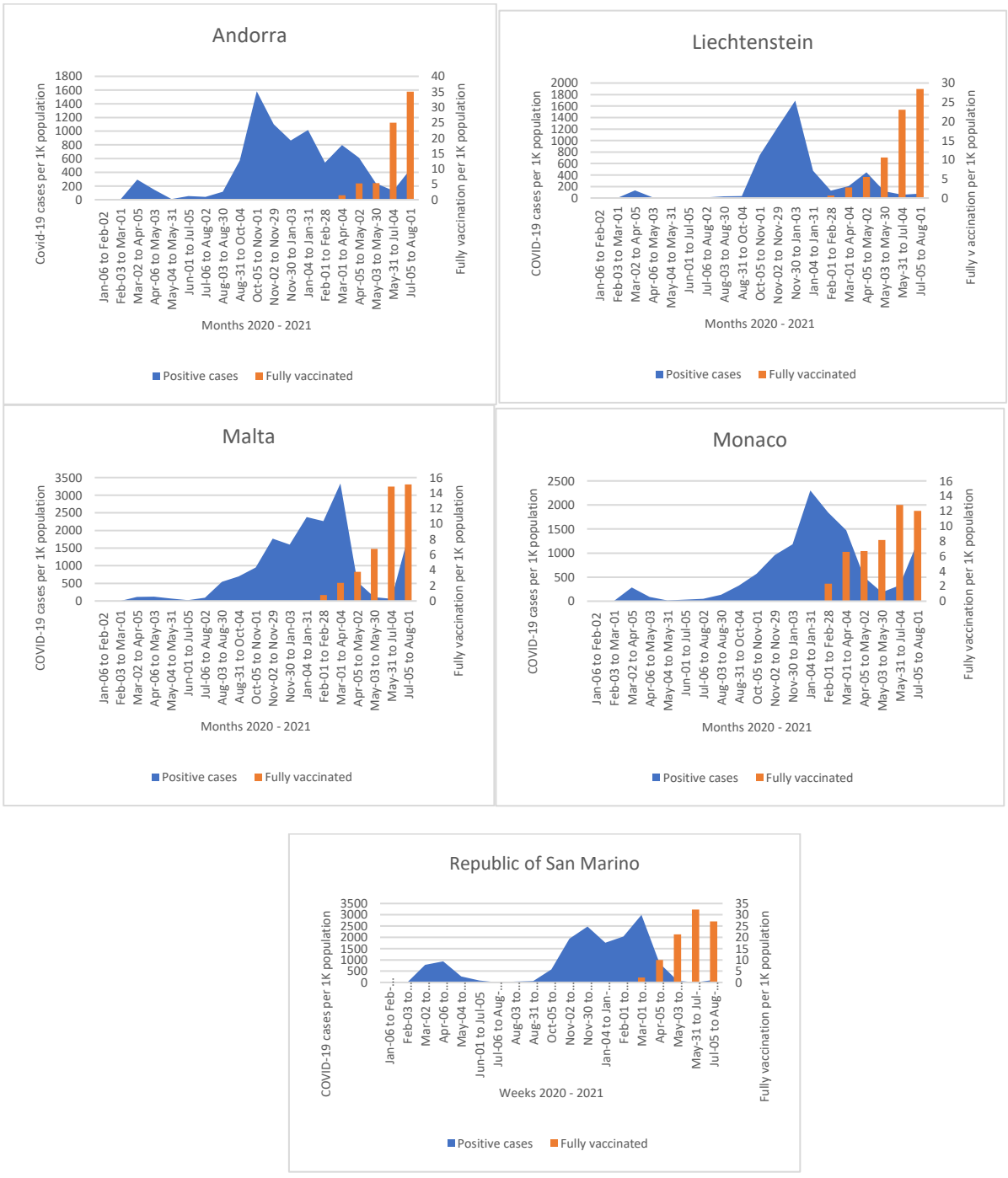

Figure 3B. Comparison assessment of COVID-19 cases and fully vaccination population per 1,000 across Andorra, Liechtenstein, Malta, Monaco and Republic of San Marino

Only Malta, out of the six microstates, is a member of the European Union and benefits from the advanced purchase agreement (APA). Following the EMA's clearance, Malta began receiving vaccination doses in instalments, as per the APA agreement (27, 49). Only Malta purchased vaccine doses from all EMA-approved manufacturers and was the first to begin vaccination campaigns (28). The other microstates had to find alternative ways to buy vaccine doses and then start their own immunization campaigns. Given that the microstates had similar vaccination policies in place, the purchase disparity could have contributed to the microstates' differing vaccination rollout times. Vaccine apprehension could potentially be a role in the disparity in vaccination coverage. In fact, in early January, healthcare professionals in Andorra expressed apprehension about being immunized, in contrast to Malta's approach (50, 51). Nonetheless, as the vaccination campaign progressed, all microstates saw a drop in COVID-19 infectivity. To avert outbreaks, public health and social distance measures, such as travel restrictions, should be gradually removed in accordance with the population's vaccination rate, supply, and effectiveness (52). COVID-19 containment is jeopardized by the introduction of highly transmissible variations, which is a deterrent factor. Indeed, the introduction of the Delta variety in early summer 2021 could have resulted in an increase in cases across most microstates. As a result, future policy decisions should take into account the lessons learned from prior COVID-19 outbreaks while continuing the push for widespread vaccination (53).

There are a few limits that must be acknowledged. All of the epidemiological data in this analysis was based on the sources' reporting and accuracy. There was no information on COVID-19 instances stratified by age or gender. Other data sources were identified in addition to OWID, however they lacked sufficient information to allow us to undertake analytic analysis. Low-quality data or data that was deemed untrustworthy were omitted to ensure that the study provided accurate descriptions. Furthermore, we lacked data on care capacity, population, disease trends, and tracking capacity, limiting our epidemiological studies and data output quality. Due to an inability to identify COVID-19 admissions and ICU data for all microstates, the impact of COVID-19 on the healthcare system through COVID-19 admissions and ICU could not be studied. These constraints could have influenced epidemiology interpretation and resulted in certain errors. As a result, only descriptive observations could be made, and the incidence of cases was the sole indicative indicator that could be utilized for comparisons. The COVID-19 situation at a national level could have been influenced by social variables, economic levels, and economic structure, as well as any political difficulties between governments. However, this information was not available, posing a barrier to properly comprehending COVID-19 interactions and effects within the microstates. Because vaccine data for Vatican City could not be found across several sources, this microstate had to be excluded from vaccination analysis. Furthermore, this was an observational study with the goal of providing a descriptive assessment of the COVID-19 scenario among the six microstates rather than attempting to determine the causality of the COVID-19 outcomes or evaluating pandemic governance between countries. The contributors went to great lengths to find correct information from reputable sources. It does not, however, rule out the potential of some missing data. Future research should be undertaken to investigate the microstate COVID-19 situation in greater depth and confirm the findings of this study.

Conclusion

Although the six European microstates have limited populations and physical territories, they are spread out over the continent. Although there were some similarities in the COVID-19 results amongst the microstates, the microstates and their land-bordering nations shared the most striking similarities. Whether a country has land borders or not, timely mitigation measures and vaccination rollouts appear to be critical to the pandemic's containment. The greatest pandemic impact on a country's population, on the other hand, appears to be dependent on cross-border transmission rates. This necessitates a pan-European strategic planning process as well as united action plans.

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Consent for publication: Not applicable.

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Author contributions: SC was responsible for the study design, data analyses and writing of article. EP was responsible for Andorra's data collection and coordinating the mitigations data. JV was responsible for Liechtenstein's data collection. AP was responsible for Malta's data collection and coordinating the vaccination data. DC was responsible for Monaco's data collection and coordinating the vaccination data. NM was responsible for the Republic of San Marino's data collection. KM was responsible for the Vatican City's data collection. TAM was responsible for the coordination of COVID-19 epidemiological data and mitigations data. AC helped in the data analyses and creation of graphs.

References

1. One World - Nations Online Project. Countries by Continent :: Europen Countries. Continents, 2022. Accessed on February 26, 2022. Available from: https://www.nationsonline.org/oneworld/europe.htm.
2. Klierger, P.C. The Microstates of Europe: Designer Nations in a Post-Modern World, 2012. Accessed on August 28, 2021. Available from: https://rowman.com/ISBN/9780739197967/The-Microstates-of-Europe-Designer-Nations-in-a-Post-Modern-World.
3. Eccardt, T.M. Secrets of the Seven Smallest States of Europe: Andorra, Liechtenstein, Luxembourg, Malta, Monaco, San Marino and Vatican City eBook, 2004. Accessed on August 28, 2021. Available from: https://www.amazon.com/Secrets-Seven-Smallest-States-Europe-ebook/dp/B00EK1NZA2.
4. Index mundi. Liechtenstein Life expectancy at birth. Index mundi, 2020. Accessed on September 3, 2021. Available from: https://www.indexmundi.com/liechtenstein/life_expectancy_at_birth.html.
5. GBD 2019 Demographics Collaborators, Wang, H., et al. Global age-sex-specific fertility, mortality, healthy life expectancy (HALE), and population estimates in 204 countries and territories, 1950-2019: a comprehensive demographic analysis for the Global Burden of Disease Study 2019. Lancet 2020; 396 (10258): 1160–1203.
6. World Health Orgainzation. WHO Director-General's opening remarks at the Mission briefing on COVID-19 - 12 March 2020. World Health Organization, 2020. Available from: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mission-briefing-on-covid-19---12-march-2020.
7. GardaWorld. News Alerts - Crisis 24. GardaWorld, 2020. Accessed on August 28, 2021. Available from: https://www.garda.com/crisis24/news-alerts.
8. Ralli, M., De-Giorgio, F., Soave, P.M., Ercoli, L., Arcangeli, A. Mass vaccination campaign for residents and workers and assistance to vulnerable populations during COVID-19 pandemic: The experience of the healthcare services of the Vatican City. Lancet Reg Health Europe 2021;2:100053.
9. World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, 2020. Accessed on June 14, 2021. Available from: https://eurohealthobservatory.who.int/monitors/hsrm/overview.
10. Hasell, J., Mathieu, E., Beltekian, D., Macdonald, B., Giattino, C., Ortiz-Ospina, E., et al. A cross-country database of COVID-19 testing. Sci Data 2020;7:345.
11. AbastGlobal. Andorra Healthcare Explained. Andorra Solutions, 2018. Accessed on August 29, 2021. Available from: https://www.andorra-solutions.com/blog/2018/08/23/andorra-healthcare-explained/.
12. Muscat, N.A., Calleja, N., Calleja, A., Cylus, J. Malta Health system review. Health Syst Transit 2014;16(1):1–97.
13. Information about using health services in Finland and abroad. 2019. Accessed on August 29, 2021. Available from: https://www.eu-healthcare.fi/health-services-abroad/country-specific-information-about-health-services.
14. Ralli, M., Arcangeli, A., Soave, P.M., Carbone, L., Ercoli, L., De-Giorgio, F. Impact of COVID-19 pandemic on the medical activities of the Directorate of Health and Hygiene, Vatican City State. J Intern Med 2021;290(1):213–219.
15. Expatfinder.com. Healthcare in San Marino | ExpatFinder Guides. 2021. Accessed on August 29, 2021. Available from: https://www.expatfinder.com/san-marino/expat-guides/article/healthcare-in-san-marino/1854.
16. Hello Monaco. Healthcare in Monaco. All you need to know about healthcare in Monaco, 2019. Accessed on August 29, 2021. Available from: https://www.hellomonaco.com/how-to/medicine/all-you-need-to-know-about-healthcare-in-monaco.
17. Carrasco, M.G., Royo-Cebrecos, C., Ambatlle, I., Serres, K., Lopez, J., Vilanova, D., et al. Assessment of the Andorran response to SARS-Cov-2 Pandemic. Enf Emerg 2021;20(2):61–70.
18. Cuschieri, S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. Z Gesungh Wiss 2022;30(2):459-464.
19. Grech, V. May you live in interesting times: COVID-19 and Mater Dei Hospital, Malta. Res Humanit Med Educ 2020;7:102–105.
20. Cuschieri, S., Falzon, C., Janulova, L., Aguis, S., Busuttil, W., Psaila, N., et al. Malta's only acute public hospital service during COVID-19: a diary of events from the first wave to transition phase. Int Soc Qual Heal Care 2021;33(1):138.
21. Arcangeli, A., Ralli, M., De-Giorgio, F., Soave, P.M., Ercoli, L. The Vatican City State Internal Healthcare System Response to COVID-19 Pandemic: Prevention and Control Strategies. Appl Health Econ Health Policy 2021;19(2):141–144.
22. Liechtensteinische Landesverwaltung. COVID-19 Tests. Gesundheit, Vorsorge und Pflege-Privatpersonen, 2021. Accessed on August 30, 2021. Available from: https://www.serviceportal.li/de/privatpersonen/gesundheit-vorsorge-und-pflege/coronavirus/covid-19-tests.
23. Minsitry of Health Malta. Getting Tested. COVID-19, 2021. Accessed on August 30, 2021. Available from: https://deputyprimeminister.gov.mt/en/health-promotion/covid-19/Pages/getting-tested.aspx.

