RAPID RISK ASSESSMENT

Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – eleventh update: Resurgence of cases

5 August 2020

UNEDITED DRAFT

Summary

Since 31 December 2019 and as of 2 August 2020, 17 841 669 cases of COVID-19 have been reported worldwide, including 685 281 deaths. EU/EEA countries and the UK reported 1 733 550 cases (10% of all cases), including 182 639 deaths (27% of all deaths).

The COVID-19 pandemic continues to pose a major public health threat to EU/EEA countries and the UK and to countries worldwide, many of which have been experiencing widespread transmission of the virus for several months. Following a decline in the number of cases seen in EU/EEA countries and the UK following the first peak, there has been a recent increase in cases in many countries. Following the increase in cases that was observed across EU/EEA countries and the UK starting in April 2020, all countries implemented a range of response measures which led to a reduction in incidence. As countries regained control of transmission and alleviated the burden on healthcare, many measures were relaxed or removed to allow for a more sustainable way of living with the virus in circulation. While many countries are now testing mild and asymptomatic cases, which has resulted in increased case reports, there is a true resurgence in cases in several countries as a result of relaxing physical distancing measures.

Further increases in the incidence of COVID-19, and associated hospitalisations and deaths can be mitigated if sufficient control measures are reinstalled or reinforced in a timely manner. Countries that now observe an increase in cases after they have lifted their control measures following a temporary improvement of the epidemiological situation, should consider re-instating selected measures through a phased, step-wise and sustainable approach. Assessment of risk at local level is important, taking into consideration the epidemiological situation, local services and lessons learned regarding the impact of previous measures.

Member States implementing comprehensive testing are better able to rapidly detect an increase in cases and identify groups at high risk of disease. Alongside a tailored local testing strategy, the speed of contact tracing is important to reduce transmission, and efforts should be made to reduce the time needed for each step in the testing, notification, and contact tracing process.

Given that there are now dedicated COVID-19 surveillance systems, extensive public health measures in place, and ongoing testing and contact tracing of the population, countries should be better prepared to prevent and control any resurgence in cases.

In general, response strategies should be guided by continuous monitoring and assessment the epidemiological situation. They should be based on sustainable public health measures to protect vulnerable groups and decrease transmission in the community and include extensive testing and contact tracing followed by isolation and treatment of identified cases and quarantining of contacts.

In addition to the preparedness and response strategies implemented by national authorities, adapted human behaviour is key in tackling this pandemic. As the COVID-19 pandemic continues, it is natural for people to become fatigued and reduce compliance with public health measures. Risk communication efforts should be tailored to changes in the local situation and continuous messaging is needed to remind the population that the SARS-CoV-2 virus will remain in circulation within the community and that the everyday measures to reduce potential exposure remain cough and respiratory etiquette, physical distancing, hand hygiene, wearing face masks, reducing the number of contacts and staying home when ill.

What is new in this update?

- Updated epidemiological situation and response measures implemented in the EU/EEA countries and the UK;
- Updated testing strategies, contact tracing, and general and targeted measures to minimise the risk of resurgence of COVID-19;
- Various risk profiles based on the changes countries are observing in their reported cases, hospitalisations, testing methodologies, and test positivity rates in response to relaxing or removing of measures.

What are the risks being assessed in this update?

In this update, we analyse the risk of further escalation of COVID-19 in the countries that have reported a recent increase in COVID-19 cases and the risk of further escalation COVID-19 across all EU/EEA countries and the UK.

In countries for which there is a strong indication of increasing transmission, locally or nationally, as demonstrated by a recent increase in cases and an increase in hospitalisations, the risk of further escalation of COVID-19 is **high**. For those countries, the risk is **very high** if they do not implement or reinforce multiple measures including physical distancing and contact tracing, considering they have sufficient testing capacity.[1]

In countries for which there is evidence that is suggestive of increasing transmission, as demonstrated by a recent increase in cases and no increase in hospitalisations but with an increase in test positivity rates (considering they have sufficient testing capacity and intensity of testing has remained stable), the risk of further escalation is **high**. For those countries, the risk is **very high** if they do not implement or reinforce multiple measures, including physical distancing and contact tracing.

The risk of further escalation of COVID-19 is **moderate-high** for countries reporting a recent increase in cases but no increase in hospitalisations or test positivity rates (considering they have sufficient testing capacity and intensity of testing has remained stable). The countries that have multiple measures in place should conduct local assessments to better understand the local drivers of the increase in cases and to determine which measures should be added or strengthened.

Overall, the risk of further escalation of COVID-19 across all EU/EEA countries and the UK (considering they have sufficient contact tracing and testing capacity), is **moderate** for countries that continue to implement and enforce multiple measures including physical distancing and **very high** for countries that do not implement or enforce such measures.

Regularly updated information on the coronavirus disease 2019 (COVID-19) outbreak is available on ECDC's website [1], the European Commission website [2], and the World Health Organization (WHO) website [3]. This risk assessment is based on published information available as of 2 August 2020.

[1] Sufficient testing capacity refers to testing at least all symptomatic cases and their contacts according to the latest ECDC and WHO guidance.

1. Event background

Epidemiological situation

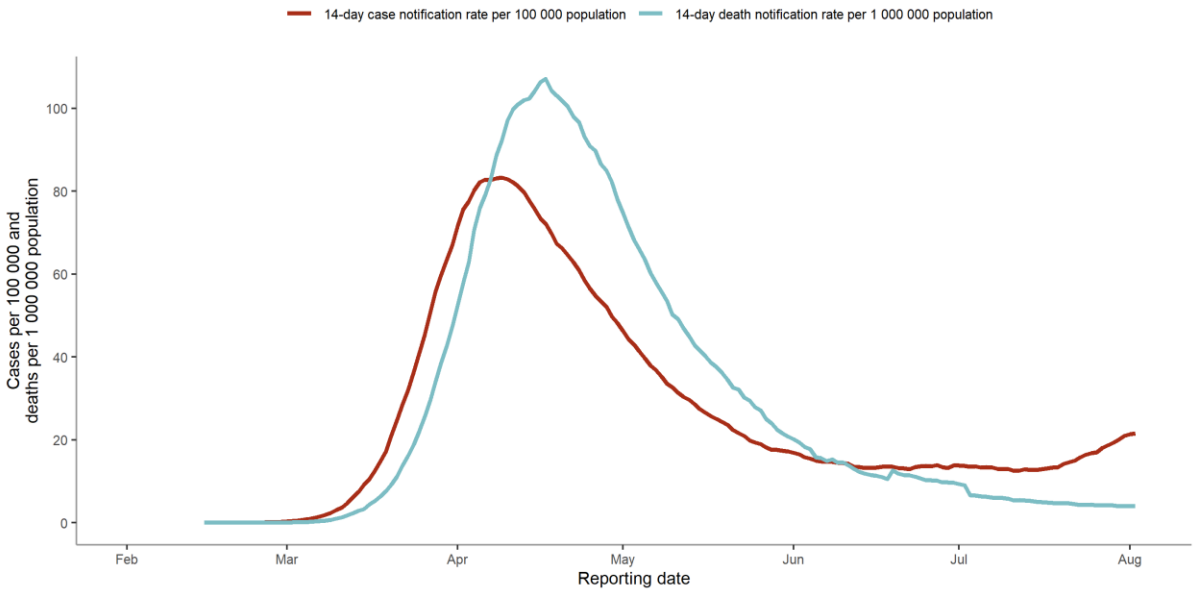
Since ECDC's tenth risk assessment published on 11 June 2020 (ref) and as of 2 August 2020, 10 772 391 new COVID-19 cases and 279 694 new deaths have been reported worldwide, out of a total of 17 841 669 reported cases and 685 281 reported deaths since 31 December 2019. Since the beginning of the pandemic, the EU/EEA and the UK have reported 1 733 550 cases and 182 639 deaths (10% of all cases and 27% of all deaths reported worldwide).

In week 14, the EU/EEA, and the UK reached its peak in reported cases. The trend in the EU/EEA, and the UK declined between the end of weeks 15 and week 23 (second week of April and first week of June), after which it reached a plateau, but has shown a resurgence over the last weeks.

The total number of daily cases reported, as well as the 14-day incidence rate, seems to be increasing again in the EU/EEA and the UK overall, though it is currently lower than the first peak which occurred on 9 April 2020 (Figure 1). Most of the new cases (111 840) reported in the last 14 days in the EU/EEA and the UK have been reported in Spain (28 267), Romania (15 420), France (13 245), the UK (8 743) and Germany (8 319). As of 2 August 2020, the 14-day case notification rate for the EU/EEA and the UK was 21.5 (country range: 2.2–209.5) per 100 000 population. Compared to the incidence of reported cases for the 14 days up to 19 July (13.4 per 100 000 population) there was an increase of 60.5%. The 14-day COVID-19 death notification rate for the EU/EEA and the UK was 4.1 (country range: 0-15.9) per 1 000 000 population. The rate has been stable for 13 days. Pooled estimates of all-cause mortality reported by EuroMOMO have returned to normal level, however for week 30, low excess mortality was reported in Sweden and moderate excess mortality in Belgium, Portugal and Spain.

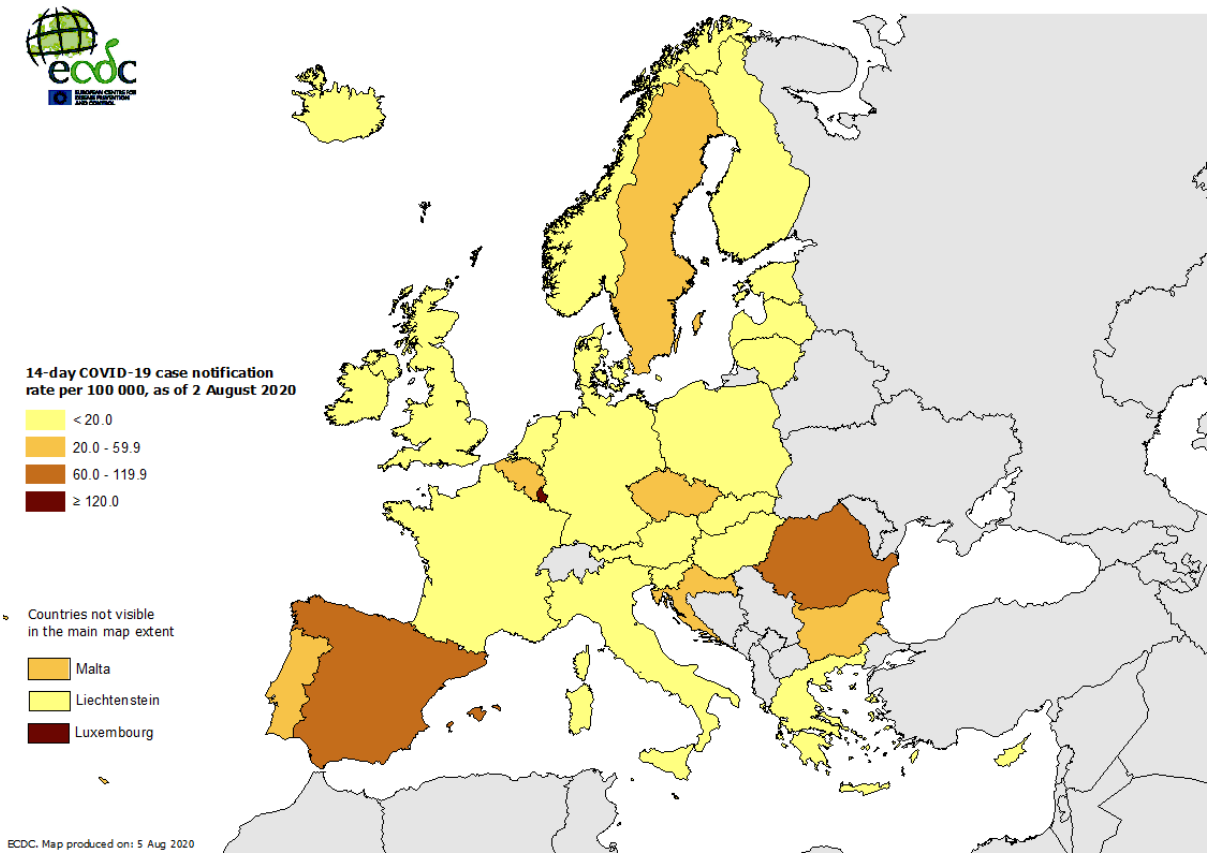
Hospital and/or ICU occupancies due to COVID-19 are increasing in Bulgaria, Croatia Czechia, Luxembourg, Romania and Slovenia. No other increases have been observed, although data availability is incomplete and among the countries (Belgium, Czechia, Luxembourg, Malta, Romania and Spain) reporting an increasing trend in the 14-day incidence of COVID-19 cases no data on hospital and/or ICU occupancies were available for Malta and Spain.

Figure 1. EU/EEA and the UK: 14-Day COVID-19 case and death notification rates, 2 August 2020



As of 2 August 2020, 10 countries had 14-day incidence of reported cases greater than 20 per 100 000 population. Among these, six countries (Belgium, Czechia, Luxembourg, Malta, Romania and Spain) reported an increase of 30% or greater and two countries (Portugal and Sweden) reported decrease of 30% or greater compared to the incidence of reported cases for the 14 days up to 19 July Figure 3 (A)). In three countries (Luxembourg, Romania and Spain) the rate was higher than 60 per 100 000 population (Figure 2, Table 1).

Figure 2. Incidence of reported COVID-19 cases/100 000 population in EU/EEA countries and the UK in the last 14 days, (20 July – 2 August 2020)



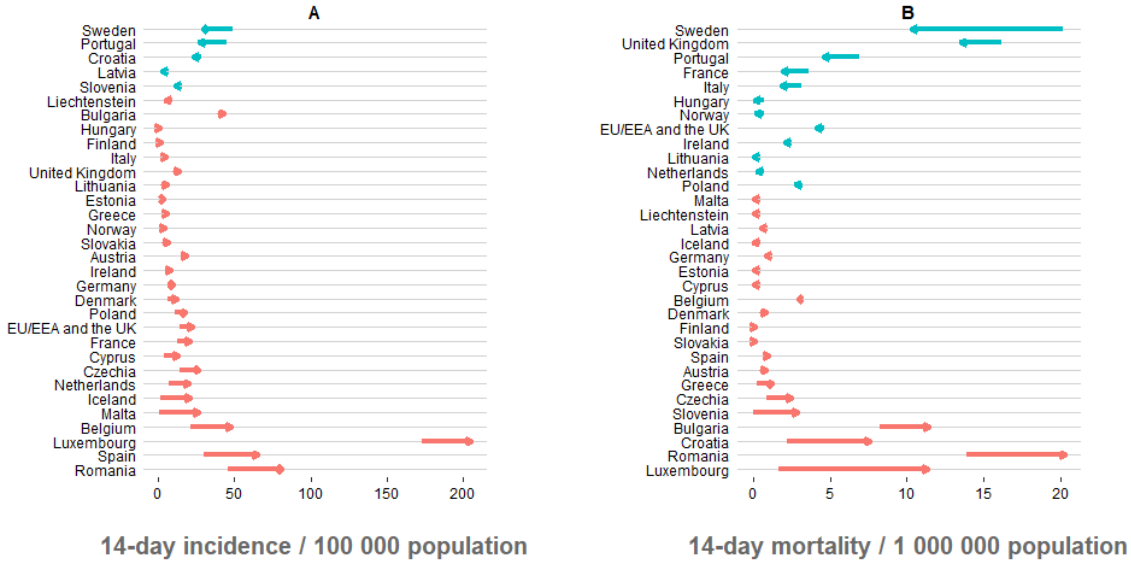
The 14-day incidence of reported cases increased by a factor of less than twice in Czechia, Luxembourg and Romania, and by between 2.5-3 times in Belgium and Spain.

Increasing trend in Belgium, Czechia, Spain and Romania has been present for between 12 and 49 days (Annex 1).

Two countries, Poland and Romania, reported 14-day incidence rates at 17.4 and 79.4 per 100 000 population which were greater than their previous peak in rates in mid-June (16.6 per 100 000 population) and mid-April (25.6 per 100 000 population), respectively (Annex 1).