24. Gouvernment Princier, Principaute De Monaco. Testing and Screening - Covid 19, 2020. Accessed on August 30, 2021. Available from: https://covid19.mc/en/fight-against-coronavirus/tout-sur-les-tests-diagnostics/.
25. European Observatory on Health Systems and Policies. Health system responses to COVID-19. World Health Organization, 2020. Accessed on November 14, 2021. Available from: https://www.euro.who.int/en/about-us/partners/observatory/publications/eurohealth.
26. Ralli, M., Arcangeli, A., Soave, P.M., Voglino, M.C., De-Giorgio, F. SARS-CoV-2 seroprevalence in the Vatican City State. Eur J Intern Med 2021;86:98–99.
27. European Medical Agency. Covid-19 vaccines: authorised. Covid-19, 2021. Accessed on May 11, 2021. Available from: https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/vaccines-covid-19/covid-19-vaccines-authorised.
28. Ministry of Health Malta. Vaccines. Ministry of Health Malta 2022. Accessed on February 11, 2022. Available from: https://deputyprimeminister.gov.mt/en/health-promotion/covid-19/Pages/vaccines.aspx.
29. Fabrega, I.M. [Benazet afirma que la situació administrativa amb Pfizer s'ha desbloquejat.] El Periòdic d'Andorra, 2021. Accessed on August 30, 2021. Available from: https://www.elperiodic.ad/noticia/83398/benazet-afirma-que-la-situacio-administrativa-amb-pfizer-sha-desbloquejat.
30. European Observatory on Health Systems and Policies. How has the COVID-19 vaccination been rolled-out in small countries within the European Region? – Cross-Country Analysis. COVID-19 Health Systems Response Monitor, 2021. Accessed on August 28, 2021. Available from: https://analysis.covid19healthsystem.org/index.php/2021/07/02/how-has-the-covid-19-vaccination-been-rolled-out-in-small-countries-within-the-european-region.
31. Landesverwaltung Fürstentum Liechtenstein. [Vorbereitung der online-Anmeldung für Risikopatienten. Landesverwaltung Fürstentum Liechtenstein], 2021. Accessed on August 30, 2021. Available from: https://www.serviceportal.li/de/medienmitteilungen/vorbereitung-der-online-anmeldung-fuer-risikopatienten.
32. Gouvernerment Princier, Principaute De Monaco. Vaccination - Covid 19 Monaco. Gouvernerment Princier Principaute De Monaco, 2021. Accessed on August 30, 2021. Availble from: https://covid19.mc/en/fight-against-coronavirus/vaccination/vaccination-procedure.
33. Lopez, L. [Comença la vacunació.] El Periòdic d'Andorra, 2022. Accessed on March 2, 2022. Available from: https://www.elperiodic.ad/noticia/83472/la-vacunacio-comenca-avui.
34. Zambon, P. Covid-19 vaccines Liechtenstein. Covid-19 vaccines, 2022. Accessed on March 12, 2022. Available from: https://covidvax.live/location/lie.
35. Portail du Gouvernement - Monaco. First COVID-19 vaccination in Principality. Coronavirus (Covid-19) Policy & Practice, 2020. Accessed on August 30, 2021. Available from: https://en.gouv.mc/Policy-Practice/Coronavirus-Covid-19/Actualites/First-COVID-19-vaccination-in-Principality.
36. Campagna vaccinazione anti Covid-19 - Repubblica di San Marino. [A cosa serve la terza dose di vaccino?] A cura dell'Ufficio Relazioni con il Pubblico I.S.S., 2021. Accessed on August 30, 2021. Available from: https://vaccinocovid.iss.sm/?fbclid=IwAR08Vk4YiaRH0IZKDnwusOn6VX2sC85l7MkQiEgM76qIGdMDYU9JX1Y96Qk.
37. Vatican News. Vatican begins vaccination campaign. Vatican News, 2021. Accessed on August 30, 2021. Available from: https://www.vaticannews.va/en/vatican-city/news/2021-01/vatican-begins-vaccination-campaign.html.
38. Vinceti, M., Filippini, T., Rothman, K.J., Ferrari, F., Goffi, A., Maffeis, G., et al. Lockdown timing and efficacy in controlling COVID-19 using mobile phone tracking. EClinicalMedicine 2020;25:100457.
39. Goumenou, M., Sarigiannis, D., Tsatsakis, A., Anesti, O., Docea, A.O., Petrakis, D., et al. COVID-19 in Northern Italy: An integrative overview of factors possibly influencing the sharp increase of the outbreak. Mol Med Rep 2020;22(1):20–32.
40. García, J.M.M., Izquierdo, J.A., Pérez, M.I.G. [COVID-19 in Spain, how did we get here?]. Aten primaria 2020;52(10):676–679.
41. Gaudart, J., Landier, J., Huiart, L., Legendre, E., Lehot, L., Bendiane, M.K., et al. Factors associated with the spatial heterogeneity of the first wave of COVID-19 in France: a nationwide geo-epidemiological study. Lancet Public Health 2021;6(4):e222–e231.
42. Chinazzi, M., Davis, J.T., Ajelli, M., Gionnani, C., Litvinova, M., Merler, S., et al. The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. Science 2020;368(6489): 395–400.
43. Cuschieri, S., Balzan, M., Gauci, C., Aguis, S., Grech, V. Mass Events Trigger Malta's Second Peak After Initial Successful Pandemic Suppression. J Community Health 2021;46:618-625.

44. Priesemann, V., Brinkmann, M.M., Ciesek, S., Cuschieri, S., Czypionka, T., Giordano, G., et al. Calling for pan-European commitment for rapid and sustained reduction in SARS-CoV-2 infections. Lancet 2021; 397(10269):P92–93.
45. Times of Malta. Malta enters month-long shutdown as schools, services close, amid virus spike. Times of Malta, 2021. Accessed on March 18, 2021. Available from: https://timesofmalta.com/articles/view/watch-prime-minister-announcing-new-covid-19-measures.857200.
46. Calleja, N., Gualtieri, A., Terzic, N., Scoutellas, V., Calleja-Agius, J. Managing COVID-19 in four small countries: Initial response to the pandemic in San Marino, Montenegro, Malta and Cyprus. Health Policy 2022; S0168-8510(22)00017-3.
47. Svoboda, J., Tkadlec, J., Pavlogiannis, A., Chatterjee, K., Nowak, M.A. Infection dynamics of COVID-19 virus under lockdown and reopening. Scientific Reports 2022:1526.
48. DeRoo, S.S., Pudalov, N.J., Fu, L.Y. Planning for a COVID-19 Vaccination Program. JAMA 2020;323(24):2458-2459.
49. European Commission. EU Vaccines Strategy, 2021. Accessed on June 5, 2021. Available from: https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/public-health/eu-vaccines-strategy_en.
50. Cuschieri, S., Grech, V. A comparative assessment of attitudes and hesitancy for influenza vis-à-vis COVID-19 vaccination among healthcare students and professionals in Malta. Z Gesundh Wiss 2021:1–8.
51. Esteban, A. [L'11% de sanitaris no es vol vacunar.] Diari d'Andorra, 2021. Accessed on September 1, 2021. Available from: https://www.diariandorra.ad/noticies/nacional/2021/01/23/l_del_personal_sanitari_del_saas_rebutja_vacunar_se_173574_1125.html.
52. Leung, K., Wu, J.T., Leung, G.M. Effects of adjusting public health, travel, and social measures during the roll-out of COVID-19 vaccination: a modelling study. Lancet Public Health 2021;6(9):E674-E682.
53. Priesemann, V., Balling, R., Bauer, S., Beutels, P., Valdez, A.C., Cuschieri, S., et al. Towards a European strategy to address the COVID-19 pandemic. Lancet 2021;398(10303):P838-839.

Appendix

Supplement table 1. Demographic characteristics of the microstates

Characteristics	**Andorra**	**Liechtenstein**	**Malta**	**Monaco**	**San Marino**	**Vatican City**
Archipelago size	468Km^2	160Km^2	316 Km^2	2.1Km^2	61Km^2	0.49Km^2
Land borders	Spain and France	Switzerland and Austria	None	France	Italy	Italy
Population size	77,265	38,137	442,772	39,525	34,017	800
Female Life expectancy at birth (2019)	84.9 years	85 years	84.9 years	82.3 years	84.3 years	-
Male Life expectancy at birth (2019)	79.8 years	79.9 years	80.2 years	77.9 years	80.0 years	-

Supplement table 2. Comparison assessment of the different vaccination strategies across the six microstates.

Group/Priority	**Andorra** [1]	**Liechtenstein** [2]	**Malta** [3]	**Monaco** [4]	**Republic of San Marino** [5]	**Vatican City** [6]
1	Residents in social and health centers, for the elderly or disabled, and the workers of these centers,	Residents in nursing homes	Healthcare workers and long-term care facility workers (public and private sector)	Residents 75+	ISS Operators, Disabled people,	Priority given to health and public safety personnel
	Health professionals and those with highest exposure,		Persons living in long-term care facilities – elderly and mental health		Guests and employees of structures dedicated to the most fragile people	Elderly
	People with disabilities who require professional support measures at home to the virus,		Persons aged 85 and over		Private facility operators,	Personnel who most frequently come in contact with the public.
	Workers of companies that offer home care services to people with severe disabilities,				Healthcare workers diagnosed with COVID-19 recover,	
	Primary care physicians and other essential health personnel who are involved in vaccination and pandemic response				Seniors over 75+, Fragile patients with polypathologies	

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Supplement table 2. Comparison assessment of the different vaccination strategies across the six microstates (continued).

	People over 70, vulnerable people (eg. transplanted patients and people receiving dialysis)	Inpatient care staff, outpatient care staff, state hospital staff	All other frontliners;	Residents 65+	People between 60 and 75 years old, School staff, Police Forces	
	Health professionals who carry out healthcare activities with a higher risk than the general population which were not included or not vaccinated in phase I,		Persons 80-85 years of age			
	Primary caregivers of people who are cared for at home with large dependency,					
	Minors which meet the criteria set out in phase I and which have not been able to vaccinate by age criteria					
2						
	Phase 3 (a): People aged >60 or <70 years who have not been vaccinated in the previous stages, ,	Those working in the medical primary care	Vulnearable population	Medical and care staff	People between 16-18 and 59 years old,	
	People at risk of hospital admission, morbidity and mortality due to COVID-19 presenting certain pathologies not included in the previous stages and which have not yet been vaccinated		Staff at schools and child-care centers		People diagnosed with COVID-19 recovery	
3	Workers in supervised flats and shelters,		Persons 70-80 years of age			
	Essential front-line personnel who have not been vaccinated previously,					
	Penitentiary centers					
	Phase 3 (b): People aged >50 or <60 years who have not been vaccinated in the previous stages					

Supplement table 2. Comparison assessment of the different vaccination strategies across the six microstates (continued).

4	Rest of the population	People born in 1951 and older	Rest of the population in decending age group order	Persons with these risk factors are prioritised when registering: Obesity (BMI >30), COPD and severe respiratory failure, Complicated arterial hypertension, Heart failure, Diabetes (Type 1 and Type 2), Chronic kidney failure, Cancers and malignant haematological diseases that are active and date from fewer than 3 years ago, Solid organ or haematopoietic stem cell transplantation, Trisomy 21 Others to be specified		
5		Risk groups under 70 years of age		People aged over 18 who present risk factors for co-morbidity according to a list drawn up by the French High Authority of Health taken up in Monaco.		
6		Remaining population		Rest of population		

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References

[1] Butlleti Oficial del Principat d'Andorra. Regulador del Pla de vacunació contra la infecció per SARS-CoV-2. *Butlleti Oficial del Principat d'Andorra*, https://www.bopa.ad/bopa/033018/Pagines/GD20210205_13_23_21.aspx (2021, accessed 30 August 2021).

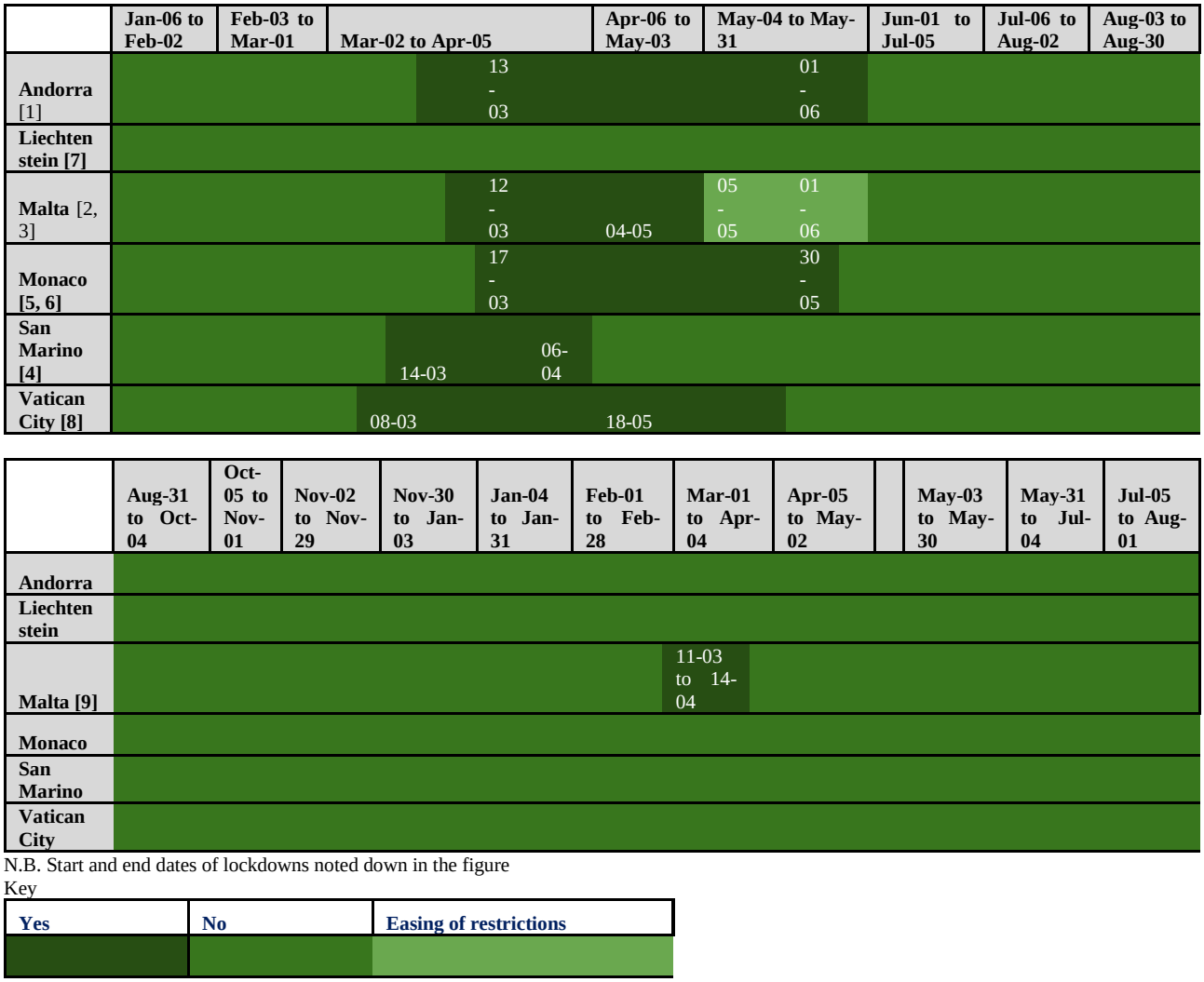
[2] Landesverwaltung Fürstentum Liechtenstein. Informationen zur COVID-19 Impfung. *Health, Prevention and Care*, https://www.serviceportal.li/de/privatpersonen/gesundheit-vorsorge-und-pflege/coronavirus/informationen-zur-covid-impfung (2021, accessed 30 August 2021).

[3] Ministry of Health Malta. Vaccines. *Ministry of Health Malta*, https://deputyprimeminister.gov.mt/en/health-promotion/covid-19/Pages/vaccines.aspx (2021).

[4] Gouvernerment Princier Principaute De Monaco. Vaccination (procedure) - Covid 19 Monaco. *Gouvernerment Princier Principaute De Monaco*, https://covid19.mc/en/fight-against-coronavirus/vaccination/vaccination-procedure/ (2021, accessed 30 August 2021).

[5] A cura dell'Ufficio Relazioni con il Pubblico I.S.S. Campagna vaccinazione anti Covid-19 - Repubblica di San Marino. *A cura dell'Ufficio Relazioni con il Pubblico I.S.S.*, https://vaccinocovid.iss.sm/?fbclid=IwAR08Vk4YiaRH0IZKDnwusOn6VX2sC85l7MkQiEgM76qIGdMDYU9JX1Y96Qk (2021, accessed 30 August 2021).

[6] Vatican News. Vatican's Covid-19 vaccinations to begin soon. *Vatican News*, https://www.vaticannews.va/en/vatican-city/news/2021-01/vatican-covid19-vaccination-programme.html (2021, accessed 30 August 2021).



N.B. Start and end dates of lockdowns noted down in the figure

Key

Supplement figure 1. Lockdowns instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Carrasco M, Royo-Cebrecos C, Ambatlle I, et al. Assessment of the Andorran response to SARS-Cov-2 Pandemic. *Enf Emerg* 2021; 20: 61–70.

[2] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.

[3] Times of Malta. Malta enters month-long shutdown as schools, services close, amid virus spike. *Times of Malta*, https://timesofmalta.com/articles/view/watch-prime-minister-announcing-new-covid-19-measures.857200 (2021, accessed 18 March 2021).

[4] RTV San Marino. Nuovo decreto legge in vigore fino al 6 aprile – 14 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/politica-c2/nuovo-decreto-legge-in-vigore-fino-al-6-aprile-a185082 (accessed 5 September 2021).

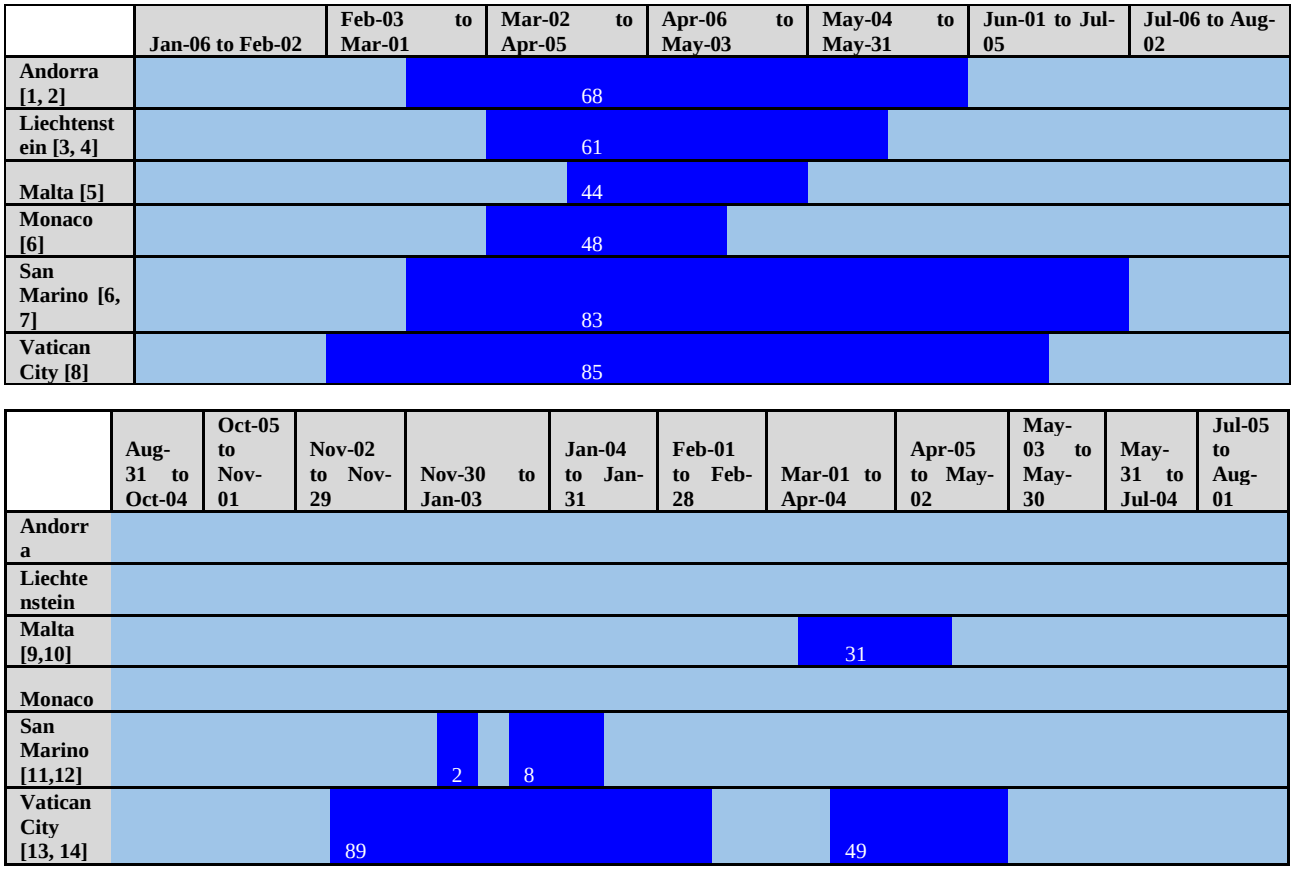
[5] Garda World. Monaco: Lockdown implemented March 17 /update 1. *Garda World*, https://www.garda.com/crisis24/news-alerts/328151/monaco-lockdown-implemented-march-17-update-1 (2020, accessed 5 September 2021).

[6] Garda World. Monaco: Authorities ease COVID-19 restrictions May 4 /update 2. *Garda World*, https://www.garda.com/crisis24/news-alerts/337806/monaco-authorities-ease-covid-19-restrictions-may-4-update-2 (2020, accessed 5 September 2021).

[7] The Government Principality of Liechtenstein. Media Release: Slowing down the spread of the corona virus is the top priority – 13 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/117-corona-ausbreitung-verhindern-0313.pdf?t=637629137284192848 (accessed 5 September 2021).

[8] Wanted in Rome. Public returns to St Peter's Square for pope's blessing – 24 May 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/public-returns-to-st-peters-square-for-popes-blessing.html (accessed 5 September 2021).

[9] Times of Malta. Malta enters month-long shutdown as schools, services close, amid virus spike. *Times of Malta*, https://timesofmalta.com/articles/view/watch-prime-minister-announcing-new-covid-19-measures.857200 (2021, accessed 5 September 2021).



N.B. The closure periods (in days) are illustrated within the figure
Key:

Non-Essential Shops	
Closed	***Open***

Supplement figure 2. Mitigations involving non-essential shops instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Diari d'Andorra. Government closes trade less food and pharmacies – 13 March 2020. *Andorra la Vella*, https://www.diariandorra.ad/noticies/nacional/2020/03/13/missatge_institucional_del_cap_govern_aquest_vespre_158554_1125.html (accessed 5 September 2021).
[2] Navarro, T. Road to reopening – 20 April 2020. *El Periòdic*, https://www.elperiòdic.ad/noticia/78549/cami-cap-a-la-reobertura (accessed 5 September 2021).
[3] The Government Principality of Liechtenstein. Media Release Coronavirus: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637629253778400834 (accessed 5 September 2021).
[4] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 5 September 2021).
[5] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[6] World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, https://www.covid19healthsystem.org/searchandcompare.aspx (2021, 5 September 2021).
[7] RTV San Marino. Nuovo decreto legge in vigore fino al 6 aprile – 14 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/politica-c2/nuovo-decreto-legge-in-vigore-fino-al-6-aprile-a185082 (accessed 5 September 2021).
[8] Wanted in Rome. Vatican Museums reopen after lockdown on 1 June – 23 May 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/vatican-museums-reopen-after-lockdown-on-1-june.html (accessed 5 September 2021).
[9] Sansone, K. [LIVE] New COVID-19 restrictions: schools to close from Monday • Non-essential shops and services to shut from tomorrow – 10 March 2021. *MaltaToday*, https://www.maltatoday.com.mt/news/national/108269/prime_minister_to_announce_more_covid19_restrictions (accessed 5 September 2021).
[10] Television Malta. Gyms, pools and retail outlets not providing essential services to remain closed until 11th April – 10 March 2021.