Two countries, Portugal and Sweden, reported a 39% and 46% decrease in the 14-day case notification rate respectively, compared to their incidence rates on 19 July (Figure 3 (A)).

Figure 3. Change in reported COVID-19 in 14-day incidence of reported COVID-19 cases /100 000 population (A) and (B) 14-day incidence of reported COVID-19 deaths /100 000 population from 19 July to 2 August 2020 among EU/EEA countries and the UK



Notification rates are highly dependent on a number of factors, one of which is the testing rate. Weekly testing rates in the EU/EEA and the UK vary between 95.5 and 10 657 tests per 100 000 population (Table 1). Luxembourg has the highest testing rate for week 30, followed by Denmark, Malta, the UK, Cyprus, Austria, Ireland and Portugal. The lowest testing rate and the highest positivity rate for week 30 was in Croatia, followed by Romania, Bulgaria, Spain, Czechia, Belgium, Poland and Slovenia (Table 1.)

Table 1. COVID-19 reported 14-day case and death incidence rates, testing rates and positivity rates during week 30, 2020, EU/EEA and the UK.

Country	14-day case notification rate (per 100 000 population)	14-day death notification rate (per 1 000 000 population)	Testing rate (per 100 000 population)	Positivity rate (%)
Reference date	**2 August 2020**	**2 August 2020**	**Week 30**	**Week 30**
Austria	19.4	0.9	1120.1	0.8
Belgium	44.4	2.7	610.2	3.4
Bulgaria	45.7	12.3	463.2	5.2
Croatia	24.3	6.1	269.2	5.1
Cyprus	9.9	0	1221.9	0.1
Czechia	26.7	2.3	321.6	4
Denmark	10.6	0.7	1855.6	0.2
Estonia	3.8	0	190	0.5
Finland	2.3	0.2	523.1	0.2
France	19.8	1.7	683.4	1.3
Germany	10	0.7	678.8	0.7
Greece	5.6	1.1	234.9	0.7
Hungary	2.2	0.1	181.7	0.7
Iceland	15.4	0	95.5	1.5

Ireland	7.3	2	1012.6	0.2
Italy	6	1.7	534.3	0.5
Latvia	2.6	0.5	528.2	0.2
Liechtenstein	7.8	0	NA	NA
Lithuania	6.4	0	749.4	0.4
Luxembourg	209.5	4.9	10659.2	1.2
Malta	21.5	0	1453.7	0.2
Netherlands	18.2	0.7	645.2	1
Norway	3.6	0	435.4	0.3
Poland	17.4	2.7	365.9	2.1
Portugal	28.4	5.2	923.3	1.6
Romania	79.4	19.1	580.2	6.2
Slovakia	6.6	0.2	247	1.2
Slovenia	11.1	2.9	272.2	2.2
Spain	60.2	0.5	582.4	4.5
Sweden	30.7	12.1	578.1	2.9
United Kingdom	13.1	13.8	1378.2	0.5
EU/EEA and the UK - TOTAL	**21.5**	**4.1**	**710.4**	**1.4**

At the sub-national level, there is substantial variation within and across countries, with some regions reporting no cases in the last 14 days and others reporting an incidence of more than 120 per 100 000 population (Figure 4). For the period analysed, Luxembourg and some regions in Bulgaria, Croatia, Spain and Romania reported incidences of more than 120 per 100 000 population.

For the period analysed, which compared weeks 29/30 with weeks 30/31, an increasing trend on the 14-day incidence of reported COVID-19 cases/100 000 population was seen across and within countries (Figure 5). Cyprus and regions from Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, France, Germany, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, United Kingdom, Slovakia, Slovenia, Spain and Sweden reported an increasing trend. In contrast, a decreasing trend was observed in Luxembourg and regions from Bulgaria, Croatia, Poland, Portugal, United Kingdom, Spain and Sweden during the same period.

All countries reporting an increased 14-day case notification rate also had increased testing rates per 100 000 population including Belgium, Czechia, Luxembourg, Malta, Romania, and Spain (Annex 1). The testing rate, however, remained low in Belgium, Czechia, Romania and Spain (Table 1, Figure 6). When excluding Luxembourg, which reported testing rates 5.7 times higher than the country with the next highest testing rate, there was no correlation between 14-day case notification rates and testing rates (Spearman's rank correlation rho: 0.25, p-value = 0.18).

Figure 4. 14-day COVID-19 case notification rate per 100 000 population in weeks 30 - 31 in the EU/EEA/UK.

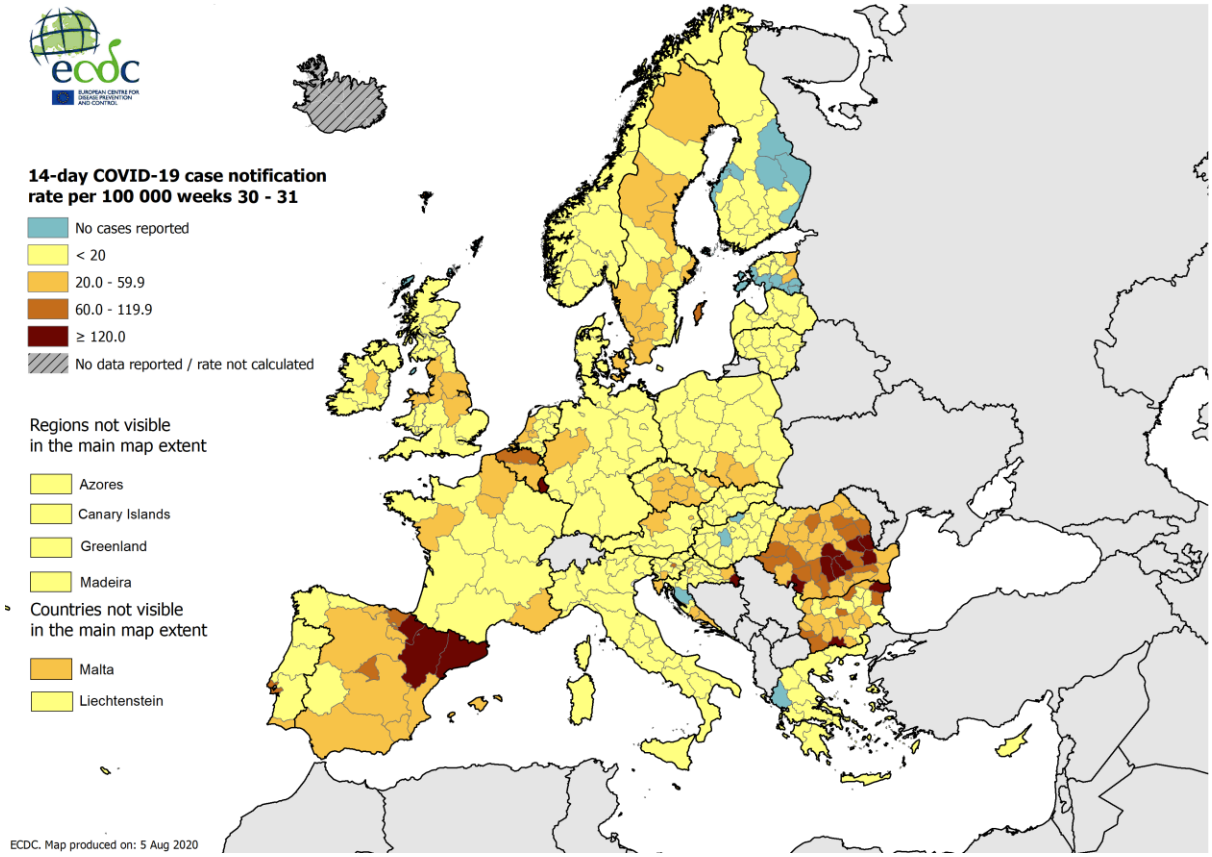
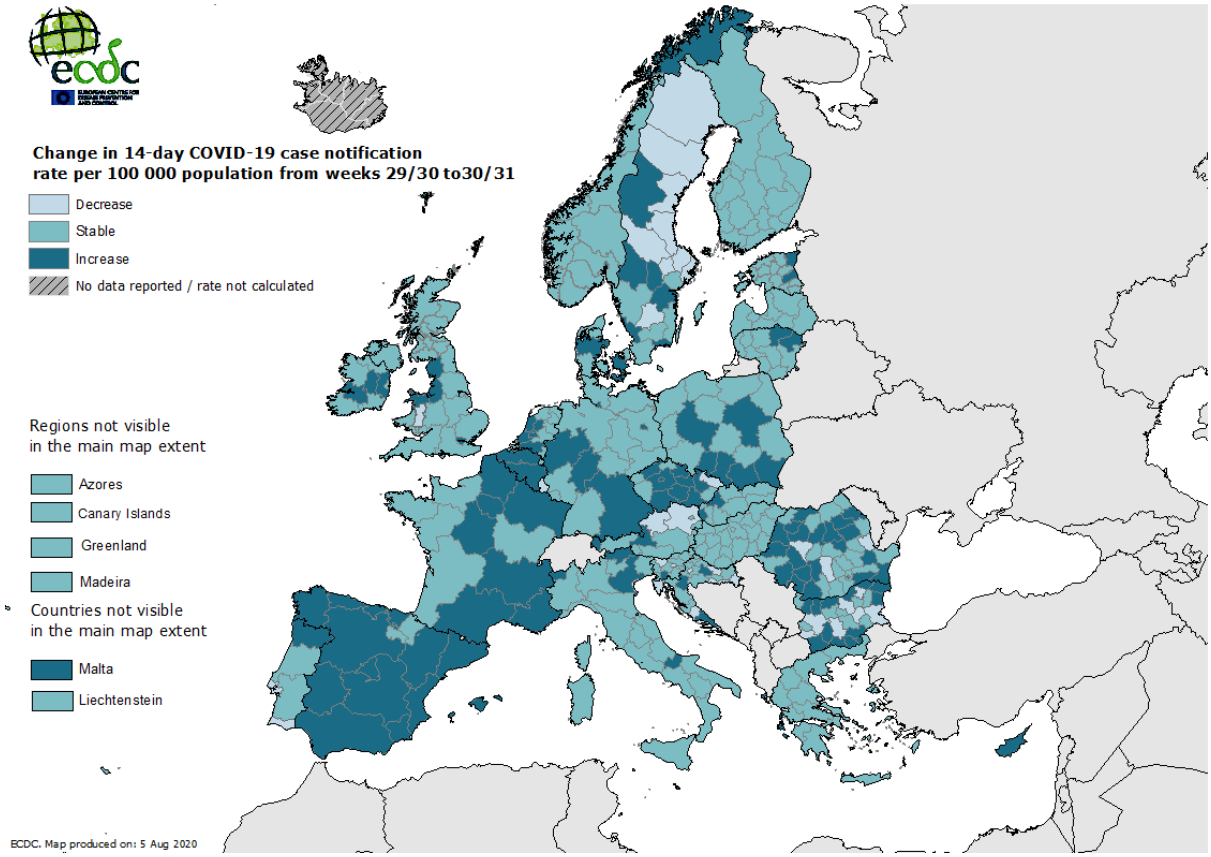
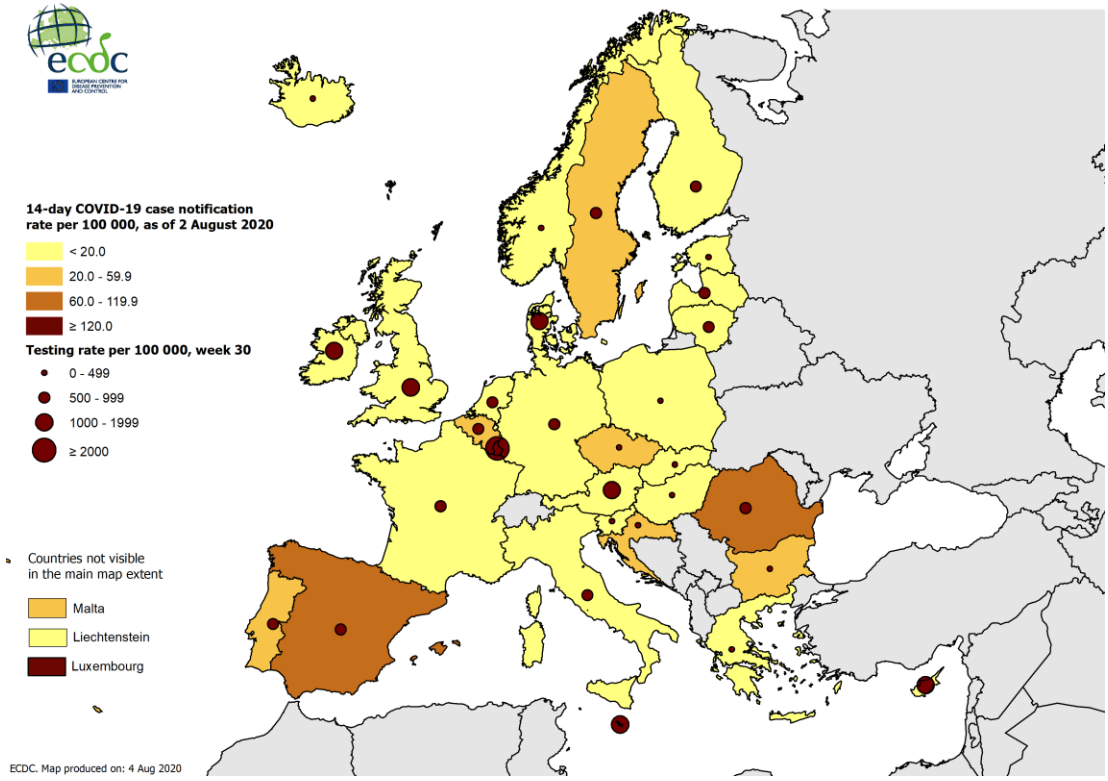


Figure 5. Change in 14-day incidence of reported COVID-19 cases/100 000 population in EU/EEA countries and the UK at subnational level between weeks 29/30 and weeks 30/31



Trend for day x compares 14-day rate on day x with that on day x-7.
Regions with low rates (cases: <10) or which do not meet the criteria below are classified as stable trend.
Increasing/decreasing trend: relative rate changes (cases: >10%) OR absolute rate changes (cases: >10)

Figure 6. 14-day COVID-19 case notification rate with testing rate/100 000 population in EU/EEA countries and the UK, as of 2 August 2020



Age and gender

As of 2 August 2020, age and gender were reported for 728 080 (96%) of the 760 159 cases reported in TESSy. The largest proportion of cases overall were reported among 50-59 year-olds (18.2%) among both males and females. Only 1.9% of cases were reported among children below 10 years of age and 3.6% among 10-19 year-olds (Figure 7(a)). Age distributions varied by severity of infection with a higher representation of older persons among hospitalised patients and deaths (Figure 7). The male-to-female ratio overall was 0.9, however this varied by age-group and by severity with more males than females admitted to hospital, requiring intensive care and also dying.

The age-distribution was different when comparing the periods of January – May and June – July. Between January and May 2020, 39.8% of cases were aged 60 years or above and the largest proportion of cases were reported among 50-59 year-olds (18.7%). In contrast, in June and July, persons aged 60 years or above accounted for 17.5% of cases and the largest proportion of cases were reported among 20-29 year-olds. The proportion of cases diagnosed among children and youths aged below 20 years also increased from 4.2% of cases between January and May to 12.4% in June and July. The median age decreased from 54 years in January – May to 39 years in June – July. The proportion of mild-cases overall and in each age-group (except among persons aged 80 years or above) also increased between the two periods (9.8% overall), with the biggest increase among children below 10 years of age (+8.7%). In contrast, the proportion of mild cases decreased among persons aged 80 years or above (-10.6%). These changes could be related in part of the expansion of testing over time, leading to more testing of milder cases, particularly among younger persons, as well as potentially increased transmission among younger people once public health measures were lifted.