[11] Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 22 December, 2020 (Doc III.15). *Republic of San Marino*, https://www.google.com/url?sa=D&q=http://www.bollettinoufficiale.sm/on-line/RicercaBU%3Foperation%3DgetDocBU%26id%3D36394c22cc386eecaeea1a6093898932e91c4b53&ust=1630924980000000&usg=AOvVaw0p3MCE8P5lXMgKLPOYlQGf&hl=en-GB (accessed 5 September 2021).
[12] Cardelli, A., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 5 January, 2021. *Republic of San Marino* (accessed 5 September 2021).
[13] Wanted in Rome. Covid-19 in Italy: Vatican Museums reopen after 88 days – 31 January 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-in-italy-vatican-museums-reopen-after-88-days.html (accessed 5 September 2021).
[14] Wanted in Rome. Covid-19: Vatican Museums reopen on 3 May with stricter rules – 2 May 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-vatican-museums-to-reopen-in-may-with-stricter-rules.html (accessed 5 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02
Andorra [1]					N/A	N/A	N/A
Liechtenstein [2]							
Malta [4]							
Monaco [7]							
San Marino [5]							
Vatican City [8]							

	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Liechtenstein [3]											
Malta											
Monaco [7]											
San Marino [6]											
Vatican City [8]											

N.B. The rows with N/A represent unidentified data for the marked period

Key:

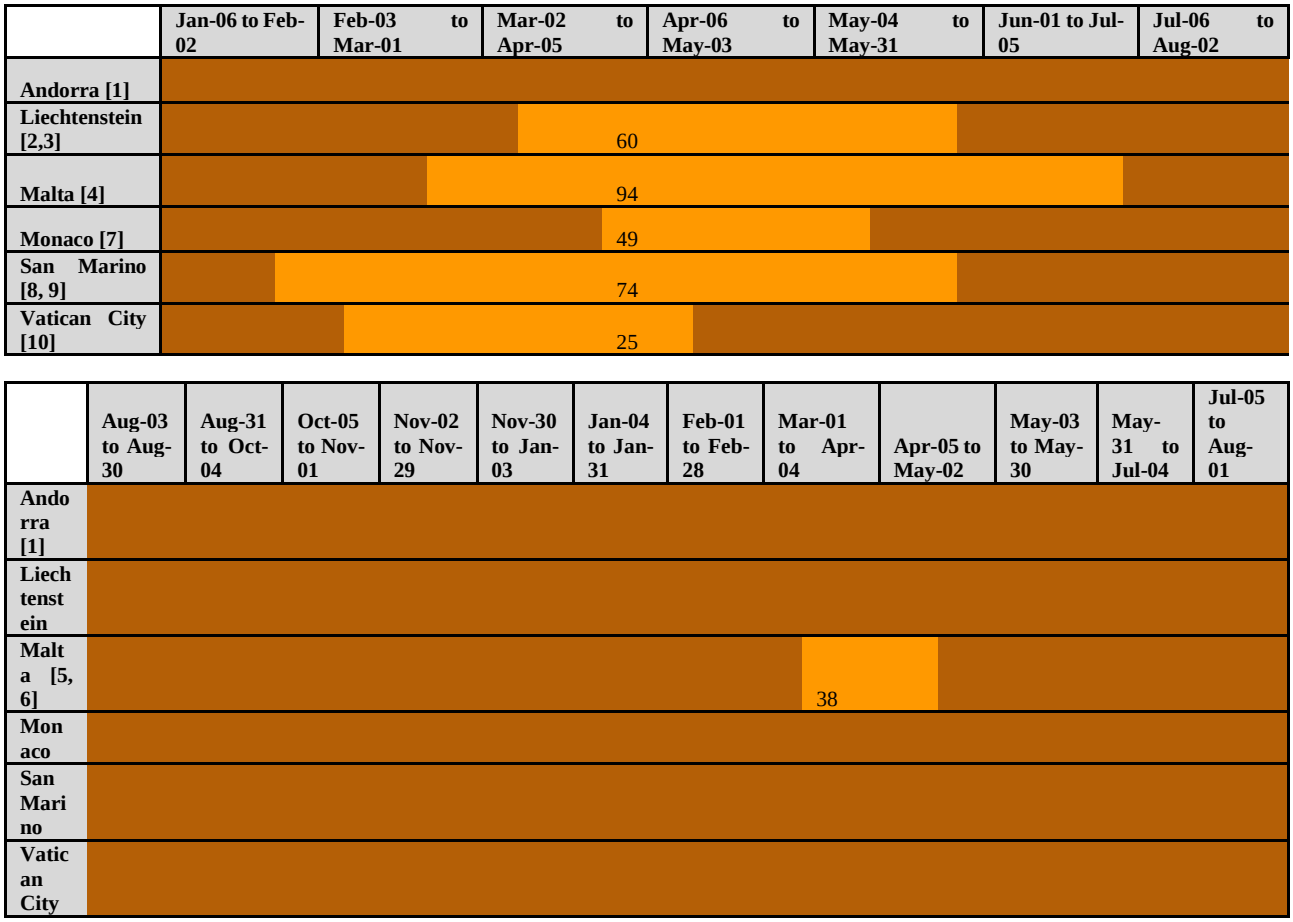
Remote Working		
Yes	***No***	***Optional***

Supplement figure 3. Mitigations involving remote working instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Carrasco, M. G., Ambatlle, I., Serres, K. et al. Assesment of the Andorran response to SARS-Cov-2 Pandemic. *Enf Emerg* 2021; 20: 61–70.
[2] The Government Principality of Liechtenstein. Media Release: New rules of conduct and recommendation regarding coronavirus – 2 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/87-neue-verhaltensregeln.pdf?t=637643737183570445 (accessed 5 September 2021).
[3] The Government Principality of Liechtenstein. Media Release: COVID-19: Government extends measures and sharpens them selectively –15 January 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/23-corona-verlaengerung-verschaerftung-massnahmen.pdf?t=637643741190819186 (accessed 5 September 2021).
[4] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[5] Boschi, L., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 20 March, 2020 (Doc III.17). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=a5e455b95baa7283ace6f55a384b57760801dcbf (accessed 5 September 2021).
[6] Cardelli, A., Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 12 February, 2021 (Doc III.8). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=5d490cc506d1113fc9c127da35a426fc6f95d820 (accessed 5 September 2021).

[7] Gouvernment Princier PDM. COVID-19 – Implementation of teleworking – 2020. *Service public de Gouvernement Princier de Monaco*, https://en.service-public-entreprises.gouv.mc/Employment-and-social-affairs/Employment-regulations/COVID19/COVID19-Implementation-of-teleworking (accessed 5 September 2021).
[8] Ivereigh, A. An interview with Pope Francis 'A Time of Great Uncertainty' – 8 April 2020. *Commonweal magazine*, https://www.commonwealmagazine.org/time-great-uncertainty (accessed 5 September 2021).



Supplement figure 4. Mitigations on religious activities instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] el Periòdic. Vives calls for churches to remain open by applying "all precautions" – 13 March 2020. *El Periòdic*, https://www.elperiòdic.ad/noticia/77796/vives-demana-que-les-esglesies-continuin-obertes-aplicant-totes-les-prevencions (accessed 5 September 2021).
[2] The Government Principality of Liechtenstein. Media Release: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637631011108917831 (accessed 5 September 2021).
[3] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 5 September 2021).
[4] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[5] Television Malta. Church stops religious functions with immediate effect – 10 March 2021. *Television Malta*, https://www.tvm.com.mt/en/news/il-knisja-twaqqaf-il-church-stops-religious-functions-with-immediate-effect-religjuzi-kollha-beffett-immedjat/ (accessed 5 September 2021).
[6] Pace, F. Archbishop urges faithful to return to church on Sunday April 18 – 15 April 2021. *Television Malta*, https://www.tvm.com.mt/en/news/archbishop-urges-faithful-to-return-to-church-on-sunday-april-18/ (accessed 5 September 2021).
[7] World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, https://www.covid19healthsystem.org/searchandcompare.aspx (2021, 5 September 2021).
[8] RTV San Marino. Emessa la nuova ordinanza: focus su ristoranti e mense. Sospese scuole, manifestazioni culturali e eventi sportivi – 2 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/attualita-c4/emessa-la-nuova-ordinanza-focus-su-ristoranti-e-mense-sospese-scuole-manifestazioni-culturali-e-eventi-sportivi-a184433 (accessed 5 September 2021).

[9] RTV San Marino. San Marino: allo scoccare della mezzanotte parte la "Fase 2". Tutte le disposizioni nel decreto che regola la mobilità – 4 May 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/attualita-c4/san-marino-allo-scoccare-della-mezzanotte-parte-la-fase-2-tutte-le-disposizioni-nel-decreto-che-regola-la-mobilita-a187854 (accessed 5 September 2021).
[10] Wanted in Rome. Coronavirus: Vatican seals off St Peter's – 10 March 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/coronavirus-vatican-seals-off-st-peters.html (accessed 5 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02
Andorra [1, 2]			H	H	H	H H H H H H	
Liechtenstein [6, 7]	H	H	H	H	H	H H H H H	
Malta [8]	T	T	T	T + H	T+H	H H H H H	
Monaco [9 - 11]			T+H	T + H	T	H T H T	
San Marino [12]	H	H	H	H H	N/A	N/A	N/A N/A N/A N/A N/A N/A
Vatican City [13]	T	T	T	T T T	T	T	T T T T T

	Aug-03 to Aug-30	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04
Andorra [3, 4]	H H H H H H H	H + S	H + S	H	S S S S S S S H H H H H H H			
Liechtenstein	H H H H H H	H H H H	H H H H H					
Malta	H H H H H H H	H H H H	H H H H H					T+H T+H
Monaco	H T H T H T	H T H T	H T					H T
San Marino	N/A N/A N/A N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	N/A N/A
Vatican City [14, 15]	T T T T T T T	T T T T	T T T T T	T	T T T T T	T	T T T T T	

	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra [5]	S S H H H	H + S H + S	H + S H + S	H + S H + S
Liechtenstein	H H	H H	H H	H H
Malta	T+H T+H	H H	H H	H H
Monaco	H T	H T	H T	H T
San Marino	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Vatican City	T T	T T	T T	T T

N.B. The rows with N/A represent unidentified data for the marked period

Key

Hotels & Tourism			
Closed	*Open for Charters and Boats*	*Open for Schengen, EU and UK*	*Open*

T + H - both tourism and hotels closed; T - tourism only open for charters and boats; H - hotels open; S - Ski resorts; Monaco: From end of June onwards tourism
was open for Schengen, UK and EU countries and Hotels were open

Supplement figure 5. Mitigations on hotels and tourism instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Navarro, T. Some hotels are closing in anticipation of new measures from the Executive – 16 March 2020. *El Periòdic*, https://www.elperiòdic.ad/noticia/77854/alguns-hotels-tanquen-a-lespera-de-noves-mesures-de-lexecutiu (accessed 5 September 2021).

[2] Fàbrega, I. M. The boundary begins with the general resumption of activity – 26 May 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/79230/comenca-el-desconfinament-amb-la-represa-general-de-lactivitat (accessed 5 September 2021).