The age-distribution of mild (non-hospitalised) cases similarly changed over time, with the largest proportion of cases being diagnosed among 20-29 year-olds in June and July (20.1%), in contrast to January-May, when 50-59 year-olds accounted for the largest number of cases (20.5%). Hospitalised cases also tended to be younger in June and July compared to previous months (median age: January – May: 67 years; June - July: 62 years) although the majority were still 60 years of age or above (January - May: 63.6%; June-July: 53.1%). The proportion of cases admitted to intensive care was also slightly younger in June and July (median age: January – May: 65 years; June - July: 63 years) with 22.5% of cases being below 50 years of age compared to 14% between January and May (Figure 8(i)). Almost all deaths were among persons aged 60 years or over in both periods, however there was a lower proportion of deaths among 60-79 year olds in June and July compared to January to May (January - May: 36.4%; June - July 26.9%) and a higher proportion of deaths among persons aged 80 years or over (January May: 58.5%; June - July 67.9%).

Figure 7: Age and gender distribution of COVID-19 cases reported in TESSy at different levels of severity as of 2 August 2020, EU/EEA and the UK.

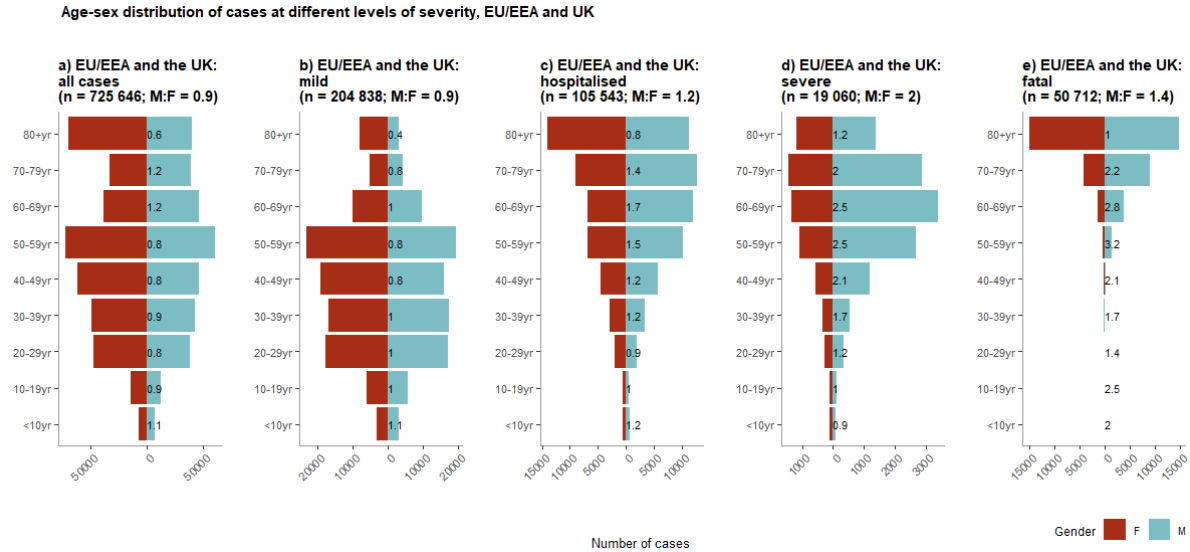
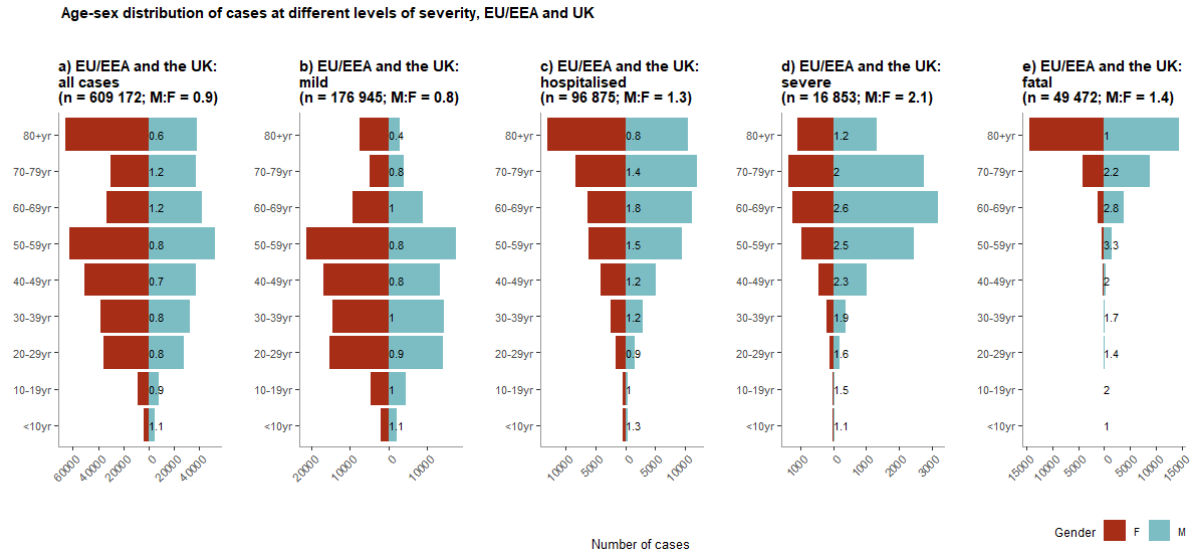
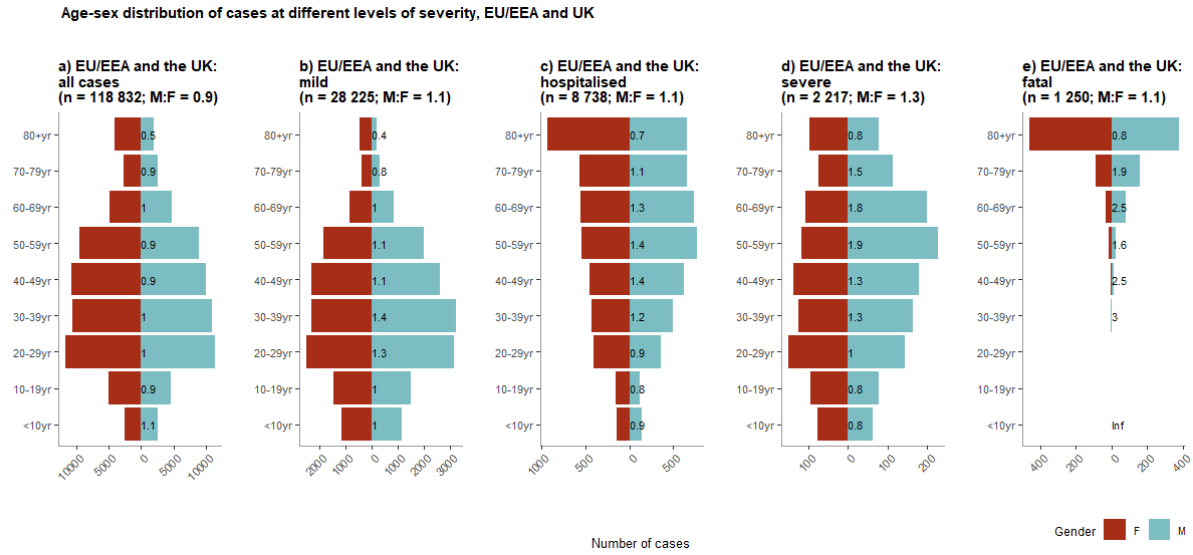


Figure 8: Age and gender distribution of COVID-19 cases reported in TESSy at different levels of severity, January – May 2020 (i) and June – July 2020 (ii), EU/EEA and the UK.

(i) January - May 2020



(ii) June – July 2020



Hospitalisation and ICU occupancy

As of 2 August 2020, hospital and/or ICU occupancies due to COVID-19 are increasing in Bulgaria, Croatia Czechia, Luxembourg, Romania and Slovenia (Figure 8). No other increases have been observed, although data availability is incomplete and among the countries reporting an increasing trend in the 14-day incidence of COVID-19 cases no data on hospital and/or ICU occupancies were available for Malta and Spain.

Overall, 28% of reported COVID-19 cases to date in the EU/EEA and the UK have been hospitalised; among hospitalised patients, 14% required ICU and/or respiratory support, although there is considerable variation among countries (Figure A, Annex 3).

Deaths

As of 2 August 2020, the 14-day COVID-19 death notification rate for the EU/EEA and the UK was 4.1 (country range: 0-15.9) per 1 000 000 population. The rate has been stable for 13 days (Figure 1).

As of 2 August 2020, Bulgaria, Croatia, Portugal, Romania, Sweden and the United Kingdom had 14-day incidence of deaths greater than 5 per 1 000 000. Among these, three countries reported decrease 10% or

greater compared to the incidence of reported cases for the 14 days up to 19 July (Figure 3 (B)): Portugal (33%), Sweden (38%) and United Kingdom (14%).

Three countries reported increase 10% or greater compared to the incidence up to 19 July: Bulgaria (48%), Croatia (257%) and Romania (33%) (Figure 3 (B)).

We estimate that 24% (country range: 0.5–38.0%) of hospitalised COVID-19 cases reported in the EU/EEA and the UK have died.

Pooled estimates of all-cause mortality reported by EuroMOMO have now returned to normal levels, following a period of substantially increased excess mortality that coincided with the COVID-19 pandemic peaks. However, for week 30, low excess mortality was reported in Sweden and moderate excess mortality in Belgium, Portugal and Spain. In some countries an increase in mortality, could be linked to heat waves [4]. This needs to be kept under close observation and further assessment is needed.

Importation

Of the 760 159 cases reported in the EU/EEA and the UK to TESSy between 23 January and 2 August 2020, the importation status was known for 565 871 cases (74.4%). Of these, 549 198 (97.1%) were infected in the reporting country, whereas 16 673 (2.9%) were likely infected in another country.

Among the 15 countries which reported more than 80% of their cases in TESSy and reported the place of infection for more than 80% of cases, 4.8% of cases were reported to be imported (8 101 out of 169 678 cases)[2]. Imported cases were mainly reported to be infected in another EU/EEA country or the UK (6 469, 79.9%) with a further 9.8% infected in another country in the European continent.

The proportion of imported cases among these 15 countries changed over time: in January and February, when overall case numbers were low, 26 out of 51 reported cases were imported (51%). The proportion of imported cases decreased in March to 15.3%, however the absolute number of imported cases was highest in March (5 634 cases). As lockdowns and travel restrictions were introduced, the proportion (and number) of imported cases decreased to 1.5% in April and reached a minimum of 1% in May when 241 cases out of 24 024 were reported to be imported. The number and proportion of imported cases then increased in June and July to reach 3.6% of reported cases (616 out of 16 905 cases).

The proportion of imported cases also varies by country. Table A (Annex 3) shows the proportion of imported cases between January and May and June and July. A larger number of countries reported that more than 20% of cases were infected abroad during the latter period. This could be partly due to systematic testing of travellers entering the country as travel restrictions were eased.

Testing

Testing strategies have changed over the course of the epidemic as testing capacity has improved and countries have moved towards more widespread testing in the community, including the testing of asymptomatic individuals in some circumstances [5]. Any increase in testing across both the general population as well as high-risk areas or vulnerable groups, will enable a better understanding of the trends in transmission.

There are marked differences between countries in the rates of testing for COVID-19 (Table 1). The testing rate in week 30 ranged from up to 10 659.2 tests per 100 000 in Luxembourg. Seven countries had testing rates over 1 000 tests per 100 000 during week 30 (Austria, Cyprus, Denmark, Ireland, Luxembourg, Malta, United Kingdom). All these countries had test positivity rates below 1.0% except Luxembourg which reported a positivity rate of 1.2%. On 2 August, Luxembourg's 14-day case notification rate was the highest ever reported at 209.5 per 100 000.

Following the initial peak in cases seen across Europe, most countries have reported increasing trends in testing rates alongside declining trends in notification rates (Annex 1). However, there has been a steady decline in testing rates in five countries (Estonia, Hungary, Italy, Slovenia, Sweden), which have all also observed declining notification rates with the exception of Slovenia where notification rates have shown a steady increase, and more recently Hungary.

Testing positivity ranged from 0.1% in Cyprus to 6.2% in Romania, where there has been a steady increase in

[2] None of the most populated countries in the EU/EEA (Germany, France, Italy, Spain, Poland) nor the UK are included among those 15 countries, that becoming into a limited representativeness of the overall EU/EEA and UK population [needs some grammatical improvement].

the positivity rate as well as an increase in the testing rate. The six countries with the testing positivity rates higher than 3 in week 30 (Belgium, Bulgaria, Croatia, Czechia, Romania and Spain) all reported marked increases in the rates of notifications of cases and deaths over the past month.

Some countries in the EU/EEA and the UK, have reported implementing testing strategies that include screening asymptomatic individuals for SARS-CoV-2. Some countries are conducting random swabbing of members of occupations with identified high-risk contact with the public like healthcare workers, police, armed forces, etc.; whereas, others are conducting comprehensive screening of individuals when there is an outbreak detected in a specific setting. Many countries have established testing of incoming travellers from areas with high 14-day incidence rates or have enacted 14-day quarantine recommendations for incoming travellers. As testing strategies and objectives differ over the course of the epidemic throughout the European region, it remains important to consider whether an increase in case notification rates is due to a change in testing methods or a true resurgence.

Vulnerable groups

Medically and socially vulnerable groups are at an elevated risk of severe disease and death due to the public health measures in place to reduce the spread of COVID-19. The medically vulnerable include older adults, people with underlying health conditions, and the socially vulnerable include those with long-term physical, mental, intellectual or sensory impairments, homeless people, people living in abusive household settings, sex workers, and others who face challenges due to their belonging to two or more categories of social vulnerability.

Residents in long-term care facilities (LTCF) are also a vulnerable population group for COVID-19 and are especially at risk when transmission rates are high within the general community. Many LTCFs across the region and globally have reported COVID-19 outbreaks, with high rates of morbidity and case fatality among residents [6]. In some countries, a high proportion of all the deaths reported at the national level have been among residents of such facilities. The transmission dynamics of COVID-19 combined with a previously low availability of testing are considered to have fuelled a rapid spread within and between facilities. A further contributing factor has been asymptomatic transmission among cases in both staff and residents [6].

People in prisons are another vulnerable group on account of the many environmental factors in prisons that may increase risk of transmission of COVID-19, such as overcrowding and unsanitary facilities, and the demographic profile of the prison population including the proportion of population belonging to risk group for developing severe disease [7]. Outbreaks in prison settings can be a serious challenge for public health as they can quickly overburden prison and community health services and, given the high turnover in many prisons, can result in increased transmission within, or reintroduction into, marginalised communities.

Environmental factors such as overcrowding in reception and detention centres may increase exposure to SARS-CoV-2 among migrants and refugees living in reception and detention centres [8]. Outbreaks in reception and detention centres can spread quickly in the absence of adequate prevention measures.

Occupational settings

Recently, multiple outbreaks have been reported in various types of occupational settings within and beyond the EU/EEA and the UK, including slaughterhouses, meat processing plants, construction sites and mines [9-12]. Outbreaks in these occupational settings may drive ongoing transmission depending on the number of employees and their interactions within the community.

Robust data on the true extent of COVID-19 among occupational settings are limited and the under-identification of clusters is likely in many occupational settings. However, many clusters have been identified among occupational groups working in health and social care sectors, particularly in LTCFs and hospitals, where frequent testing has been conducted. Large numbers of occupational transmission are reported from the food packaging and processing sectors, in factories and manufacturing, and in office settings [13].

Data suggest that the most common exposure relates to lack of physical distancing, particularly in indoor settings, including in shared accommodation, canteens, rest rooms or transport [13]. Factors associated with transmission also included face to face contact with clients in sectors such as transport and retail, lack of access to handwashing facilities, housing conditions, and lack of appropriate communication of the recommended public health measures.

Outdoor vs. indoor settings

As the more stringent physical distancing measures were relaxed over time, public health authorities have encouraged people to spend more time outdoors given knowledge that indoor settings are higher-risk settings for transmission than outdoor settings. In Spain, this has led to multiple activities being allowed outdoors with terraces in bars and restaurants opening early, ahead of cinemas or other indoor activities. Following such

relaxation of measures, many clusters associated with outdoor activities have been reported from Catalonia, with conclusions drawn that the higher the level of voice required to be heard, the higher the chances of infection, and as such close gatherings outdoors can be, in principle, as dangerous as indoors, despite that ventilation may not be as good indoors [9,14].

The seasonality of COVID-19 and the potential effect of increasing temperatures and humidity leading to a decrease in the transmission of SARS-CoV-2 has been widely discussed [15,16]. However, the current situation of the pandemic in many countries in the northern hemisphere, suggests these statements may need to be revisited.

Non-pharmaceutical interventions in EU/EEA countries and the UK

Most EU/EEA countries and the UK have multiple response measures in place, ranging from advice regarding hand and respiratory hygiene to limiting the size of non-essential groups to <50 people, stay at home recommendations for risk groups, closures of public spaces, and the mandatory and voluntary use of masks in the community. A selection of non-pharmaceutical interventions in place on 1st of June and 1st of July are displayed below in Figure 9 and by country in Annex 2 to provide an overview of changes over time preceding the recent increase in cases. It is possible that measures in place in some countries have changed subsequent to the data shown on 1st July.

Between 1 June and 1 July, 13/31 countries reduced the number of measures in place, whereas 3/31 countries introduced additional measures to help control the spread of COVID-19 (Figure 9). Countries generally opened more public spaces (8), removed measures related to general stay at home recommendations (6), and removed the limits on <50 people (5). Three countries (Ireland, Italy, and Latvia) reopened public spaces with community mask wearing in place. It should be noted that the use of masks in the community should always be accompanied by other public health measures and recommendations related to physical distancing to avoid crowding. Czechia and Slovakia currently have mandatory mask measures in the community with the recommendation that people remain 2 meters apart but without the other physical distancing measures of stay at home orders, cancellation of mass gatherings <50, teleworking and closure of public spaces.

Figure 9. Summary table of response measures in place in EU/EEA/UK countries as of 1 June 2020 and 1 July 2020

*The data on non-pharmaceutical interventions in Figure 9 are based on information available from official public sources of Member States as of Tuesday 28 July at 18:00 and may not capture measures being taken by countries that are not reported on publicly available websites. The response measures displayed are national measures, reported on official public websites. This data has several limitations. Firstly, there is substantial heterogeneity in physical distancing policies and their implementation between countries. The exact dates of introduction were often available from official sources but delays in their implementation may have occurred. Additionally, availability of public data from official government sources varies among countries.

Contact tracing

Contact tracing continues to be a key public health activity to contain COVID-19 clusters and outbreaks. Contact tracing is an ongoing measure across the countries in the EU/EEA and the UK, although the implementation has varied over time, and between regions within countries. Contact tracing mobile applications (apps) can complement, but not replace conventional contact tracing. These apps allow for proximity tracing and notification of contacts exposed to a case, provided both parties have downloaded the app. Around half of all EU/EEA countries and the UK are known to have already launched such apps with another 8-10 countries planning to do so in the near future [17-21], although the extent of their use and effectiveness remains unknown.

2. Disease background

For more information and latest evidence on coronaviruses, epidemiology, transmission, clinical characteristics, diagnostic testing and screening, immune response, immunity, vaccine and treatment and transmission in different settings, please visit the page on COVID-19 disease background on ECDC's website: https://www.ecdc.europa.eu/en/2019-ncov-background-disease (last updated on 30 June 2020).

Detailed epidemiological information on laboratory-confirmed cases reported to The European Surveillance System (TESSy) is published in ECDC's weekly COVID-19 surveillance report: https://covid19-surveillance-report.ecdc.europa.eu/

This update of the risk assessment only provides an overview of the latest information on individual and population immunity.

3. ECDC risk assessment

This assessment is based on information available to ECDC at the time of publication and unless otherwise stated, the assessment of risk refers to the risk that existed at the time of writing. The overall risk is determined by a combination of the probability of an event occurring and of its consequences (impact) to individuals or the population [22].

Risk assessment questions

- **What is the risk of further escalation of COVID-19 in the countries that have reported a recent increase in COVID-19 cases?**

- **What is the risk of further escalation COVID-19 across all EU/EEA countries and the UK?**

What is the risk of further escalation of COVID-19 in the countries that have reported a recent increase in COVID-19 cases?

In EU/EEA countries and the UK that have reported a recent increase in cases:

- The risk of further escalation of COVID-19 is **high** in countries that have also had an increase in hospitalisations providing a strong indication that there is a genuine increase in transmission occurring. For these countries, the overall risk of escalation is **very high** if they do not implement or reinforce multiple measures including physical distancing measures and contact tracing and have sufficient testing capacity.

- The risk of further escalation of COVID-19 is **high** for the countries reporting no increase in hospitalisations but have an increase in test positivity rates (if testing capacity is sufficient and intensity has remained stable), suggesting increasing levels of transmission. For these countries, the overall risk of escalation is **very high** if they do not implement or reinforce multiple measures including physical distancing measures and contact tracing.

- The risk of further escalation of COVID-19 is **moderate-high** for the countries reporting no increase in hospitalisations or test positivity rates (if testing capacity is sufficient and intensity has remained stable). The countries that have multiple physical distancing measures in place should conduct local risk assessments to better understand the groups or settings driving the increase in cases and to determine which the measures should be in place or strengthened.

This assessment was based on the information below:

Following the increase in COVID-19 cases that was observed across EU/EEA countries and the UK starting in March 2020, all countries implemented a range of response measures, which led to a reduction in incidence. Although there remains much uncertainty around which combination and intensity of measures had an impact on transmission, and evidence is still emerging, the measures that were applied did result in an overall reduction in cases following their implementation.

All countries have scaled up testing capacity and many have conducted sero-epidemiological studies with data indicating that community transmission is on-going across countries and that whilst immunity is slowly increasing in some areas, it remains overall at low levels, so there remains a large susceptible population around the EU/EEA countries and the UK [23].

Following the declines in incidence between mid-April and June, in some countries there has been a phasing out of some of the response measures across countries, particularly for the stricter distancing measures (e.g. 'lock-downs', border closures) with an increase in population mobility as regular activities have resumed.

On 2 July 2020, ECDC published a rapid risk assessment on the resurgence of reported cases of COVID-19 and provided options for response regarding tailored control and prevention measures as well as long-term sustainable implementation of essential NPIs in the south east Europe candidate countries [24].

In recent weeks, there has been an increase in the overall EU incidence rate of reported cases with increasing trends observed in 26 countries. Of these countries, 12 reported increases of over 10% with the rates in two of these countries (Poland and Romania) exceeding their previous peaks. Increasing trends in cases have also been observed in many EU/EEA countries and the UK at the subnational level.

Many clusters of infection have been identified in the community associated with specific settings (e.g. LTCFs, prisons), occupations (e.g. miners, workers in meat processing plants) and events where there is increased risk of transmission due to certain factors and environmental conditions (e.g. increased face to face contact, crowding and lack of ventilation). Infections in these settings have in some situations been important drivers of transmission in the community.

Notification rates are highly dependent upon a number of factors including the testing rate. The increase in notifications reported by Luxembourg is partly explained by the large increase in testing resulting from implementation of a widespread testing strategy that includes screening asymptomatic individuals for SARS-CoV-2. In Bulgaria, Czechia, Luxembourg, and Romania, which have all reported recent increasing cases there have been increasing trends in hospitalisation strongly suggesting that the increase in notifications is not just related to an increase in testing.

Evidence that there are localised or national increases in transmission is indicative that the degree to which measures have been reduced in number or intensity is no longer constraining the effective reproduction number of COVID-19 infections to below 1.0, either within specific localities or more generally (depending on the extent of the observed increases) and as such countries that report increasing cases and hospitalisations are at very high risk for further escalation of COVID-19 within their countries without the reintroduction or reinforcement of effective physical distancing measures.

The death notification rate for COVID-19 across the EU has been stable for the past 13 days but three countries have reported increases. Mortality data provide information on the impact of COVID-19 that is important to monitor but is subject to coding issues and reporting delays and does not provide as timely information on the progression of the pandemic as new case notification rates and hospitalisation data.

If sufficient control measures are not maintained and/or if there is not good adherence to these measures, further increases in the incidence of COVID-19 cases, and associated hospitalisations and deaths will occur. Countries that have relaxed measures and now observe indicators of increasing transmission, should consider re-instating measures that were lifted in a phased, step-wise approach. A local approach to the assessment of risk is important taking into consideration the epidemiological situation, local services and information on the impact of previous measures that were implemented.

What is the risk of further escalation of COVID-19 across all EU/EEA countries and the UK?

The risk of further escalation of COVID-19 is **moderate** for countries that continue to implement and enforce multiple measures including physical distancing and have sufficient contact tracing and testing capacity.

The risk of further escalation of COVID-19 is **very high** for countries that do not implement or enforce multiple measures including physical distancing and have insufficient contact tracing and testing capacity.

This assessment is based on the following considerations:
Given that there are now dedicated COVID-19 surveillance systems, extensive public health measures in place, and ongoing testing and contact tracing of the population, any resurgence in cases should be rapidly detected and extreme situations such as the sudden rise faced by the EU/EEA countries and the UK in March and April this year can be avoided. The levels of preparedness and awareness within the Member States are markedly different now than from the situation at the beginning of the pandemic.

Most countries (26/31) are now reporting an increase in their 14-day case notifications, and whilst the increasing trends in some countries may be related to changes in testing capacity, the data on hospitalisations and testing positivity suggest that in many countries the increase in notifications reflects a genuine increase in the circulation of the virus.

The extent to which easing of restrictions on travel, within and between countries might exert an ongoing impact on disease transmission across the region will depend on several factors, but particularly on the capacity of

countries to detect (test) and trace the contacts of cases, whether those be cases of infection acquired within the country or outside. The proportion of cases that are reported to have been imported from one country to another is low. However, the mobility of people within a country and to a lesser extent across borders remains a risk for transmission in the absence of low incidence across all areas, widespread susceptibility to infection and variable application of control measures.

The implementation of control measures varies across EU/EEA countries and the UK. Whilst evidence of the effectiveness of each measure remains unknown, there is an understanding that multiple measures need to be in place to control transmission. Around a third (10/31) of countries have only three or fewer control measures in place (including closure of public spaces, limits on sizes of non-essential groups, and the wearing of face masks in the community and a few countries have currently very few measures (none or one) in place to prevent ongoing transmission . Between June 1 and July 1, 13/31 countries removed or relaxed measures related to physical distancing; three countries have increased the number of measures in place; and 15 countries maintained the same number of measures Since 1 July, there have been changes in the measures implemented in countries with five countries changing their recommendations around masks.

Further increases in cases are likely if robust testing and contact tracing systems are not in place or cannot cope where there is a rising incidence, and if physical distancing and other NPIs are not well implemented and tailored to the local situation. Countries that see an increase in the percentage of positive tests and have relaxed or removed various control measures will be at higher risk for resurgence than countries that have maintained measures or strengthened them. As countries implement multiple response measures and the public's adherence to these measures varies, it also remains difficult to quantify the risk posed to each country.

Sixteen countries recommend stay at home measures for people in risk groups, which should reduce the impact of severe disease for those vulnerable populations. However, outbreaks among vulnerable groups, in particular among the elderly in LTCFs, have been widely reported with high levels of associated morbidity and mortality and a strong and tailored public health approach is required to limit transmission.

4. Options for response

Response strategy needs to be based on preparedness planning and is guided by risk assessments taking into consideration the national context (epidemiological situation, resources, socio-political situation). In general, national response is based on testing and contact tracing followed by isolation of identified cases and contacts, treatment of cases and public health measures to prevent or decrease rates of transmission in the community.

4.1 Strategic planning for different scenarios

Evolution of the epidemiological situation necessitates a local risk assessment and adaptive changes in the response measures. The fifth rapid risk assessment produced by ECDC on 2 March this year, outlines specific measures that should be considered for the different epidemiological scenarios [25].

Several countries appear to be now progressing from limited local community transmission towards sustained community transmission (localised outbreaks which start to merge and become indistinct; leading to sustained transmission in the country; culminating in increasing pressure on healthcare systems) necessitating a stronger approach focused on both containment and mitigation measures. Options for response in this scenario outlined in the risk assessment include promotion of various control measures including specific physical distancing measures such as the cancellation of mass gatherings and measures in the work place as well as the preparing healthcare services to meet potential increasing demands for treating COVID-19 cases.

4.2 Monitoring and evaluation

Monitoring is important to provide strategic local information to authorities and policy makers to enable effective decision-making. All countries should have a strong monitoring and evaluation framework in place to closely monitor both the epidemiological situation and the impact of the public health interventions in place.

ECDC has developed a monitoring and evaluation framework covering COVID-19 preparedness, prevention and control activities [26]. The framework, which is harmonised with WHO's COVID-19 Strategic Preparedness and Response monitoring and evaluation framework [27], presents key indicators and provides guidance on how to collect and analyse data for these indicators. The main areas for monitoring proposed in the ECDC framework include surveillance, laboratory activities and testing capability, case management, maintenance of essential health services, infection prevention and control, vaccine monitoring and risk communication. The framework will

need to be adapted to local circumstances to rapidly detect increased transmission, assess the impact of interventions in place, and guide risk communication messages to the public.

4.3 Testing strategy

Widespread testing, prompt isolation of cases and timely and effective contact tracing and quarantine of identified contacts are currently the main pillars of the public health response to control COVID-19. Therefore, ECDC recommends that testing efforts be maximised with the aim of offering timely testing to all symptomatic cases, including mild cases [23,28][ref].

Large-scale testing is key to control transmission within a population, to ensure comprehensive contact tracing and as the foundation for effective surveillance. Testing results inform decisions to implement or reduce public health measures. Widespread testing is crucial in order to identify localised resurgence early, which may help prevent the need to implement blanket mitigation measures for an entire population.

The points below are key priorities to consider in order to optimise testing strategies:

- Ensure all people with symptoms, even very mild symptoms are tested.
- Ensure testing is easily accessible for everyone, including populations such as migrants, seasonal workers and travellers.
- Promote and ensure people with symptoms are tested as soon as possible after symptom onset.
- Ensure sufficient laboratory capacity exists and ability to deliver results timely, ideally within 24 hours of sample collection.
- Ensure robust follow-up system for case management, rapid contact tracing and quarantine.

Further options to consider as part of an effective testing strategy include testing of asymptomatic persons such as:

- Persons who have had a high-risk exposure to a confirmed case (close contacts) [29] .
- Persons working with vulnerable populations.
- Persons in high-risk settings such as prisons and long term care facilities [6,7].
- In the context of clusters or outbreaks.
- In the context of screening of populations at higher risk of infection such as travellers returning from high-transmission settings [30] or persons working in occupations with high risk of exposure.

However, the practicalities of widespread testing may not be feasible; in addition, in low prevalence settings, it could lead to higher rates of false positives, and may not be cost effective. Testing of asymptomatic people could be considered if resources allow, but such testing should not compromise accessibility or timeliness of testing of symptomatic people and should be regularly evaluated to provide evidence on the effectiveness of such strategies.

Testing strategies for symptomatic COVID-19 cases, high-risk populations and point prevalence studies are described in the "Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – tenth update" document [23] Testing strategies are also provided for long-term care facilities [6], prisons [7], and migrant and refugee reception and detention centres [8].

4.4 Contact tracing

The aim of contact tracing is to promptly identify and manage contacts of COVID-19 cases in order to reduce further onward transmission by contacts before being identified and quarantined [31]. Rigorous contact tracing, when accompanied by extensive testing, is an effective strategy for the control of COVID-19. When implemented, in combination with other measures, contact tracing can help reduce transmission even if not all contacts of a case can be identified and traced [32]. A recent modelling study has estimated that with 80% coverage, the immediate testing on symptom onset and quarantine of contacts within 24 hours, can reduce the reproduction number by 26% (14 -35%) [33]. Case finding through contact tracing provides a targeted approach to identifying cases with studies suggesting that testing of asymptomatic contacts may be helpful in increasing the impact of contact tracing in terms of reducing onward transmission [34].