[3] López, L. Hotels closed waiting for borders to reopen – 11 November 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/82161/hotels-tancats-a-lespera-que-es-reobrin-les-fronteres (accessed 5 September 2021).
[4] El periòdic. The government and the ski resorts agree on a gradual opening – 28 December 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/83076/el-govern-i-les-estacions-desqui-acorden-una-obertura-progressiva (accessed 5 September 2021).
[5] Bernat, M. Open hotels fill 48% on weekends – 5 May 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/85494/els-hotels-oberts-omplen-el-48-el-cap-de-setmana (accessed 5 September 2021).
[6] The Government Principality of Liechtenstein. Media Release: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637631011108917831 (accessed 5 September 2021).
[7] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 5 September 2021).
[8] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[9] World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, https://www.covid19healthsystem.org/searchandcompare.aspx (2021, 5 September 2021).
[10] Travelbans. Travel Ban, New Rules and Unexpected Flying Restrictions: What will tourism be life after coronavirus? https://travelbans.org/ (accessed 5 September 2021).
[11] Drift Travel. Hotels re-open in the Principality of Monaco. *Drift Travel*, https://drifttravel.com/hotels-re-open-in-the-principality-of-monaco/ (accessed 5 September 2021).
[12] Fabbri, M. Decreto in via di definizione: si ragiona su Cassa Integrazione Straordinaria per pubblico e privato – 13 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/politica-c2/decreto-in-via-di-definizione-si-ragiona-su-cassa-integrazione-straordinaria-per-pubblico-e-privato-a185018 (accessed 5 September 2021).
[13] Wanted in Rome. Vatican Museums reopen after lockdown on 1 June – 23 May 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/vatican-museums-reopen-after-lockdown-on-1-june.html (accessed 5 September 2021).
[14] Wanted in Rome. COVID-19 in Italy: Vatican Museums reopen after 88 days – 31 January 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-in-italy-vatican-museums-reopen-after-88-days.html (accessed 5 September 2021).
[15] Wanted in Rome. COVID-19: Vatican Museums reopen on 3 May with stricter rules – 2 May 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-vatican-museums-to-reopen-in-may-with-stricter-rules.html (accessed 5 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02
Andorra							
Liechtenstein							
Malta [1]							
Monaco							
San Marino							
Vatican City							

	Aug-03 to Aug-30	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra												
Liechtenstein												
Malta												
Monaco												
San Marino												
Vatican City												

Key:

Airports		
Closed	*Open*	*No airport*

Supplement figure 6. Mitigations involving the airport instituted by Malta (the only microstate with an airport)

References

[1] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02
Andorra [1]							
Liechtenstein [4 – 6]							
Malta [16]							
Monaco	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Marino [18]							
Vatican City [20]							

	Aug-03 to Aug-30	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra [2, 3]												
Liechtenstein [7-15]												
Malta [16, 17]	!	N/A N/A N/A N/A N/A		<6	N/A N/A N/A N/A		N/A	<6 <4			^^	N/A
Monaco	N/A	N/A N/A N/A		N/A	N/A N/A		N/A	N/A N/A	N/A	N/A N/A	N/A	N/A
San Marino [19]				<6						<4		<20
Vatican City [20]												

N.B. The rows with N/A represent unidentified data for the marked period

Key:

Gathering Limitations								
Over 1000	*Upto 1000*	*Upto 300*	*Upto 100*	*Upto 30*	*Upto 10*	*Upto 5*	*No limits*	*Limits Unspecified*

! (Malta): 7th august - 100 people indoors and 300 people outdoors for mass events (every event would be limited by the size of the venue, with no more than one person for every four-square meter)
^^ (Malta) although the six-person limit has been removed. Large, mass gatherings are still banned.

Supplement figure 7. Mitigations on gatherings instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Pérez V. G. Maximum 10 people per table, separated by a meter and a half – 26 May 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/79219/maxim-10-persones-per-taula-separades-per-un-metre-i-mig (accessed 5 September).
[2] Government of Andorra. Health authorities are calling for reduced social interaction – 18 September 2020. *Government of Andorra*, https://www.govern.ad/comunicats/item/11886-les-autoritats-sanitaries-demanen-reduir-la-interaccio-social (accessed 5 September 2021).
[3] López L. It is limited to 10 people and two meetings Christmas meetings – 15 December 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/82854/es-limita-a-10-persones-i-dues-trobades-les-reunions-de-nadal (accessed 5 September 2021).
[4] The Government Principality of Liechtenstein. Media Release: Implementation of events in Liechtenstein – 28 February 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/86-durchfuehrung-veranstaltungen.pdf?t=637636023362056561 (accessed 5 September 2021).
[5] The Government Principality of Liechtenstein. Media Release:Coronavirus: measure will be tightened tomorrow, Monday, March 16 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637636025390652932 (accessed 5 September 2021).

[6] The Government Principality of Liechtenstein. Media Release: Slowing down the spread of the corona virus is the top priority–13 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/117-corona-ausbreitung-verhindern-0313.pdf?t=637629137284192848 (accessed 5 September 2021).
[7] The Government Principality of Liechtenstein. Media Release: Extensive return to normal – 24 June 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/351-corona-rueckkehr-normalitaet-0624.pdf?t=637636028069245539 (accessed 5 September 2021).
[8] The Government Principality of Liechtenstein. Media Release: Start into a new normal – 29 May 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/293-corona-neue-normalitaet-0529.pdf?t=637636026151123766 (accessed 5 September 2021).
[9] The Government Principality of Liechtenstein. Media Release: Large events are possible again and the quarantine requirement has been adjusted – 11 September 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/480-corona-grossveranstaltungen-0911.pdf?t=637636029710493216 (accessed 5 September 2021).
[10] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 5 September 2021).
[11] The Government Principality of Liechtenstein. Media Release: COVID-19: Government extends measures and sharpens them selectively – 15 January 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/23-corona-verlaengerung-verschaerftung-massnahmen.pdf?t=637636042121862572 (accessed 5 September 2021).
[12] The Government Principality of Liechtenstein. Media Release: Government decides to cautiously relax measures first – 23 February 2021. *Information and Communication the Government Principality of Liechtenstein, https://www.regierung.li/files/attachments/20210223-Medienmitteilung-102-Corona-Lockerung-Massnahmen.pdf?t=637636020345385727* (accessed 5 September 2021).
[13] The Government Principality of Liechtenstein. Media Release: The epidemiological situation allows further easing – 18 May 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/20210518-Medienmitteilung-303-Corona-Weitere-Lockerungen.pdf?t=637636044774939647 (accessed 5 September 2021).
[14] The Government Principality of Liechtenstein. Media Release: Government is further easing corona measures – 29 June 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/20210629-regierung-lockert-corona-massnahmen-weiter.pdf?t=637635461126772613 (accessed 5 September 2021).
[15] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[16] Times of Malta. Bars ordered to close until December, public groups beyond six prohibited. *Times of Malta*, https://timesofmalta.com/articles/view/bars-clubs-to-remain-closed-until-december-grouper-larger-than-six-to.827485 (2020, accessed 5 September 2021).
[17] Sansone, K. [LIVE] New COVID-19 restrictions: schools to close from Monday • Non-essential shops and services to shut from tomorrow – 10 March 2021. *MaltaToday*, https://www.maltatoday.com.mt/news/national/108269/prime_minister_to_announce_more_covid19_restrictions (accessed 5 September 2021).
[18] Boschi, L., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 20 March, 2020 (Doc III.17). *Republic of San Marino*, http://www.bollettinoufficiale.sm/online/RicercaBU?operation=getDocBU&id=a5e455b95baa7283ace6f55a384b57760801dcbf (accessed 5 September 2021).
[19] A3M Global Monitoring. Making Your World a Little Safer, Local Control. https://www.global-monitoring.com/en/ (accessed 5 September 2021).
[20] Wanted in Rome. Vatican: Pope celebrates Easter in St Peter's without faithful – 9 April 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/vatican-pope-celebrates-easter-in-st-peters-without-faithful.html (accessed 5 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02
Andorra [1, 2]					N/A	N/A	N/A
Liechtenstein	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Malta [3]			*				
Monaco	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Marino [5, 6]				N/A	N/A		
Vatican City	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Aug-03 to Aug-30	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A	N/A	N/A	N/A
Liechtenstein	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A	N/A	N/A	N/A
Malta [4]								**				
Monaco	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A	N/A	N/A	N/A
San Marino [7]												
Vatican City	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A	N/A	N/A	N/A

N.B. The rows with N/A represent unidentified data for the marked period

Key:

Non-Essential Travel	
Allowed	*Not Allowed*

Supplement figure 8. Mitigations on non-essential travel instituted by the microstates from the onset of COVID-19 till 1st August 2021

References

[1] Revuelta, E. Cross-border residents and students will be able to enter and leave the Principality – 14 March 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/77835/els-residents-tranfronterers-i-els-estudiants-podran-entrar-i-sortir-del-principat (accessed 6 September 2021).

[2] Pérez, V. G. Anar i tornar de l'estranger en un dia no suposarà aïllament – 30 April 2020. *El periòdic*, https://translate.google.com/?sl=auto&tl=en&text=https%3A%2F%2Fwww.elperiòdic.ad%2Fnoticia%2F77835%2Fels-residents-tranfronterers-i-els-estudiants-podran-entrar-i-sortir-del-principat&op=translate (accessed 6 September 2021).

[3] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.

[4] Sansone, K. [LIVE] New COVID-19 restrictions: schools to close from Monday • Non-essential shops and services to shut from tomorrow – 10 March 2021. *MaltaToday*, https://www.maltatoday.com.mt/news/national/108269/prime_minister_to_announce_more_covid19_restrictions (accessed 6 September 2021).

[5] RTV San Marino. Misure urgenti in materia di contenimento e gestione dell'emergenza epidemiologica da COVID-19 – 8 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/comunicati-c9/misure-urgenti-in-materia-di-contenimento-e-gestione-dell-emergenza-epidemiologica-da-covid-19-a184756 (accessed 6 September 2021).

[6] Travelbans. Travel Ban, New Rules and Unexpected Flying Restrictions: What will tourism be life after coronavirus? https://travelbans.org/ (accessed 6 September 2021).

[7] Segretaria di stato per gli affair esteri, per la cooperazione economica internazionale e le telecomuniciazioni. Availabe at: https://www.esteri.sm (accessed 6 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02	Aug-03 to Aug-30
Andorra [1 – 3]			*	*	* *	* * * * *	**** *	*** ** *** **
Liechtenstein [7]						*	*	* *
Malta [13]				*	* *	* * * *	*	* *
Monaco [16 – 19]					* *	**	**	** ***
San Marino [23]	N/A	N/A	N/A	N/A	N/A * ->	N/A N/A N/A	N/A N/A	N/A N/A
Vatican City [25 – 27]			****/ +	****/+	**** **** /+ /+	*** *** */+ */+	****/ + ****/+	*** *** */+ */+

	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra [4 – 6]	*****	*****	** ** * ** ** * ** ** *	*****	*****	*****	*****	*** ** ** **	** ** * ** ** * *****	** ** *	***
Liechtenstein [8 - 12]	*		** *	*	*	*	*	* * * *	*		
Malta [14, 15]	*	*	** ** * ** ** * ** ** *	*****	*****	*****	*****	*** ** ** **	** ** * ** ** * *****	** ** *	
Monaco [20 - 22]	***		** * ** *	***	***	***	***	** ** ** **		**** * ** ** *	** ** ** *
San Marino [24]	N/A	N/A	N/A N/A N/A	N/A	N/A	N/A	N/A	N/A N/A N/A	N/A	N/A N/A N/A	
Vatican City [27, 28]	****/+	****/+	-> + +	+	+	+	+	+ + + +	+ + +		+

N.B. The rows with N/A represent unidentified data for the marked period

Key

Mask Mandate			
Mask mandate with fine	***Mask mandate w/o fine***	***Mask mandate + fine unspecified***	***No mandate***

* in shops, schools, public areas, indoors and public transport
** in queues
*** in crowded areas
\+ in St Peter's Basilica
**** in all public spaces
***** everywhere

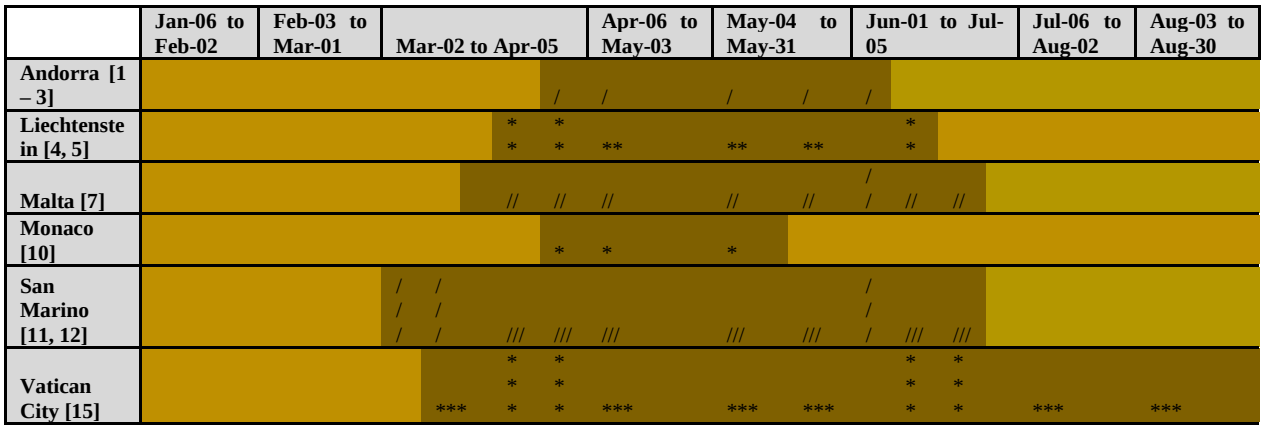
no mandate in workplaces only
no mandate everywhere except public transport
no mandate for fully vaccinated people only