Speed is important for contact tracing to contribute to reducing transmission, and efforts should be made to reduce the time needed for each step in the process [35]. Firstly, people with symptoms compatible with COVID-19 should be tested as soon as possible. This includes emphasising to the public the need to test as soon as symptoms develop and to ensure testing is easily accessed, including for visitors from other countries. Test

turnaround time should be minimised, and public health authorities notified promptly after a positive result so that contact tracing can be initiated.

To improve timeliness, public health authorities may also consider initiating the contact tracing process for possible and probable cases [36] while awaiting for the test result. If the test result is later found to be negative, contact persons would be informed accordingly. Public health authorities can also consider 'retrospective contact tracing' or 'source finding' where cases are interviewed about their activities and contacts between 14 and 2 days before symptom onset to identify where they became infected and from whom. This would allow authorities to go back to the 'source' and contacts arising from any subsequent cases originating from the same source. This approach has been used for example in New Zealand and Japan and is being trialled in the UK [37-39]. Modelling studies suggest that adding an element of retrospective contact tracing to regular contact tracing helps reduce the effective reproduction number [40].

Data from contact tracing can provide a better understanding of the epidemiology of COVID-19, providing valuable information on transmission and attack rates, supporting the identification of key settings where transmission is occurring and facilitating a greater understanding of the effectiveness of different mitigation measures, such as physical distancing. Seven key indicators around contact tracing have been identified by ECDC as important for monitoring and countries should be encouraged to collect and analyse data relating to these indicators [26].

Contact tracing can be labour intensive if there are many cases and is conducted manually [41]. ECDC has published guidance on ways to scale up contact tracing which include the use of novel technology-based approaches to assist in the identification and management of contacts such as specific contact management software e.g. Go.Data, web-based tools and mobile phone applications (apps) for proximity detection and automatic notification [32].

Mobile apps can speed up the contact tracing process and also help identify more contacts as they do not rely on the memory of the case. However, conventional contact tracing should be carried out in parallel to the use of apps since their effectiveness is associated with their coverage which may be low in some key populations e.g. older people [42]. Public health authorities should be closely involved in the ongoing evaluation and calibration of mobile apps as empirical data on their effectiveness is lacking [42]. ECDC has published guidance for public health authorities on the development and use of such apps to ensure that the main epidemiological and operational considerations are taken into account [43]. Issues around data protection and privacy are covered in guidance from the European Commission and eHealth Network [44,45].

4.5 Non-pharmaceutical interventions

The main route of transmission of SARS-CoV-2 is likely to be through large droplets (>5µm in diameter) with transmission also possible through aerosols (i.e. small droplets and droplet nuclei ≤5µm in diameter, also referred to as short-range airborne transmission), direct contact and fomites (i.e. contaminated surfaces and objects) [46]. However, the relative contribution of the different transmission routes to SARS-CoV-2 infection and to the spread of the COVID-19 pandemic has not been determined, yet. Current evidence suggests the highest rates of transmission are from infected individuals expelling large amounts of large and small respiratory droplets (coughing, singing, or speaking loudly) in indoor settings; and that infection rates decrease with increasing distance from the source, with a shorter duration of contact, and with an increased level of ventilation with fresh air. Super spreading events have been reported in multiple occasions, where usually multiple persons have prolonged contact in closed spaces, and may be important drivers of transmission in the pandemic [47,48].

In June 2020, ECDC listed in the tenth update of our Risk Assessment on COVID-19 in the EU/EEA countries and the UK a non-exhaustive list of non-pharmaceutical interventions, indicating those which should be maintained regardless of transmission rates and those to be considered in the event of increased incidence [23]. Several countries in the EU/EEA and the UK are observing a resurgence of COVID-19 cases one to three months after the gradual lifting of stricter measures implemented between March-April 2020. Different public health measures are currently considered or reinstated, while trying to avoid stricter measures such as a nation-wide `stay-at-home' orders (see Figure 9).

At the same time response fatigue and the economic consequences of the response to the spring COVID-19 wave, compromise widespread adherence to the mainstay recommendations, such as physical distancing, increase the risk of reduced public acceptance for measures in place for a prolonged time [49]. Non-adherence to physical distancing recommendations during parties (family functions or other) and overcrowding in public places, nightclubs or other recreations have been seen as the main drivers of the resurgence of cases in several EU/EEA countries [50-54].

4.5.1 General measures

General measures are presented in two categories: minimum baseline measures that should be considered regardless of transmission rates, and additional measures that may need to be considered at local (subnational) level or even at national level in case the reproduction number remains higher than one.

4.5.1.1. Baseline measures

Hygiene measures

As mentioned above, the main route of transmission of SARS-CoV-2 is likely to be through large droplets and direct contact, which has been discussed since the early days of emergence of the virus. Therefore, meticulous hand and respiratory hygiene insisting in the protection of mouth and nose with the elbow when coughing and sneezing, and avoiding touching the face, nose, eyes and mouth has been continuously advocated and should remain in the focus of risk communication to the public. The contribution of the fomite route is not clarified, although a recent cluster has been attributed to contact transmission [55].

Physical distancing and limiting gatherings

Recent evidence confirmed the importance of physical distancing for the prevention of person-to-person transmission of SARS-CoV-2. In a systematic review and meta-analysis, physical distancing of one meter or more was associated with an approximately 5-fold reduction of the transmission risk, with a twofold increased protective effect for every added meter distance [56]. Physical distancing can be achieved through a recommendation or obligation to maintain minimum one and ideally 2 metres distance between individuals in public places, reinforced by measures such as discouraging or prohibiting small, medium-sized and mass gatherings [57], and implementing a wider policy of teleworking. Facilitation of physical distancing in public spaces can be achieved with limiting allowed seating and floor markings, as well as implementing physical barriers for employees serving multiple persons (e.g. cashiers, ticketing staff, etc.).

A recent analysis of eight non-pharmaceutical interventions implemented in 41 countries found the highest reduction of the effective reproduction number R_1 when gatherings were limited to 10 people or less (36%; 16%-53%), compared to 100 people or less (21%; 1%-39%) and to 1000 people or less (2%; -20%-22%) [58].

One approach that could decrease the intensity of physical distancing and limit the mental effects of this measure, is by creating 'social bubbles' [59,60]. Consistently meeting with the same people, whether friends or co-workers, can allow for a greater degree of contact between people, while still minimising the risk of SARS-CoV-2 transmission and associated outbreaks.

Using face masks in the community

There is increasing evidence supporting the effect of face masks for the prevention of SARS-CoV-2 transmission. In a recent systematic review, Chu et al. found on average a more than five-fold reduction of the transmission risk from 17.4% with no face mask to 3.1% with a face mask (e.g., N95, surgical, or 12-16 layer cotton mask) [56]. In healthcare settings, stronger positive associations with the use of FFP2 respirators compared to the use of medical masks or similar, were found. In addition, several other studies on the use of either medical or non-medical face masks in the community have provided evidence on the efficacy of this measure at individual [61-63] and population level [64,65]. The evidence shows that wearing masks is not only effective to reduce the spread of the virus through respiratory secretions (source control), but also to protect the individuals that wear them correctly from contracting COVID-19.

Based on the available evidence, implementing the use of face masks in the community when physical distancing cannot be guaranteed should be strongly considered, both indoors (e.g. groceries, public transport) and in overcrowded outdoor situations, in areas with increased incidence of COVID-19.

The key to the effectiveness of the use of face masks in the community is good compliance [66], and proper and rationale recommendations (unnecessary in non-crowded well ventilated open spaces), which can be improved through appropriate risk communication methods. Concerns that mandated face mask usage would generate a false sense of security that could decrease adherence to other protective behaviours such as physical distancing, have been shown unfounded in several studies [67,68]. The decision to issue a strong national recommendation or mandate the use of face masks in community settings, should take into account the local context, the availability of face masks for the public (which should not compromise the availability of face masks for health and social care workers), socio-political situation and resources available to monitor the implementation of a mandatory measure.

Nevertheless, the use of masks in the community should not be considered as the main single cover-all measure, but should be combined with other essential measures, particularly respiratory etiquette. Recently Hong Kong, which has a long-standing mask wearing culture, faced a second wave of COVID-19 infection attributed to increased person contacts, importations and limited capacity to isolate confirmed cases [69].

Teleworking recommendation

Recommendations for workers to telework limits the number of adults circulating in the general community, reduces congestion on public transit, and reduces contacts in the workplace. In a recent assessment of the response to the first wave of COVID-19 cases in Hong Kong, community surveys found that teleworking for government and private employees was one of the most consequential physical distancing measures and up to 35% of employed persons in the country had modified their work hours to work from home [70].

Isolation and quarantine

Isolation is recommended for all confirmed, probable and possible COVID-19 cases. From an infection prevention point of view, hospitalisation and isolation in airborne infection isolation rooms or single rooms should be considered for all confirmed cases [71]. However, patients with mild and moderate illness may not require hospitalisation and could be monitored in a community facility or at home. This decision should be made on a case-by-case basis depending on the clinical presentation, requirement for supportive care, potential risk factors for severe disease, and conditions at home, including the presence of vulnerable persons in the household and the capacity to take measures to limit household transmission. Individuals with symptoms compatible with COVID-19 should be relieved of their work duties and managed in accordance with the national guidance for diagnostic testing and isolation.

Protection of vulnerable persons populations

For the protection of people in the community at increased risk of developing severe disease from infection with SARS-CoV-2, such as the elderly or those with underlying health conditions, special measures should be considered when there is ongoing local community transmission. These again must include physical distancing, strict hand and respiratory hygiene and the use of PPE by caregivers in contact with vulnerable individuals. Specifically tailored advice around physical distancing ('shielding') should also be considered, especially during periods of intense local transmission, and influenza vaccination of the vulnerable individual and their household is advisable.

4.5.1.2. Additional measures

Travel restrictions

Border closures were implemented extensively in response to the COVID-19 pandemic in the EU/EEA and the UK, as well as worldwide, with the aim of reducing long-distance transmission and importation. However, available evidence does not support recommending border closures, which cause significant secondary effects and societal and economic disruption. Border closures result in substantial challenges for logistics, trade and the movement of people, particularly during a crisis period. It is important that decision makers understand that SARS-CoV-2 as a human-to-human transmitted respiratory virus with global distribution, cannot be controlled with border closures and that measures to effectively contact trace travellers crossing borders are needed and should be reinforced during the coming period [30,72].

Limiting population movement

In addition to teleworking, limiting the numbers of contacts per person (`social bubbles') and avoiding mass gatherings (see above), limiting population movement can also be achieved through paying particular attention in the regulations for high-risk only (e.g. bars, nightclubs, gyms), most non-essential businesses, closure of schools and finally through `stay-at-home' orders, which may be total or partial (e.g. curfew). A recent analysis of the effect of eight non-pharmaceutical interventions in 41 countries between January and May 2020 found a reduction of the reproduction number with 31% (13-46%) for the closure of (some) high-risk businesses with only a slightly higher effect of 40% (22-55%) reduction for most non-essential businesses;; and 18% (4-31%) for stay-at-home orders [58].

4.5.2 Targeted measures

In countries seeing a resurgence in cases, it is important to prevent outbreaks in specific settings and re-evaluate infection prevention and control measures as well as enhanced surveillance to monitor potential resurgences. The prompt and rigorous application of non-pharmaceutical interventions, including physical distancing measures, strict hand and respiratory hygiene, the appropriate use of face masks and cleaning, can assist significantly in mitigating the risk of transmission of SARS-CoV-2. Cases in these settings must be promptly identified and managed and a comprehensive testing and contact tracing strategy is essential.

Healthcare facilities

Healthcare workers and long-term care facility administrators should continue implementing the measures for COVID-19 preparedness and infection prevention and control described in the ECDC: 'Infection prevention and control for COVID-19 in healthcare settings – Third update' [73], as incorporated in the national guidance. All healthcare worker staff should be trained properly in IPC protocols to prevent nosocomial transmission and should be provided with adequate personal protective equipment. Universal masking for all routine clinical care activities (also for non-COVID patients and residents) should be strongly considered as long as there is community transmission of COVID-19. In addition, ways to increase ICU and hospital treatment capacities should be clarified for potential resurgence in cases incorporating lessons from responding to the spring wave of COVID-19.

Prisons

Challenges for the successful control of COVID-19 in prisons include unavoidable close human-to-human contact, poor ventilation, sub-optimal healthcare services, multi-morbidities of inmates and the often high turnover of people coming in and out of the prison from the community, including the prison staff [7]. In addition to standard measures, cleaning and disinfection is particularly important due to the closed environment, possible overcrowding and the centralised provision of services within prison settings, which promote clustering. Prison administrations and justice authorities should consider strategies to avoid overcrowding, the restriction of visitors, the 'cocooning' of people at high risk of severe COVID-19. In addition, prison administrators should review and improve ventilation of the facility if possible and ensure that staff have access to adequate PPE and can stay at home, if they are symptomatic [7]. Prisons should also ensure there is a robust system in place for the surveillance and monitoring of COVID-19 in people in prison (including staff members), which should be developed in consultation with local public health authorities.

Other occupational settings

In relation to the prevention of COVID-19 in occupational settings, a particular focus on testing is important in combination with robust and enforced polices for physical distancing, hygiene and cleaning, appropriate use of PPE and hand hygiene, particularly in closed settings and in situations of extended contact, shared transportation and accommodation [13]. Robust surveillance and contact tracing is essential and specific guidance is provided by EU-OSHA on some aspects of the prevention of COVID-19 in occupational settings [74]. There is also a need for strong collaboration between public health and occupational health and safety authorities at the local and national level. Strong inter-sectoral collaboration and the implementation of recommended public health measures will help to prevent resurgence of COVID-19 in the workplace and in the wider community and attention should be given to cooperation between national and international authorities if clusters involve seasonal workers or workers from other countries.

4.6 Risk communication

As the COVID-19 pandemic continues, it is natural for people to become fatigued and reduce compliance with public health measures. Whilst all risk communication efforts should be tailored to changes in the local situation, continuous messaging is needed to remind everyone that the SARS-CoV-2 virus will remain in circulation within the community and that the everyday measures they can take to reduce potential exposure remain cough and respiratory etiquette, physical distancing, hand hygiene, and staying home when ill. People need compelling reminders to continue to adhere to measures presented by public figures of influence and trust and made aware of changes in the local situation and the measures that should be adhered to. Messaging regarding resurgence of cases may include recommendations around encouraging teleworking, restricting travel, reducing the size of non-essential groups, and other social distancing measures should be reinstated and strengthened.

The public needs to understand what actions or settings are driving the resurgence and what behaviours are resulting in an increase in cases. The public also needs to be aware of the burden on the healthcare system as that knowledge influences adherence and compliance to more restrictive measures. Despite the high scientific progression achieved in the knowledge of SARS-CoV-2 and COVID-19, there remain a number of uncertainties with regards to COVID-19 in relation to the science and the future progression of the pandemic and these uncertainties need to be openly acknowledged.

If there is a resurgence in cases, it remains imperative that vulnerable groups are protected and adequately supported and the general public are made aware of the importance and rational of measures to protect these groups.

Authorities may need to adapt or re-introduce effective response measures at the subnational level as the level of transmission is likely to vary between different areas within the same country. In addition to intensive testing and contact tracing, NPIs aimed at limiting population mobility and at reducing exposure may need to be considered to control rapid upsurges in transmission and any differences in measures applied between areas need to be cleared explained. Risk communication messaging must be realistic and acknowledge the sacrifices and lifestyle changes the public has already made for reducing the spread with sustainable and long-term implementation in mind.

5. Limitations

This assessment is undertaken based on information known to ECDC at the time of publication and has several key limitations:

- Information on testing strategies for some EU countries were not available at the time of publication of this assessment.
- It is also important to consider the lag time between infection, symptoms, diagnosis, disease notification, death, and death notification that may be subject to biases including changes in testing and reporting over time. The effects and impact of lifting or imposing response measures may take weeks to reflect in the population rates of disease.
- Assessing the impact of response measures is complex as many countries lifted or relaxed multiple measures simultaneously. Changes in individual behaviours, compliance with measures, and cultural, societal, and economic factors all play a role in the dynamics of disease transmission.
- The data on non-pharmaceutical interventions are based on information available from official public sources and may not capture measures being taken by countries that are not reported on publicly available websites. These data have several limitations. Firstly, there is substantial heterogeneity in physical distancing policies and their implementation between countries. The exact dates of introduction were often available from official sources but delays in their implementation may have occurred. Additionally, availability of public data from official government sources varies among countries. For some countries, data are no longer available on official websites concerning measures that are no longer in force, which may result in the data for more recent measures being more complete.
- The 14-day notification rate of reported cases and deaths are dependent on data collected by ECDC's epidemic intelligence team. ECDC does not recommend using notification rates to directly compare countries. Caution is recommended whenever interpreting country data with small populations as small changes in reported cases can have a significant impact on the notification rates. One must understand any changes in testing within each country to interpret the notification data.

6. Source and date of request

European Commission, 30 July 2020.

7. Consulted experts

ECDC experts (in alphabetical order): Agoritsa Baka, Jordi Borrell Pique, Stefania De Angelis, Erika Duffell, Lisa Ferland, Lea Franconeri, Josep Jansa, Irina Jovel Quinonez Dalmau, Csaba Ködmön, Favelle Lamb, Lina Nerlander, Taina Niskanen, Gianfranco Spiteri, Carl Suetens, Ivo Van Walle, Ariana Wijermans.

Disclaimer

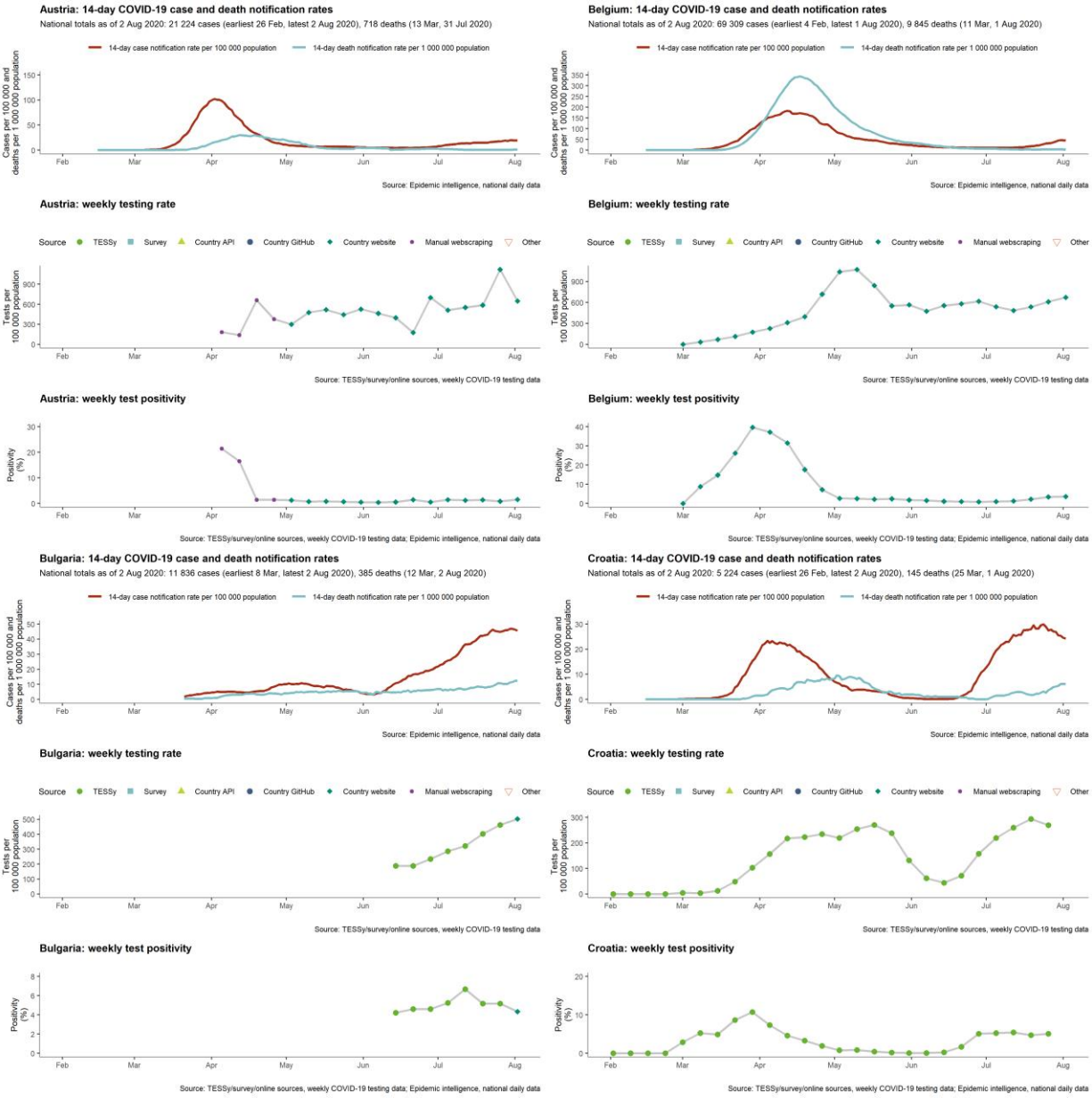
ECDC issues this risk assessment document based on an internal decision and in accordance with Article 10 of Decision No 1082/13/EC and Article 7(1) of Regulation (EC) No 851/2004 establishing a European centre for disease prevention and control (ECDC). In the framework of ECDC's mandate, the specific purpose of an ECDC risk assessment is to present different options on a certain matter. The responsibility on the choice of which option to pursue and which actions to take, including the adoption of mandatory rules or guidelines, lies exclusively with the EU/EEA Member States. In its activities, ECDC strives to ensure its independence, high scientific quality, transparency and efficiency.

This report was written with the coordination and assistance of an Internal Response Team at the European Centre for Disease Prevention and Control. All data published in this risk assessment are correct to the best of our knowledge at the time of publication. Maps and figures published do not represent a statement on the part of ECDC or its partners on the legal or border status of the countries and territories shown.

Annex 1. 14-day incidence of reported cases and deaths, testing rates and test positivity, EU/EEA, UK

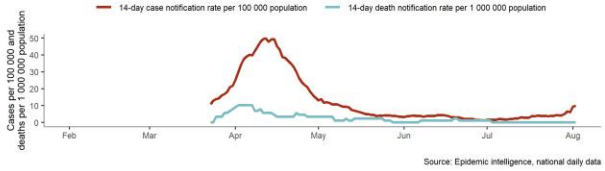
The overview of the notifications rates, testing and NPIs by country in the EU/EEA and the UK is published in the ECDC's weekly COVID-19 country overviews report: https://covid19-country-overviews.ecdc.europa.eu/#europe

Figure A. Evolution of trends in notification rates, testing rates and test positivity



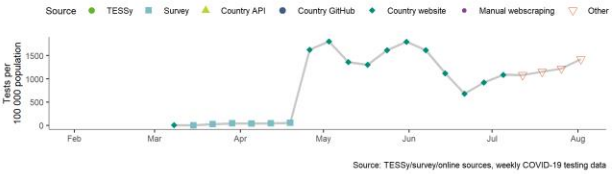
Cyprus: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 1 124 cases (earliest 10 Mar, latest 2 Aug 2020), 19 deaths (25 Mar, 19 Jun 2020)



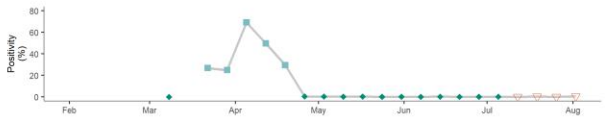
Source: Epidemic intelligence, national daily data

Cyprus: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

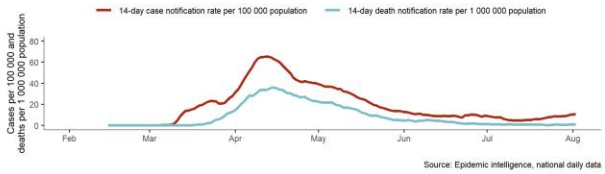
Cyprus: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

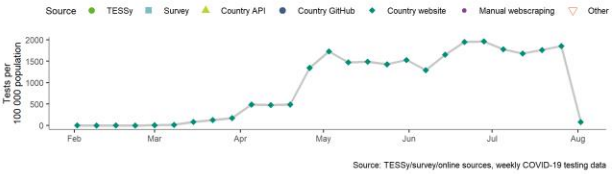
Denmark: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 13 789 cases (earliest 27 Feb, latest 1 Aug 2020), 615 deaths (16 Mar, 31 Jul 2020)



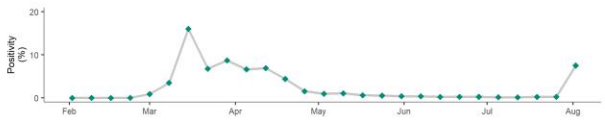
Source: Epidemic intelligence, national daily data

Denmark: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

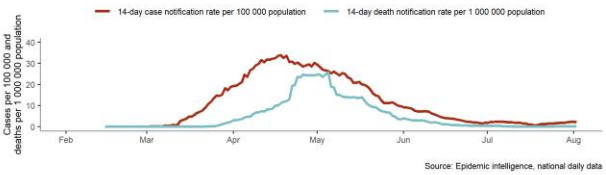
Denmark: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

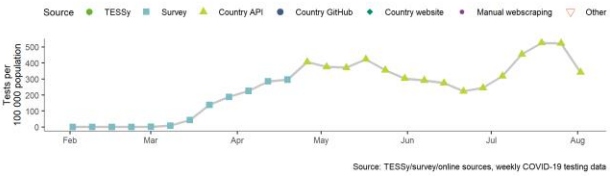
Finland: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 7 443 cases (earliest 30 Jan, latest 2 Aug 2020), 329 deaths (22 Mar, 25 Jul 2020)



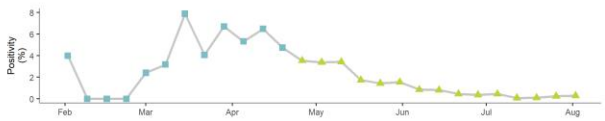
Source: Epidemic intelligence, national daily data

Finland: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

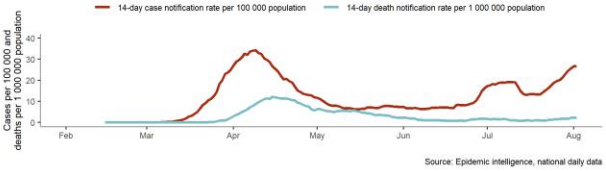
Finland: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

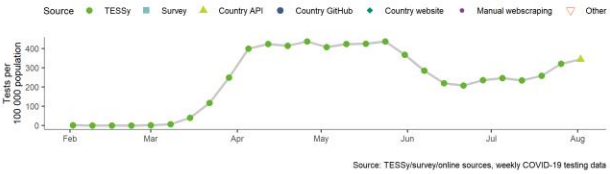
Czechia: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 16 699 cases (earliest 2 Mar, latest 2 Aug 2020), 383 deaths (23 Mar, 2 Aug 2020)



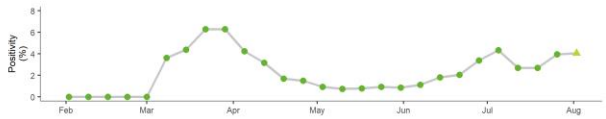
Source: Epidemic intelligence, national daily data

Czechia: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

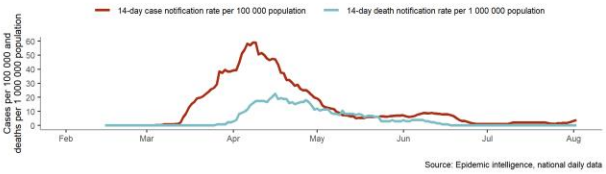
Czechia: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

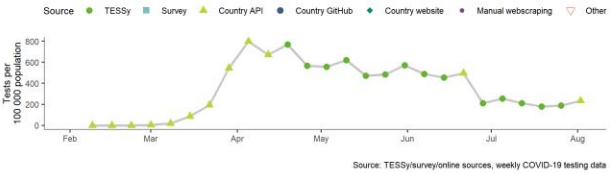
Estonia: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 2 072 cases (earliest 28 Feb, latest 2 Aug 2020), 69 deaths (26 Mar, 4 Jun 2020)



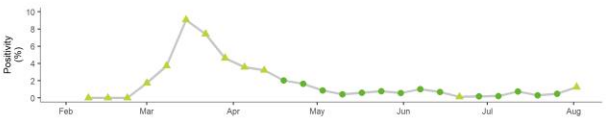
Source: Epidemic intelligence, national daily data

Estonia: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

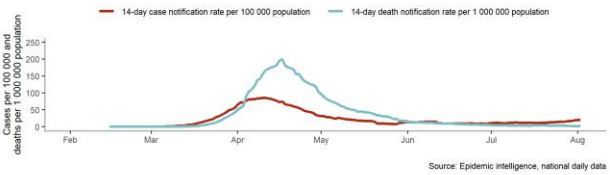
Estonia: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

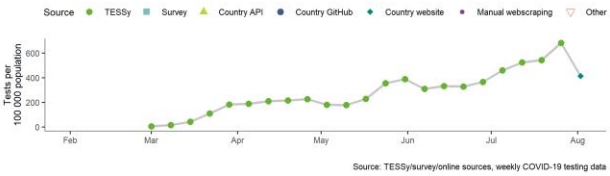
France: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 187 919 cases (earliest 25 Jan, latest 1 Aug 2020), 30 265 deaths (15 Feb, 1 Aug 2020)



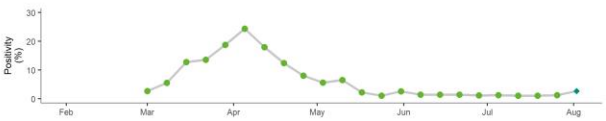
Source: Epidemic intelligence, national daily data

France: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

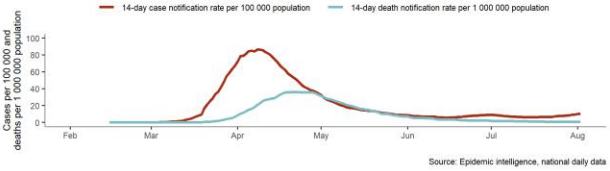
France: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

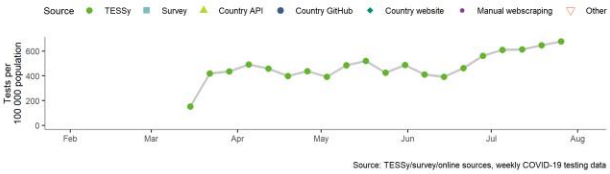
Germany: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 209 893 cases (earliest 28 Jan, latest 2 Aug 2020), 9 141 deaths (10 Mar, 31 Jul 2020)



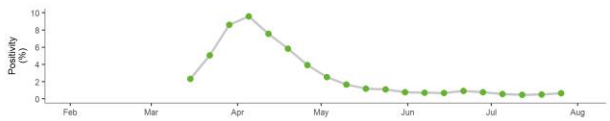
Source: Epidemic intelligence, national daily data

Germany: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

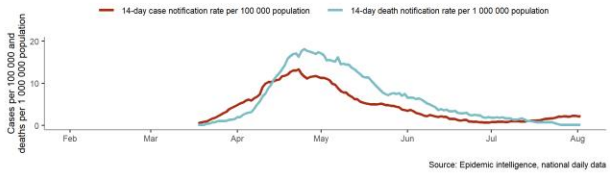
Germany: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

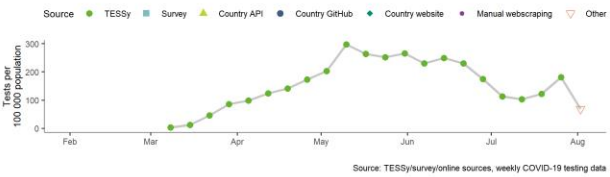
Hungary: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 4 526 cases (earliest 5 Mar, latest 2 Aug 2020), 597 deaths (16 Mar, 2 Aug 2020)