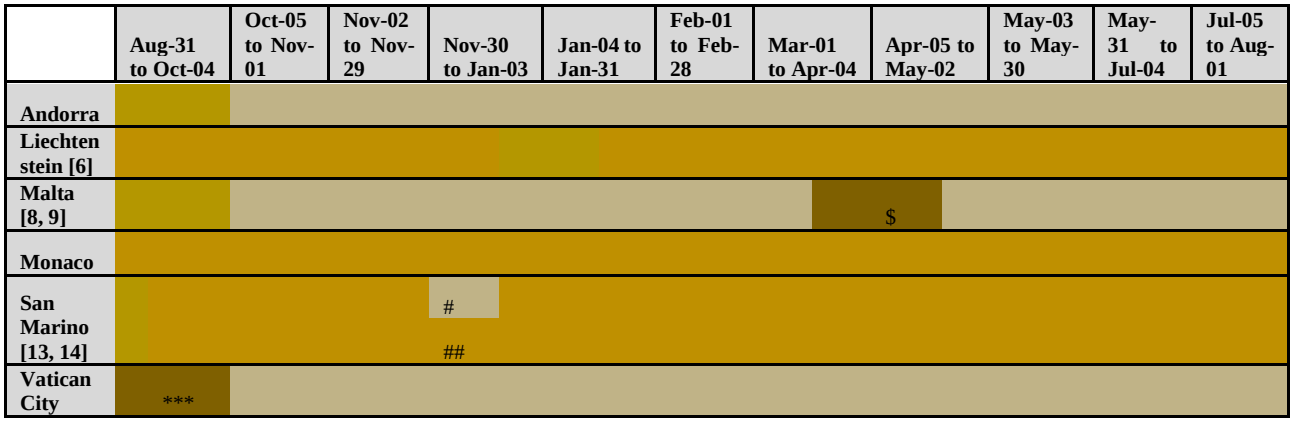
Supplement figure 9. Mitigations on mask wearing instituted by the microstates from the onset of COVID-19 till 1st August

References

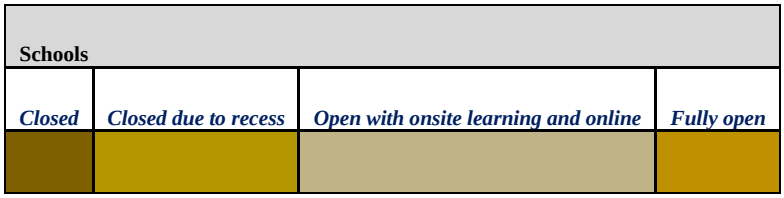
[1] Pérez, V. G. The use of a mask will be mandatory when reopening economic activity – 4 April 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/78240/lus-de-mascareta-sera-obligatori-quan-reobri-lactivitat-economica (accessed 6 September 2021).
[2] Travelbans. Travel Ban, New Rules and Unexpected Flying Restrictions: What will tourism be life after coronavirus? https://travelbans.org/ (accessed 6 September 2021).
[3] Govern d'Andorra. El Govern decreta l'ús obligatori de mascaretes com a mesura preventiva davant la COVID-19 – 14 July 2020. *Govern d'Andorra,* https://www.govern.ad/comunicats/item/11716-el-govern-decreta-l-us-obligatori-de-mascaretes-com-a-mesura-preventiva-davant-la-covid-19 (accessed 6 September 2021).
[4] Santana, F. Penalties of between 500 and 20,000 euros for skipping confinement – 14 October 2020. *Bondia*, https://www.bondia.ad/societat/sancions-dentre-500-i-20000-euros-saltar-se-el-confinament (accessed 6 September 2021).
[5] Bernat, M. The mask is already a custom – 18 June 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/86433/la-mascareta-ja-es-un-costum (accessed 6 September 2021).
[6] El periòdic. The festivities must end at 10.30 pm – 8 July 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/86820/els-actes-de-festa-major-hauran-de-finalitzar-a-les-22.30-hores (accessed 6 September 2021).

[7] The Government Principality of Liechtenstein. Media Release: Mask requirement in public transport and quarantine for people entering from risk areas – 3 July 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/372-corona-maskenpflicht-oev-0703.pdf?t=637635452709418767 (accessed 6 September 2021).
[8] The Government Principality of Liechtenstein. Media Release: Government tightened and standardized measures for events and gastronomy– 15 October 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/569-corona-pk-1015.pdf?t=637635454926460485 (accessed 6 September 2021).
[9] The Government Principality of Liechtenstein. Media Release: Government extends mask requirement – 20 October 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/577-corona-regierung-weitet-maskenpflicht-aus-1020.pdf?t=637635454926460485 (accessed 6 September 2021).
[10] The Government Principality of Liechtenstein. Media Release: COVID-19: Government extends measures and sharpens them selectively –15 January 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/23-corona-verlaengerung-verschaerftung-massnahmen.pdf?t=637643741190819186 (accessed 6 September 2021).
[11] The Government Principality of Liechtenstein. Media Release: Government takes further steps towards normalcy – 8 June 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/20210608-Medienmitteilung-348-Corona-Schritte-Normalitaet.pdf?t=637635461126772613 (accessed 6 September 2021).
[12] The Government Principality of Liechtenstein. Media Release: Government is further easing corona measures – 29 June 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/20210629-regierung-lockert-corona-massnahmen-weiter.pdf?t=637635461126772613 (accessed 6 September 2021).
[13] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[14] Television Malta. From today, obligatory to wear face masks in the street – 16 October 2020. *TVM*, https://www.tvm.com.mt/en/news/minn-ghada-obbligatorju-l-from-tomorrow-obligatory-to-wear-face-masks-in-the-street-tal-maskra-anke-fit-toroq/ (accessed 6 September 2021).
[15] Television Malta. WATCH: Many have continued to wear a mask, others say they're "very happy" – 1 July 2021. *TVM*, https://www.tvm.com.mt/en/news/watch-many-have-continued-to-wear-a-mask-others-say-theyre-very-happy/ (accessed 6 September 2021).
[16] Gouvernement Princier. COVID-19 – Eighth meeting of joint monitoring committee – 14 May 2020. *Gouvernement Princier*, https://en.gouv.mc/A-la-Une-du-Portail/COVID-19-Eighth-meeting-of-Joint-Monitoring-Committee (accessed 6 September 2021).
[17] World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, https://www.covid19healthsystem.org/searchandcompare.aspx (2021, 6 September 2021).
[18] Gouvernement Princier. COVID-19 – Prince's Government announces new precautionary measures – 30 July 2020. *Gouvernement Princier*, https://en.gouv.mc/Policy-Practice/Coronavirus-Covid-19/Actualites/Prince-s-Government-announces-new-precautionary-measures (accessed 6 September 2021).
[19] Gouvernement Princier. Mask wearing in public spaces in the Principality – 11 August 2020. *Gouvernement Princier*, https://en.gouv.mc/Policy-Practice/Coronavirus-Covid-19/Actualites/Mask-wearing-in-public-spaces-in-the-Principality (accessed 6 September 2021).
[20] Gouvernement Princier. Press release by the Prince's Government on 19 March 2021 – 19 March 2021. *Gouvernement Princier*, https://en.gouv.mc/A-la-Une-du-Portail/Press-release-by-the-Prince-s-Government-on-19-March-2021 (accessed 6 September 2021).
[21] Gouvernement Princier. COVID-19 – 10 pm curfew, relaxations for restaurants and bars, swimming pools to open – 14 May 2021. *Gouvernement Princier*, https://en.gouv.mc/Policy-Practice/Coronavirus-Covid-19/Actualites/COVID-19-10-pm-curfew-relaxation-for-restaurants-and-bars-swimming-pools-to-openaccessed (6 September 2021).
[22] Gouvernement Princier. COVID-19 – Wearing a mask is obligatory throughout the Principality of Monaco – 22 July 2021. *Gouvernement Princier*, https://en.gouv.mc/Policy-Practice/Coronavirus-Covid-19/Actualites/COVID-19-Wearing-a-Mask-is-Obligatory-Throughout-the-Principality-of-Monaco (accessed 6 September 2021).
[23] Zafferani, G., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 15 May, 2020. *Republic of San Marino* (accessed 6 September 2021).
[24] Venturini, G. C., Nicolini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 30 June, 2021 (Doc III.28). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=468d3b41d36165bcbb2c73a955913aa00e75ca76 (accessed 6 September 2021).
[25] Euronews Travel. Where can I travel in Europe this summer? A complete list of COVID-19 restrictions – 31 August 2021. *Euronews Travel*, https://www.euronews.com/travel/2021/07/14/what-s-the-latest-on-european-travel-restrictions (accessed 6 September 2021).
[26] Headout. Vatican tickets & tours available at: https://www.thevaticantickets.com/ (accessed 6 September 2021).
[27] Headout. St Peters Basilica tickets available at: https://www.st-peters-basilica-tickets.com/ (accessed 6 September 2021).
[28] Winfield, N. Italy, Vatican City imposes mask mandate outside and in as virus rebounds – 8 October 2020. *Crux – Taking the Catholic Pulse*, https://cruxnow.com/church-in-europe/2020/10/italy-vatican-city-imposes-mask-mandate-outside-and-in-as-virus-rebounds/ (accessed 6 September 2021).





Key



*Childcare and kindergraten closed on 16/3/2020. Date of reopening was not found; Primary schools closed from 16/3/2020 to 25/5/2020; Secondary schools closed from 16/3/2020 to 18/5/2020; Post-secondary schools closed from 16/3/2020 to 11/5/2020.

** Childcare closed from 13/3/2020 to 18/5/2020; Kindergarten, primary and secondary (form 1/2) schools closed from 13/3/2020 to 11/5/2020; Forms 3-5 closed from 13/3/2020 to 18/5/2020; Post-secondary schools closed from 13/3/2020 to 8/6/2020.

*** Post-secondary schools only applicable at Vatican City; / All schools closed on 16/3/2020; Childcare reopened on the 18/5/2020; All other schools reopened 2/6/2020; // All schools closed 12/3/2020 and reopened at the end of June; /// All schools closed on 2/3/2020.

Kindergarten reopened partially between 8/6/2020-25/6/2020.
Nurseries reopened on 8/6/2020.
Primary reopened on 10/6/2020.
Secondary and Post-secondary reopened on 30/6/2020.

Secondary high school - mixed learning online
All schools except Secondary high school

$ staggered opening of schools

Supplement figure 10. Mitigations on schools instituted by the microstates from the onset of COVID-19 till 1st August

References

[1] Govern d'Andorra. The Government is intensifying preventive measures to contain COVID-19 – 13 March 2020. *Govern d'Andorra,* https://www.govern.ad/comunicats/item/11302-el-govern-intensifica-les-mesures-preventives-per-a-la-contencio-del-covid-19 (accessed 6 September 2021).
[2] Carrasco, M. G., Ambatlle, I., Serres, K. et al. Assesment of the Andorran response to SARS-Cov-2 Pandemic. *Enf Emerg* 2021; 20: 61–70.