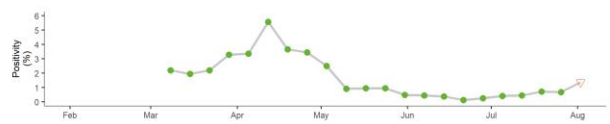
Source: Epidemic intelligence, national daily data

Hungary: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

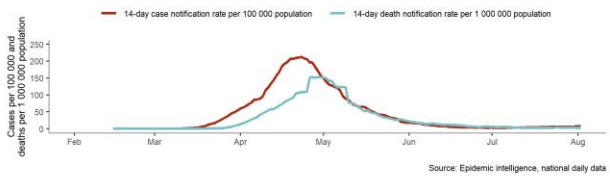
Hungary: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

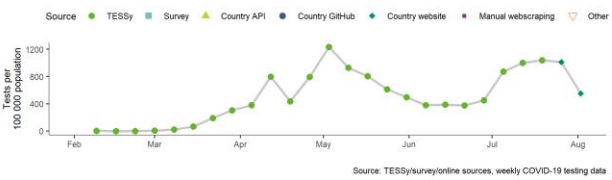
Ireland: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 26 109 cases (earliest 1 Mar, latest 2 Aug 2020), 1 763 deaths (12 Mar, 24 Jul 2020)



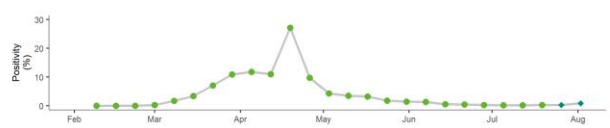
Source: Epidemic intelligence, national daily data

Ireland: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

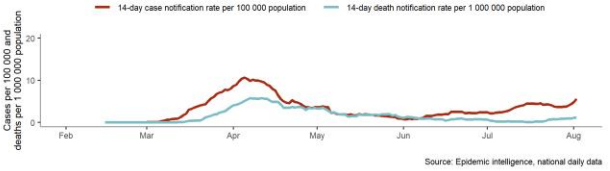
Ireland: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

Greece: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 4 587 cases (earliest 27 Feb, latest 2 Aug 2020), 206 deaths (12 Mar, 1 Aug 2020)

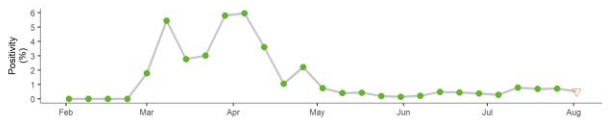


Source: Epidemic intelligence, national daily data

Greece: weekly testing rate

Source: TESSy/survey/online sources, weekly COVID-19 testing data

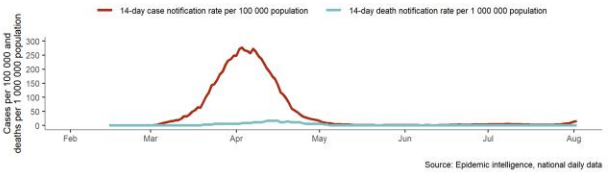
Greece: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

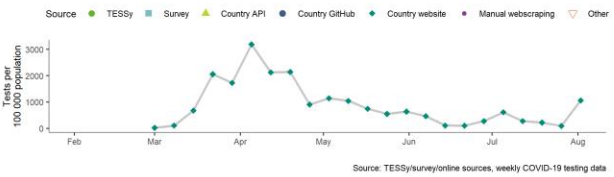
Iceland: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 1 893 cases (earliest 29 Feb, latest 2 Aug 2020), 10 deaths (20 Mar, 21 Apr 2020)



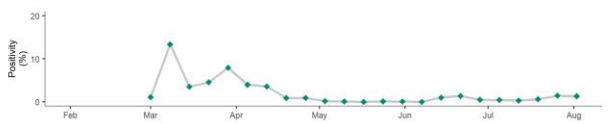
Source: Epidemic intelligence, national daily data

Iceland: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

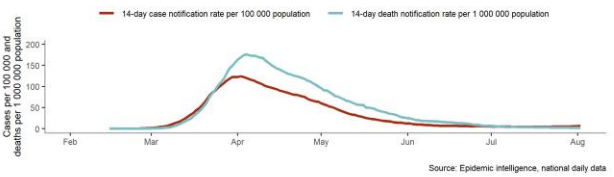
Iceland: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

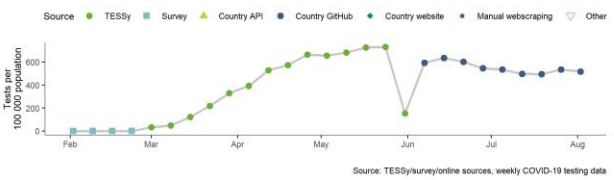
Italy: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 247 832 cases (earliest 31 Jan, latest 2 Aug 2020), 35 146 deaths (23 Feb, 2 Aug 2020)



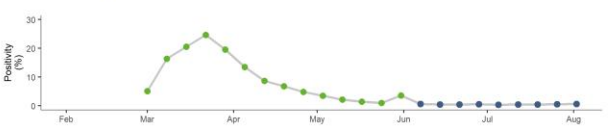
Source: Epidemic intelligence, national daily data

Italy: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

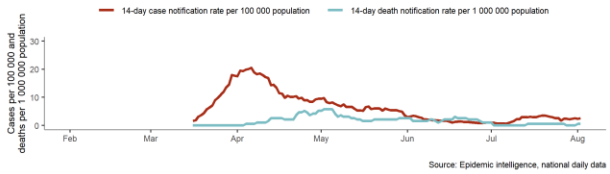
Italy: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

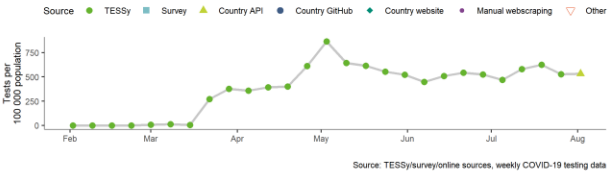
Latvia: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 1 238 cases (earliest 3 Mar, latest 2 Aug 2020), 32 deaths (4 Apr, 1 Aug 2020)



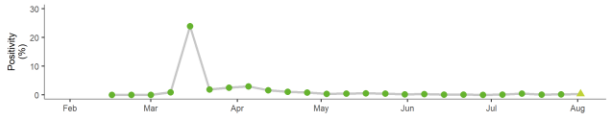
Source: Epidemic intelligence, national daily data

Latvia: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

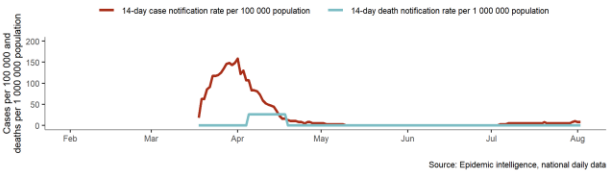
Latvia: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

Liechtenstein: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 89 cases (earliest 5 Mar, latest 31 Jul 2020), 1 deaths (5 Apr, 5 Apr 2020)



Source: Epidemic intelligence, national daily data

Liechtenstein: weekly testing rate

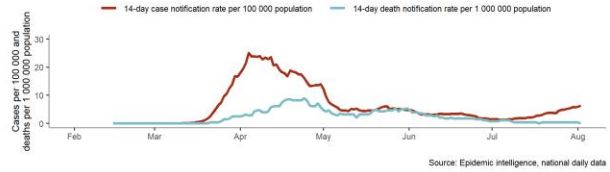
No data to plot

Liechtenstein: weekly test positivity

No data to plot

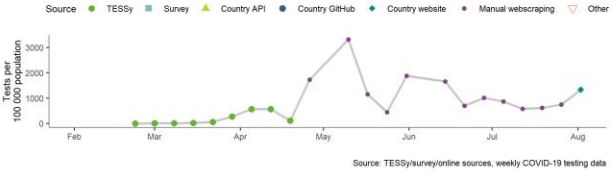
Lithuania: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 2 093 cases (earliest 28 Feb, latest 2 Aug 2020), 80 deaths (21 Mar, 19 Jul 2020)



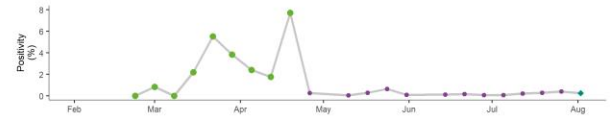
Source: Epidemic intelligence, national daily data

Lithuania: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

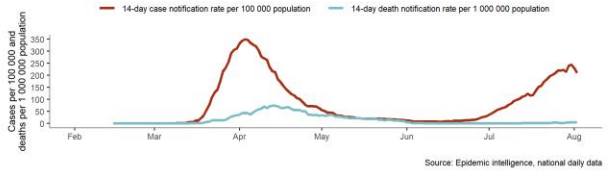
Lithuania: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

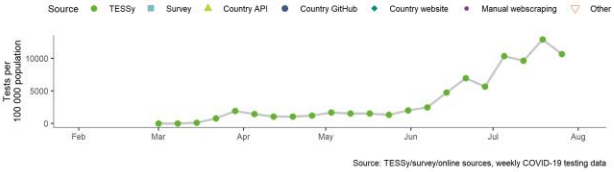
Luxembourg: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 6 695 cases (earliest 1 Mar, latest 1 Aug 2020), 114 deaths (14 Mar, 30 Jul 2020)



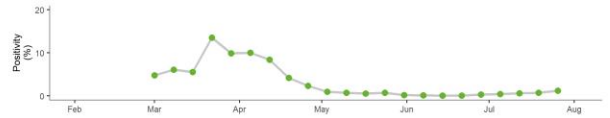
Source: Epidemic intelligence, national daily data

Luxembourg: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

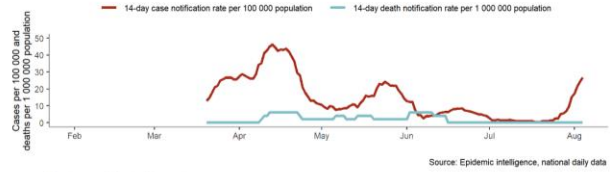
Luxembourg: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

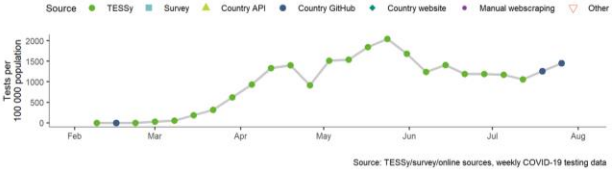
Malta: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 780 cases (earliest 7 Mar, latest 2 Aug 2020), 9 deaths (9 Apr, 2 Jun 2020)



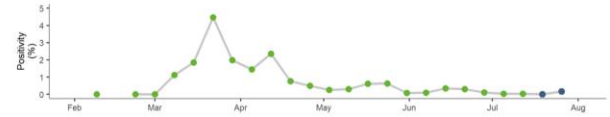
Source: Epidemic intelligence, national daily data

Malta: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

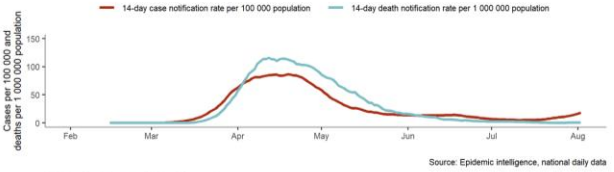
Malta: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

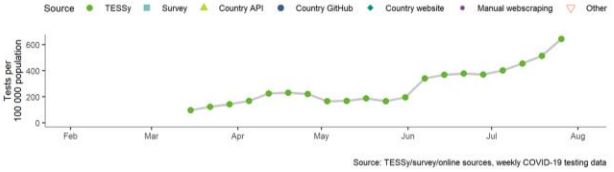
Netherlands: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 54 732 cases (earliest 28 Feb, latest 2 Aug 2020), 6 148 deaths (7 Mar, 2 Aug 2020)



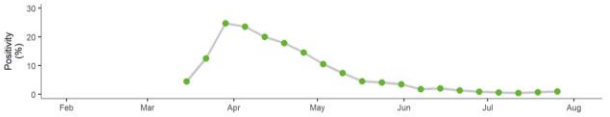
Source: Epidemic intelligence, national daily data

Netherlands: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

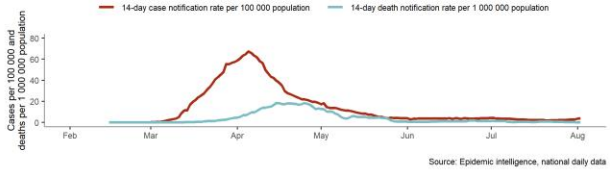
Netherlands: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

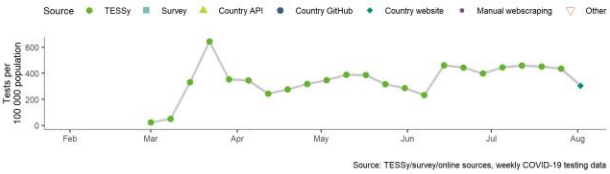
Norway: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 9 208 cases (earliest 27 Feb, latest 1 Aug 2020), 255 deaths (13 Mar, 18 Jul 2020)



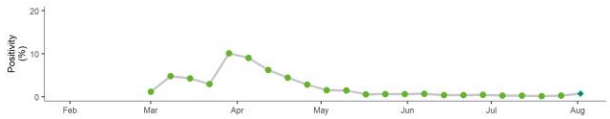
Source: Epidemic intelligence, national daily data

Norway: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

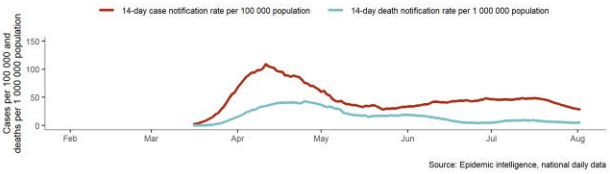
Norway: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

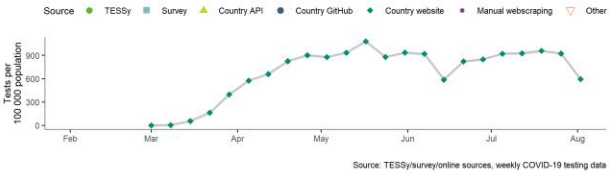
Portugal: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 51 310 cases (earliest 3 Mar, latest 2 Aug 2020), 1 737 deaths (18 Mar, 2 Aug 2020)



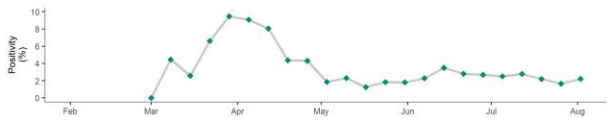
Source: Epidemic intelligence, national daily data

Portugal: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

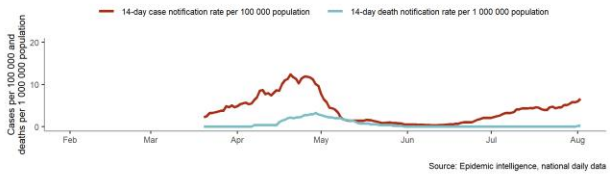
Portugal: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

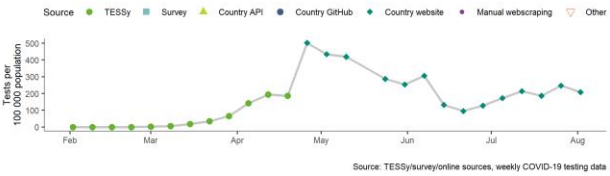
Slovakia: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 2 337 cases (earliest 7 Mar, latest 2 Aug 2020), 29 deaths (7 Apr, 1 Aug 2020)



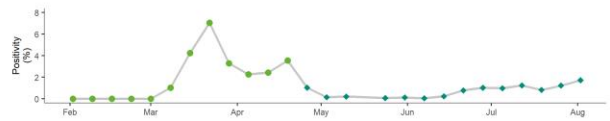
Source: Epidemic intelligence, national daily data