[3] El periòdic. Sant Ermengol school is preparing three stages for the school year – 22 August 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/80738/el-collegi-sant-ermengol-prepara-tres-escenaris-per-al-curs-escolar (accessed 6 September 2021).
[4] The Government Principality of Liechtenstein. Media Release: Slowing down the spread of the corona virus is the top priority – 13 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/117-corona-ausbreitung-verhindern-0313.pdf?t=637629137284192848 (accessed 6 September 2021).
[5] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 6 September 2021).
[6] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 6 September 2021).
[7] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[8] Sansone, K. [LIVE] New COVID-19 restrictions: schools to close from Monday • Non-essential shops and services to shut from tomorrow – 10 March 2021. *MaltaToday*, https://www.maltatoday.com.mt/news/national/108269/prime_minister_to_announce_more_covid19_restrictions (accessed 6 September 2021).
[9] Television Malta. How re-opening of church schools will proceed – 8 April 2021. *TVM*, https://www.tvm.com.mt/en/news/how-re-opening-of-church-schools-will-proceed/ (accessed 6 September 2021).
[10] Hello Monaco. Closure of Crèches and schools in Monaco and increasing prudent restrictions due to coronavirus – 14 March 2020. https://www.hellomonaco.com/news/latest-news/closure-of-creches-and-schools-in-monaco-and-increasing-prudent-restrictions-due-to-coronavirus/ (accessed 6 September).
[11] Venturini, G. C., Nicolini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 30 June, 2021 (Doc III.28). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=468d3b41d36165bcbb2c73a955913aa00e75ca76 (accessed 6 September 2021).
[12] RTV San Marino. La festa dell'arrivederci per I piccoli di nidi e materne in attesa di tornare a settembre – 4 June 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/italia-c7/la-festa-dell-arrivederci-per-i-piccoli-di-nidi-e-materne-in-attesa-di-tornare-a-settembre-a189439 (accessed 6 September 2021).
[13] RTV San Marino. San Marino: ritorno in classe per gli alunni di Infanzia, Elementari , Medie e Cfp – 7 September 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/attualita-c4/san-marino-ritorno-in-classe-per-gli-alunni-di-infanzia-elementari-medie-e-cfp-a193765 (accessed 6 September 2021).
[14] RTV San Marino. Scuola Secondaria Superiore: due proposte per una riapertura in sicurezza – 1 December 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/attualita-c4/scuola-secondaria-superiore-due-proposte-per-una-riapertura-in-sicurezza-a197839 (accessed 6 September 2021).
[15] Wooden, C. Pontifical universities to reopen in the fall, but have backup plans – 13 May 2020. *Crux – Taking the Catholic Pulse*, https://cruxnow.com/vatican/2020/05/pontifical-universities-to-reopen-in-the-fall-but-have-backup-plans/ (accessed 6 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02	Aug-03 to Aug-30
Andorra [1, 2]						N/A N/A	N/A	N/A
Liechtenstein [6 -10]								
Malta [19]								
Monaco [22, 23]								
San Marino [25]					N/A N/A N/A	N/A N/A N/A	N/A	N/A
Vatican City [29]								

	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra [3 – 5]	N/A										
Liechtenstein [11-18]				*				**		***	
Malta [20, 21]									/		
Monaco [24]											
San Marino [26 - 28]	N/A	N/A N/A N/A N/A N/A N/A			N/A	N/A N/A N/A N/A N/A N/A		N/A N/A N/A N/A N/A N/A		N/A N/A N/A N/A N/A N/A	N/A
Vatican City [30, 31]											

N.B. The rows with N/A represent unidentified data for the marked period

Key

Restaurants						
Closed	*Open with specific hours*	*Open with takeout*		*Outdoor areas open only*	*Open with a seating limit*	*Fully open*

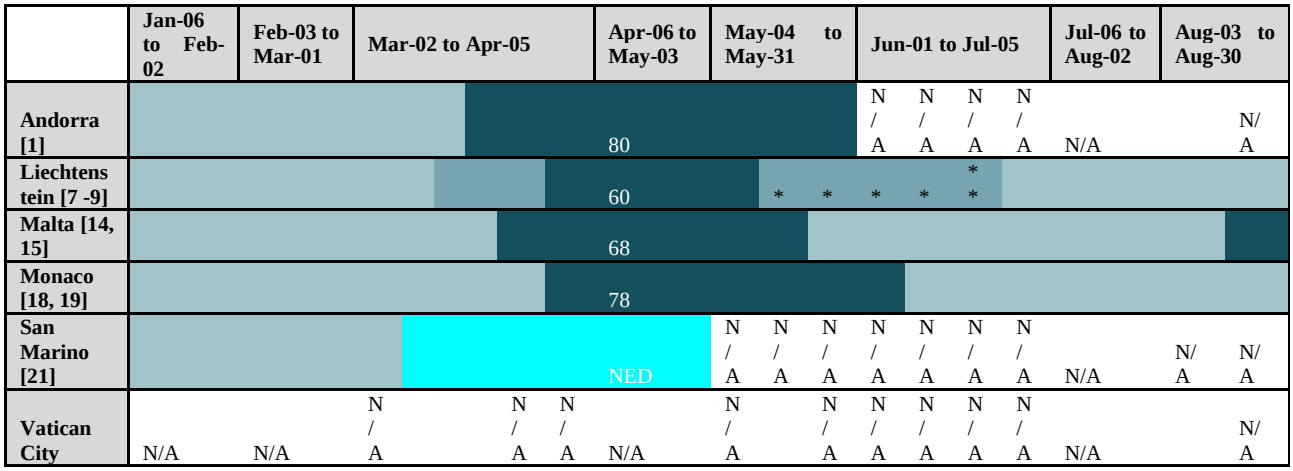
* also have seating limits
** also have a curfew
*** same seating limits continued
/ the end of this restaurant restriction, marked the beginning of restaurants opening with a curfew of 5 pm

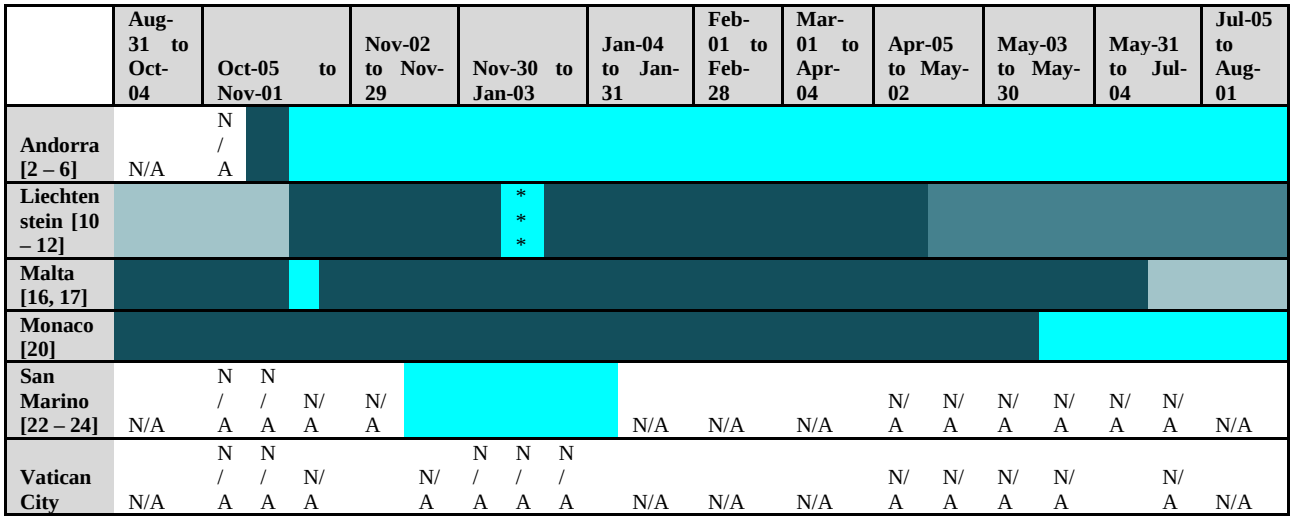
Supplement figure 11. Mitigations on restaurants instituted by the microstates from the onset of COVID-19 till 1st August

References

[1] Govern d'Andorra. Message from the head of government to the population regarding the exceptional situation due to coronavirus – 13 March 2020. *Govern d'Andorra,* https://www.govern.ad/comunicats/item/11305-missatge-del-cap-de-govern-a-la-poblacio-davant-la-situacio-excepcional-per-coronavirus (accessed 6 September 2021).
[2] El periòdic. The PS asks about the closing time of nightlife – 9 July 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/80036/el-ps-pregunta-sobre-lhora-de-tancament-doci-nocturn (accessed 6 September 2021).
[3] Pérez, V. G. The government closes the bars – 8 October 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/81533/el-govern-tanca-els-bars (accessed 6 September 2021).
[4] El periòdic. Restaurants gain an hour of attention at noon – 7 January 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/83231/els-restaurants-guanyen-una-hora-datencio-al-migdia (accessed 6 September 2021).

[5] Govern d'Andorra. The council of ministers approves extending the opening hours of bars and restaurants until 1 am – 30 June 2021. *Govern d'Andorra,* https://www.govern.ad/salut/item/13003-el-consell-de-ministres-aprova-ampliar-l-horari-d-obertura-de-bars-i-restaurants-fins-a-la-1-de-la-matinada (accessed 6 September 2021).
[6] The Government Principality of Liechtenstein. Media Release: Slowing down the spread of the corona virus is the top priority – 13 March 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/117-corona-ausbreitung-verhindern-0313.pdf?t=637629137284192848 (accessed 6 September 2021).
[7] The Government Principality of Liechtenstein. Media Release Coronavirus: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637629253778400834 (accessed 6 September 2021).
[8] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 6 September 2021).
[9] The Government Principality of Liechtenstein. Media Release: Start into a new normal – 29 May 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/293-corona-neue-normalitaet-0529.pdf?t=637636026151123766 (accessed 6 September 2021).
[10] The Government Principality of Liechtenstein. Media Release: Extensive return to normal – 24 June 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/351-corona-rueckkehr-normalitaet-0624.pdf?t=637636028069245539 (accessed 6 September 2021).
[11] The Government Principality of Liechtenstein. Media Release: Government tightened and standardized measures for events and gastronomy– 15 October 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/569-corona-pk-1015.pdf?t=637635454926460485 (accessed 6 September 2021).
[12] The Government Principality of Liechtenstein. Media Release: Government closes catering for three weeks – 23 October 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/588-corona-regierung-schliesst-gastronomie-1023.pdf?t=637629265954613756 (accessed 6 September 2021).
[13] The Government Principality of Liechtenstein. Media Release: Restaurants and bars re allowed to reopen with strict conditions – 25 November 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/673-corona-oeffnung-restaurants-bars-1125.pdf?t=637629272823957412 (accessed 6 September 2021).
[14] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 6 September 2021).
[15] The Government Principality of Liechtenstein. Media Release: government decides to cautiously open the door – 20 April 2021. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/20210420-Medienmitteilung-238-Regierung-Beschliesst-Oeffnungs.pdf?t=637629354828283620 (accessed 6 September 2021).
[16] The Government Principality of Liechtenstein. Media Release: The epidemiological situation allows further easing – 18 May 2021. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/20210518-Medienmitteilung-303-Corona-Weitere-Lockerungen.pdf?t=637636044774939647 (accessed 6 September 2021).
[17] The Government Principality of Liechtenstein. Media Release: Government takes further steps towards normalcy – 8 June 2021. *Information and Communication the Government Principality of Liechtenstein,* https://www.regierung.li/files/attachments/20210608-Medienmitteilung-348-Corona-Schritte-Normalitaet.pdf?t=637635461126772613 (accessed 6 September 2021).
[18] Embassy of the Principality of Liechtenstein, Washington D.C. Measures taken in Liechtenstein in Response to the Coronavirus Pandemic available at: https://www.liechtensteinusa.org/article/measures-taken-in-liechtenstein-in-response-to-the-coronavirus-pandemic (accessed 6 September 2021).
[19] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[20] Times of Malta. Here is what you can and cannot do under COVID-19 restrictions. *Times of Malta*, https://timesofmalta.com/articles/view/bars-clubs-to-remain-closed-until-december-grouper-larger-than-six-to.827485 (2021, accessed 6 September 2021).
[21] Television Malta. What are the protocols that restaurants have to observe? – 10 May 2021. *TVM*, https://www.tvm.com.mt/en/news/what-are-the-protocols-that-restaurants-have-to-observe/ (accessed 6 September 2021).
[22] Garda World. Monaco: Lockdown implemented March 17 /update 1. *Garda World*, https://www.garda.com/crisis24/news-alerts/328151/monaco-lockdown-implemented-march-17-update-1 (2020, accessed 6 September 2021).
[23] Riviera Press. Monaco begins phase 3 of deconfinement – 21 May 2020. *Riviera insider*, https://riviera-press.fr/insider/content/monaco-begins-phase-3-deconfinement (accessed 6 September 2021).
[24] Monaco Tribune. All you need to know about Monaco's new measures to tackle the pandemic – 2 November 2020. *Monaco Tribune*, https://www.monaco-tribune.com/en/2020/11/all-you-need-to-know-about-monacos-new-measures-to-tackle-the-pandemic/ (accessed 6 September 2021).
[25] Boschi, L., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 20 March, 2020 (Doc III.17). *Republic of San Marino*, http://www.bollettinoufficiale.sm/online/RicercaBU?operation=getDocBU&id=a5e455b95baa7283ace6f55a384b57760801dcbf (accessed 6 September 2021).
[26] Cardelli, A., Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 26 November, 2020 (Doc III.13). *Republic of San Marino*, http://www.bollettinoufficiale.sm/online/RicercaBU?operation=getDocBU&id=a0b576dd7dcd56b2de81a813255d7b020e7f1c2f (accessed 6 September 2021).
[27] Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 22 December, 2020 (Doc III.15). *Republic of San Marino*, https://www.google.com/url?sa=D&q=http://www.bollettinoufficiale.sm/online/RicercaBU%3Foperation%3DgetDocBU%26id%3D36394c22cc386eecaeea1a6093898932e91c4b53&ust=1630924980000000&usg=AOvVaw0p3MCE8P5lXMgKLPOYlQGf&hl=en-GB (accessed 6 September 2021).
[28] Cardelli, A., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 5 January, 2021. *Republic of San Marino* (accessed 6 September 2021).
[29] Wanted in Rome. Vatican museums reopen after lockdown on 1 June - 23 May 2020. *Wanted in Rome*, https://www.wantedinrome.com/news/vatican-museums-reopen-after-lockdown-on-1-june.html (accessed 6 September 2021).
[30] Wanted in Rome. Covid-19 in Italy: Vatican Museums reopen after 88 days – 31 January 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-in-italy-vatican-museums-reopen-after-88-days.html (accessed 5 September 2021).
[31] Wanted in Rome. COVID-19: Vatican Museums reopen on 3 May with stricter rules – 2 May 2021. *Wanted in Rome*, https://www.wantedinrome.com/news/covid-19-vatican-museums-to-reopen-in-may-with-stricter-rules.html (accessed 5 September 2021).





N.B. The rows with N/A represent unidentified data for the marked period

Key

Bars				
Closed	*Open with specific hours*	*Outdoor areas open only*	*Open with a seating limit*	*Fully open*

*Seating limit and must remain seated
** No seating limit and must remain seated
*** with seating limit also

Supplement figure 12. Mitigations on bars instituted by the microstates from the onset of COVID-19 till 1st August

References

[1] Govern d'Andorra. Message from the head of government to the population regarding the exceptional situation due to coronavirus – 13 March 2020. *Govern d'Andorra,* https://www.govern.ad/comunicats/item/11305-missatge-del-cap-de-govern-a-la-poblacio-davant-la-situacio-excepcional-per-coronavirus (accessed 6 September 2021).
[2] Govern d'Andorra.The government is easing temporary measures for bars and cafes– 13 November 2020. *Govern d'Andorra*, https://www.govern.ad/comunicats/item/12095-el-govern-alleugereix-les-mesures-temporals-per-a-bars-i-cafeteries (accessed 6 September 2021).
[3] López, L. Bars and cafés can also serve indoors at noon – 8 December 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/82692/els-bars-i-les-cafeteries-podran-servir-a-linterior-tambe-al-migdia (accessed 6 September 2021)
[4] Fàbrega, I. M. The opening hours of bars and cafés are extended until 8pm from today – 11 February 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/83924/lhorari-de-bars-i-cafeteries-samplia-fins-a-les-20.00-hores-a-partir-davui (accessed 6 September 2021)
[5] Pérez, V. G. Salut extends the bar service by an hour, but rules out opening nightlife – 13 May 2021. *El periòdic*, https://www.elperiòdic.ad/noticia/85657/salut-allarga-una-hora-el-servei-de-bar-pero-descarta-obrir-loci-nocturn%20/ (accessed 6 September 2021).
[6] Govern d'Andorra. The Council of Ministers approves extending the opening hours of bars and restaurants until 1am – 30 June 2021. *Govern d'Andorra,* https://www.govern.ad/salut/item/13003-el-consell-de-ministres-aprova-ampliar-l-horari-d-obertura-de-bars-i-restaurants-fins-a-la-1-de-la-matinada (accessed 6 September 2021).

[7] The Government Principality of Liechtenstein. Media Release: Slowing down the spread of the corona virus is the top priority – 13 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/117-corona-ausbreitung-verhindern-0313.pdf?t=637629137284192848 (accessed 6 September 2021).
[8] The Government Principality of Liechtenstein. Media Release Coronavirus: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637629253778400834 (accessed 6 September 2021).
[9] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 6 September 2021).
[10] The Government Principality of Liechtenstein. Media Release: Government closes catering for three weeks – 23 October 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/588-corona-regierung-schliesst-gastronomie-1023.pdf?t=637629265954613756 (accessed 6 September 2021).
[11] The Government Principality of Liechtenstein. Media Release: Restaurants and bars re allowed to reopen with strict conditions – 25 November 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/673-corona-oeffnung-restaurants-bars-1125.pdf?t=637629272823957412 (accessed 6 September 2021).
[12] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 6 September 2021).
[13] The Government Principality of Liechtenstein. Media Release: government decides to cautiously open the door – 20 April 2021. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/20210420-Medienmitteilung-238-Regierung-Beschliesst-Oeffnungs.pdf?t=637629354828283620 (accessed 6 September 2021).
[14] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.
[15] Cuschieri S, Balzan M, Gauci C, et al. Mass Events Trigger Malta's Second Peak After Initial Successful Pandemic Suppression. *Journal of Community Health* 2020; 1–8.
[16] Times of Malta. Bars ordered to close until December, public groups beyond six prohibited. *Times of Malta*, https://timesofmalta.com/articles/view/bars-clubs-to-remain-closed-until-december-grouper-larger-than-six-to.827485 (2020, accessed 6 September 2021).
[17] Times of Malta. Bars to reopen today, after more than seven months closed. *Times of Malta*, https://timesofmalta.com/articles/view/bars-to-reopen-today-after-more-than-seven-months-closed.877352 (2021, accessed 6 September 2021).
[18] Garda World. Monaco: Lockdown implemented March 17 /update 1. *Garda World*, https://www.garda.com/crisis24/news-alerts/328151/monaco-lockdown-implemented-march-17-update-1 (2020, accessed 6 September 2021).
[19] Riviera Press. Monaco begins phase 3 of deconfinement – 21 May 2020. *Riviera insider*, https://riviera-press.fr/insider/content/monaco-begins-phase-3-deconfinement (accessed 6 September 2021).
[20] Monaco Tribune. All you need to know about Monaco's new measures to tackle the pandemic – 2 November 2020. *Monaco Tribune*, https://www.monaco-tribune.com/en/2020/11/all-you-need-to-know-about-monacos-new-measures-to-tackle-the-pandemic/ (accessed 6 September 2021).
[21] Boschi, L., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 20 March, 2020 (Doc III.17). *Republic of San Marino*, http://www.bollettinoufficiale.sm/online/RicercaBU?operation=getDocBU&id=a5e455b95baa7283ace6f55a384b57760801dcbf (accessed 6 September 2021).
[22] Cardelli, A., Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 26 November, 2020 (Doc III.13). *Republic of San Marino*, http://www.bollettinoufficiale.sm/online/RicercaBU?operation=getDocBU&id=a0b576dd7dcd56b2de81a813255d7b020e7f1c2f (accessed 6 September 2021).
[23] Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 22 December, 2020 (Doc III.15). *Republic of San Marino*, https://www.google.com/url?sa=D&q=http://www.bollettinoufficiale.sm/online/RicercaBU%3Foperation%3DgetDocBU%26id%3D36394c22cc386eecaeea1a6093898932e91c4b53&ust=1630924980000000&usg=AOvVaw0p3MCE8P5lXMgKLPOYlQGf&hl=en-GB (accessed 6 September 2021).
[24] Cardelli, A., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 5 January, 2021. *Republic of San Marino* (accessed 6 September 2021).

	Jan-06 to Feb-02	Feb-03 to Mar-01	Mar-02 to Apr-05	Apr-06 to May-03	May-04 to May-31	Jun-01 to Jul-05	Jul-06 to Aug-02	Aug-03 to Aug-30
Andorra [1 – 3]								
Liechtenstein [4, 5]								
Malta [8]						N/A	N/A	N/A
Monaco [11, 12]								
San Marino [14, 15]						N/A N/A	N/A	N/A
Vatican City	N/A	N/A	N/A N/A N/A	N/A	N/A N/A	N/A	N/A	N/A

	Aug-31 to Oct-04	Oct-05 to Nov-01	Nov-02 to Nov-29	Nov-30 to Jan-03	Jan-04 to Jan-31	Feb-01 to Feb-28	Mar-01 to Apr-04	Apr-05 to May-02	May-03 to May-30	May-31 to Jul-04	Jul-05 to Aug-01
Andorra											
Liechtenstein [6, 7]											
Malta [9, 10]	N/A	N/A	N/A	N/A N/A N/A	N/A	N/A	N/A N/A				
Monaco [13]											
San Marino [16 - 18]	N/A	N/A	N/A N/A			N/A	N/A N/A N/A	N/A	N/A N/A N/A	N/A	N/A
Vatican City	N/A	N/A	N/A	N/A N/A N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N.B. The rows with N/A represent unidentified data for the marked period
Key

Gyms		
Closed	*Open*	*Specific hours*

Supplement figure 13. Mitigations on gyms instituted by the microstates from the onset of COVID-19 till 1st August

References

[1] El periòdic. Escaldes closes the playgrounds – 13 March 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/77814/ls-installacions-comunals-tanquen-i-suspenen-activitats (accessed 6 September 2021).

[2] El periòdic. The happiness of getting back in the water – 20 May 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/79137/la-felicitat-de-tornar-a-laigua (accessed 6 September 2021).

[3] Fàbrega, I. M. The Ice Palace reopens the swimming pool, gym and restaurant today – 6 June 2020. *El periòdic*, https://www.elperiòdic.ad/noticia/79435/el-palau-de-gel-reobre-avui-la-piscina-el-gimnas-i-el-restaurant (accessed 6 September 2021).

[4] The Government Principality of Liechtenstein. Media Release Coronavirus: Measures will be tightened tomorrow, Monday, March 16, 2020 – 15 March 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/119-corona-massnahmen-verschaerft-0315.pdf?t=637629253778400834 (accessed 6 September 2021).

[5] The Government Principality of Liechtenstein. Media Release: Measures to protect against the coronavirus will be further relaxed – 30 April 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/229-corona-massnahmen-0430.pdf?t=637629258571396991 (accessed 6 September 2021).

[6] The Government Principality of Liechtenstein. Media Release: National alliance for hibernation – 18 December 2020. *Information and Communication the Government Principality of Liechtenstein*, https://www.regierung.li/files/attachments/746-corona-winterruhe-1218.pdf?t=637629279284329868 (accessed 6 September 2021).

[7] The Government Principality of Liechtenstein. Media Release: Government decides to cautiously relax measures first – 23 February 2021. *Information and Communication the Government Principality of Liechtenstein, https://www.regierung.li/files/attachments/20210223-Medienmitteilung-102-Corona-Lockerung-Massnahmen.pdf?t=637636020345385727* (accessed 6 September 2021).

[8] Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. *J Public Heal* 2020; 30: 1–6.

[9] Sansone, K. [LIVE] New COVID-19 restrictions: schools to close from Monday • Non-essential shops and services to shut from tomorrow – 10 March 2021. *MaltaToday*, https://www.maltatoday.com.mt/news/national/108269/prime_minister_to_announce_more_covid19_restrictions (accessed 6 September 2021).

[10] Television Malta. Pools and gyms to re-open from 24 May – see what other measures will be relaxed – 6 May 2021. *TVM*, https://www.tvm.com.mt/en/news/deputy-pm-and-prof-charmaine-gauci-to-address-press-conference-at-10-30-am/ (accessed 6 September 2021).
[11] World Health Organization Regional Office for Europe. COVID-19 Health System Response Monitor Search and Compare - HSRM, https://www.covid19healthsystem.org/searchandcompare.aspx (2021, 6 September 2021).
[12] Riviera Press. Monaco begins phase 3 of deconfinement – 21 May 2020. *Riviera insider*, https://riviera-press.fr/insider/content/monaco-begins-phase-3-deconfinement (accessed 6 September 2021).
[13] Monaco Tribune. All you need to know about Monaco's new measures to tackle the pandemic – 2 November 2020. *Monaco Tribune*, https://www.monaco-tribune.com/en/2020/11/all-you-need-to-know-about-monacos-new-measures-to-tackle-the-pandemic/ (accessed 6 September 2021).
[14] RTV San Marino. Coronavirus: le disposizioni del decreto valide fino al 6 aprile – 9 March 2020. *RTV San Marino*, https://www.sanmarinortv.sm/news/attualita-c4/coronavirus-le-disposizioni-del-decreto-valide-fino-al-6-aprile-a184759 (accessed 6 September 2021).
[15] Zafferani, G., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 15 May, 2020. *Republic of San Marino* (accessed 6 September 2021).
[16] Cardelli, A., Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 26 November, 2020 (Doc III.13). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=a0b576dd7dcd56b2de81a813255d7b020e7f1c2f (accessed 6 September 2021).
[17] Cardelli, A., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 5 January, 2021. *Republic of San Marino* (accessed 6 September 2021).
[18] Cardelli, A., Dolcini, M., Tonnini, E. Official Bulletin of the Republic of San Marino – Official Part – Decree – Law 12 February, 2021 (Doc III.8). *Republic of San Marino*, http://www.bollettinoufficiale.sm/on-line/RicercaBU?operation=getDocBU&id=5d490cc506d1113fc9c127da35a426fc6f95d820 (accessed 6 September 2021).