Slovakia: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

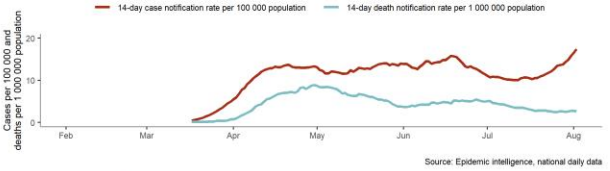
Slovakia: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

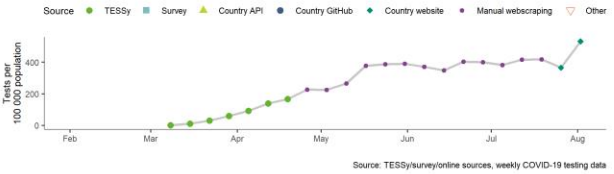
Poland: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 46 346 cases (earliest 4 Mar, latest 2 Aug 2020), 1 721 deaths (13 Mar, 2 Aug 2020)



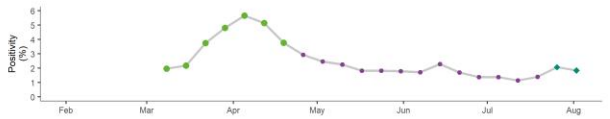
Source: Epidemic intelligence, national daily data

Poland: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

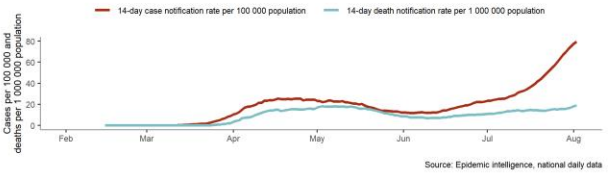
Poland: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

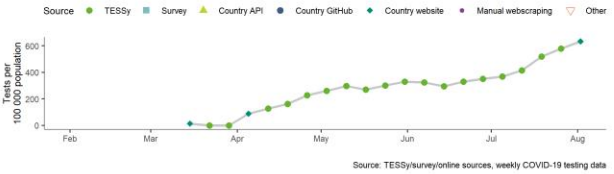
Romania: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 52 111 cases (earliest 27 Feb, latest 2 Aug 2020), 2 379 deaths (23 Mar, 2 Aug 2020)



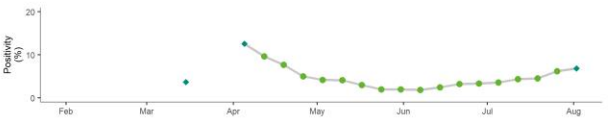
Source: Epidemic intelligence, national daily data

Romania: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

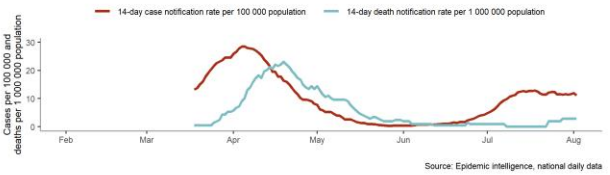
Romania: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

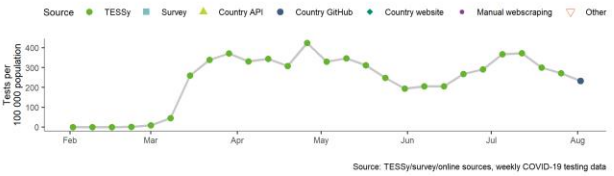
Slovenia: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 2 171 cases (earliest 5 Mar, latest 2 Aug 2020), 117 deaths (18 Mar, 28 Jul 2020)



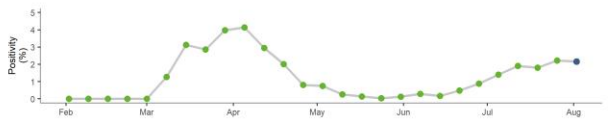
Source: Epidemic intelligence, national daily data

Slovenia: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

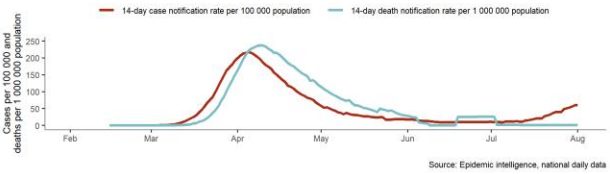
Slovenia: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

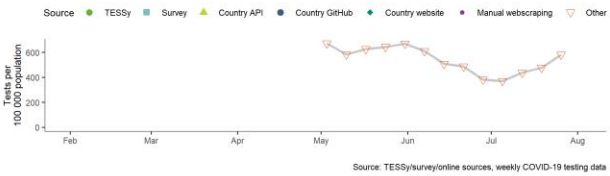
Spain: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 288 522 cases (earliest 1 Feb, latest 31 Jul 2020), 28 445 deaths (5 Mar, 31 Jul 2020)



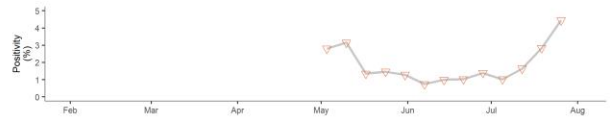
Source: Epidemic intelligence, national daily data

Spain: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

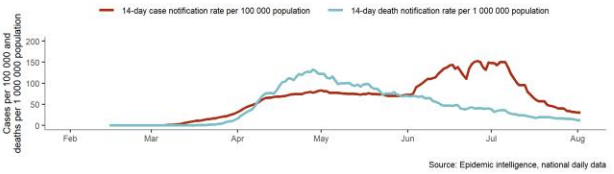
Spain: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

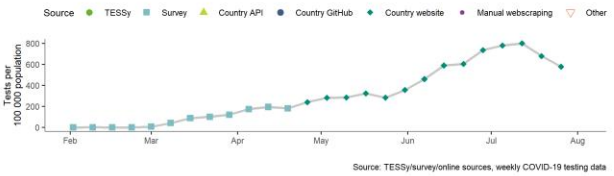
Sweden: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 80 422 cases (earliest 1 Feb, latest 1 Aug 2020), 5 743 deaths (12 Mar, 1 Aug 2020)



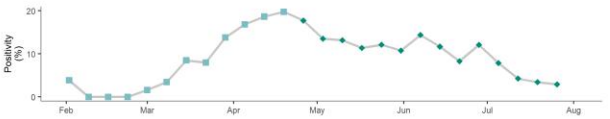
Source: Epidemic intelligence, national daily data

Sweden: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

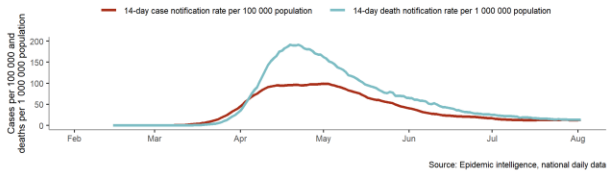
Sweden: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

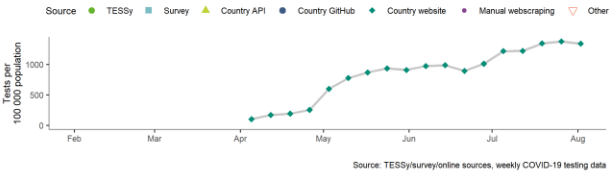
United Kingdom: 14-day COVID-19 case and death notification rates

National totals as of 2 Aug 2020: 303 952 cases (earliest 1 Feb, latest 2 Aug 2020), 46 193 deaths (7 Mar, 2 Aug 2020)



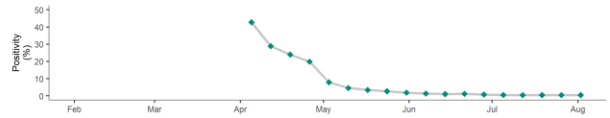
Source: Epidemic intelligence, national daily data

United Kingdom: weekly testing rate



Source: TESSy/survey/online sources, weekly COVID-19 testing data

United Kingdom: weekly test positivity



Source: TESSy/survey/online sources, weekly COVID-19 testing data; Epidemic intelligence, national daily data

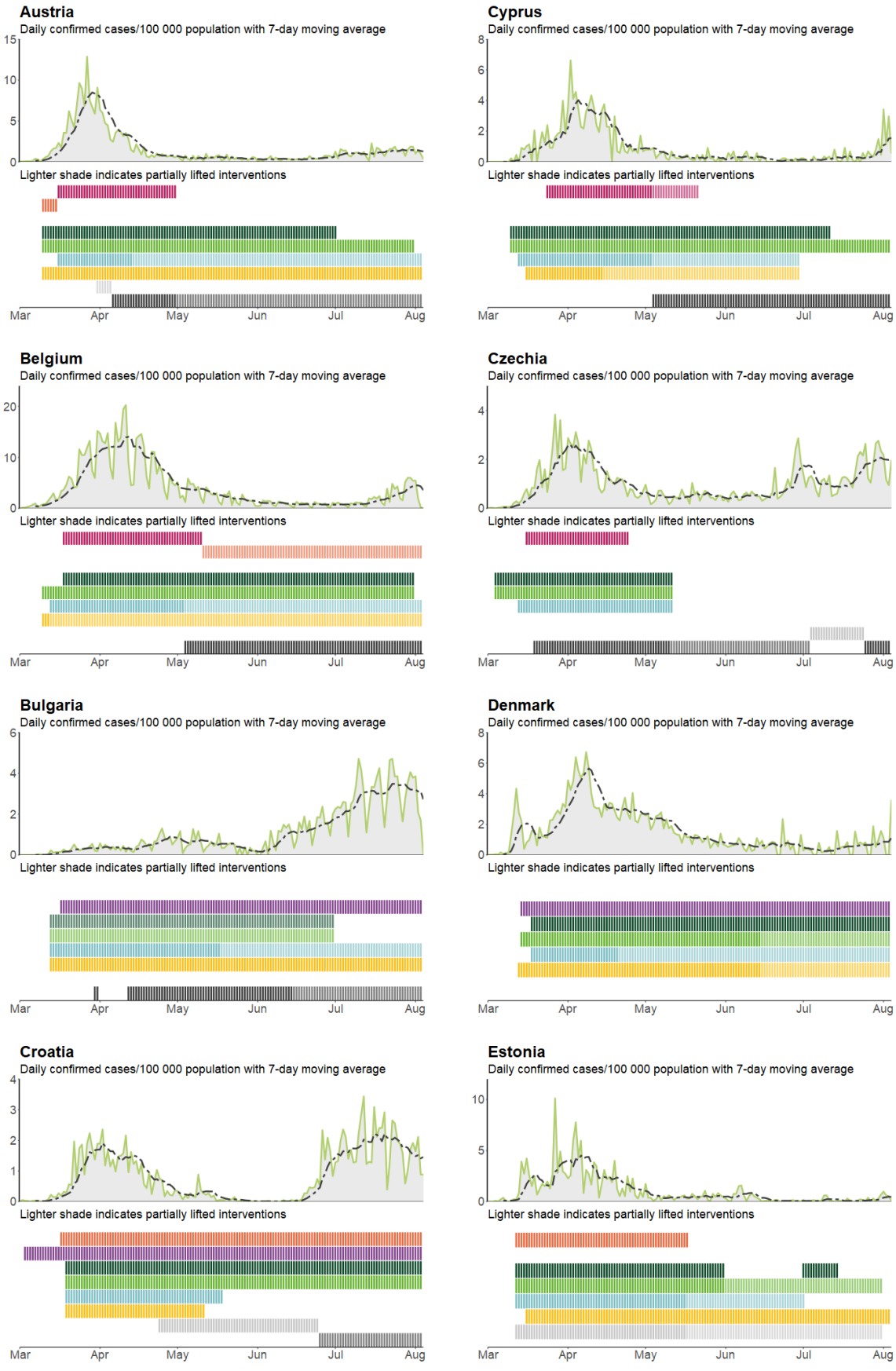
Annex 2. Response measures in EU/EEA countries and the UK, as of 28 July 2020

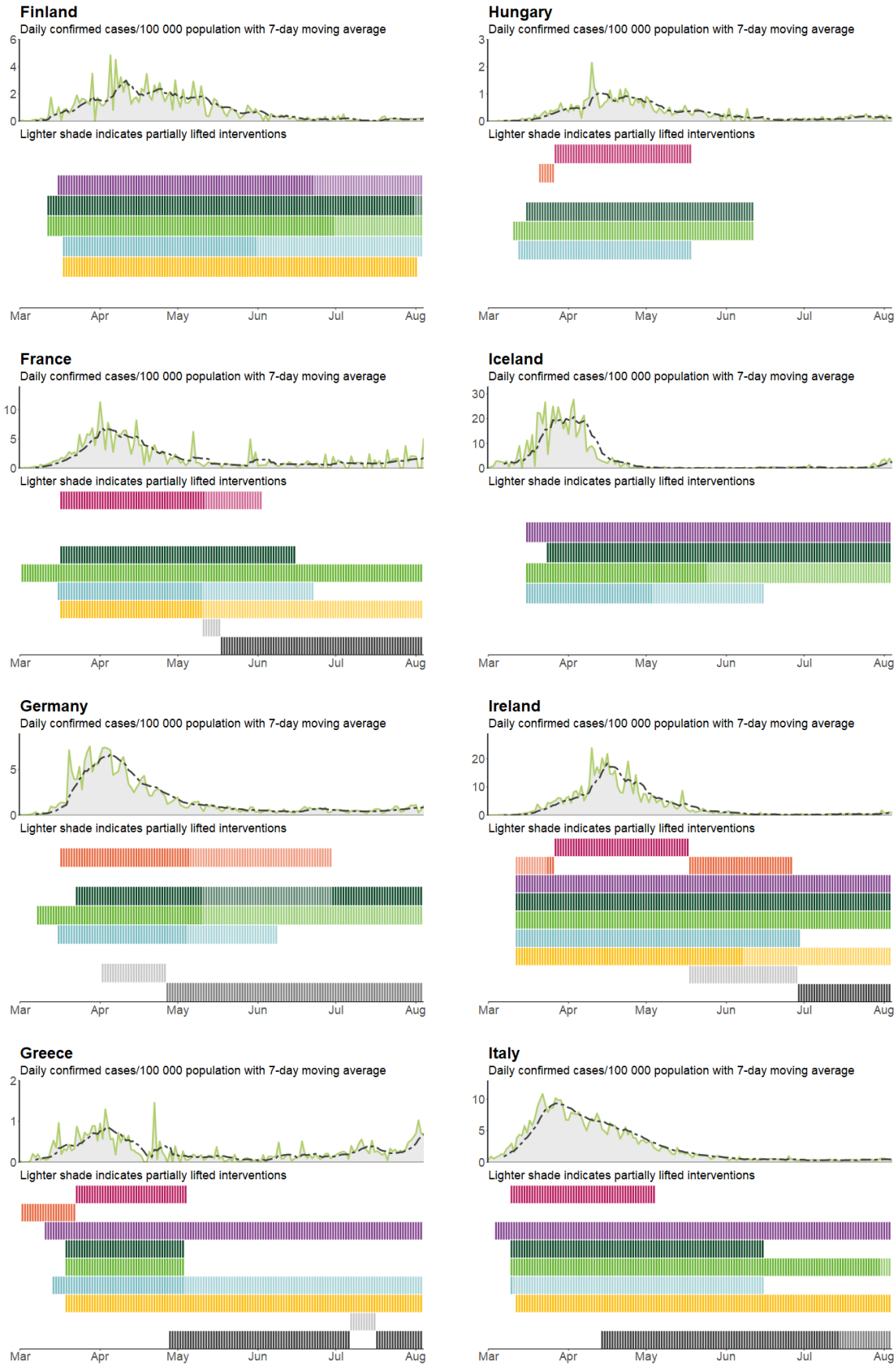
Figure B. Daily incidence of reported COVID-19 cases per 100 000 population, daily reported deaths per 1 000 000 population, both with 7-day moving average, and the public health response measures at national level reported from public sources over time

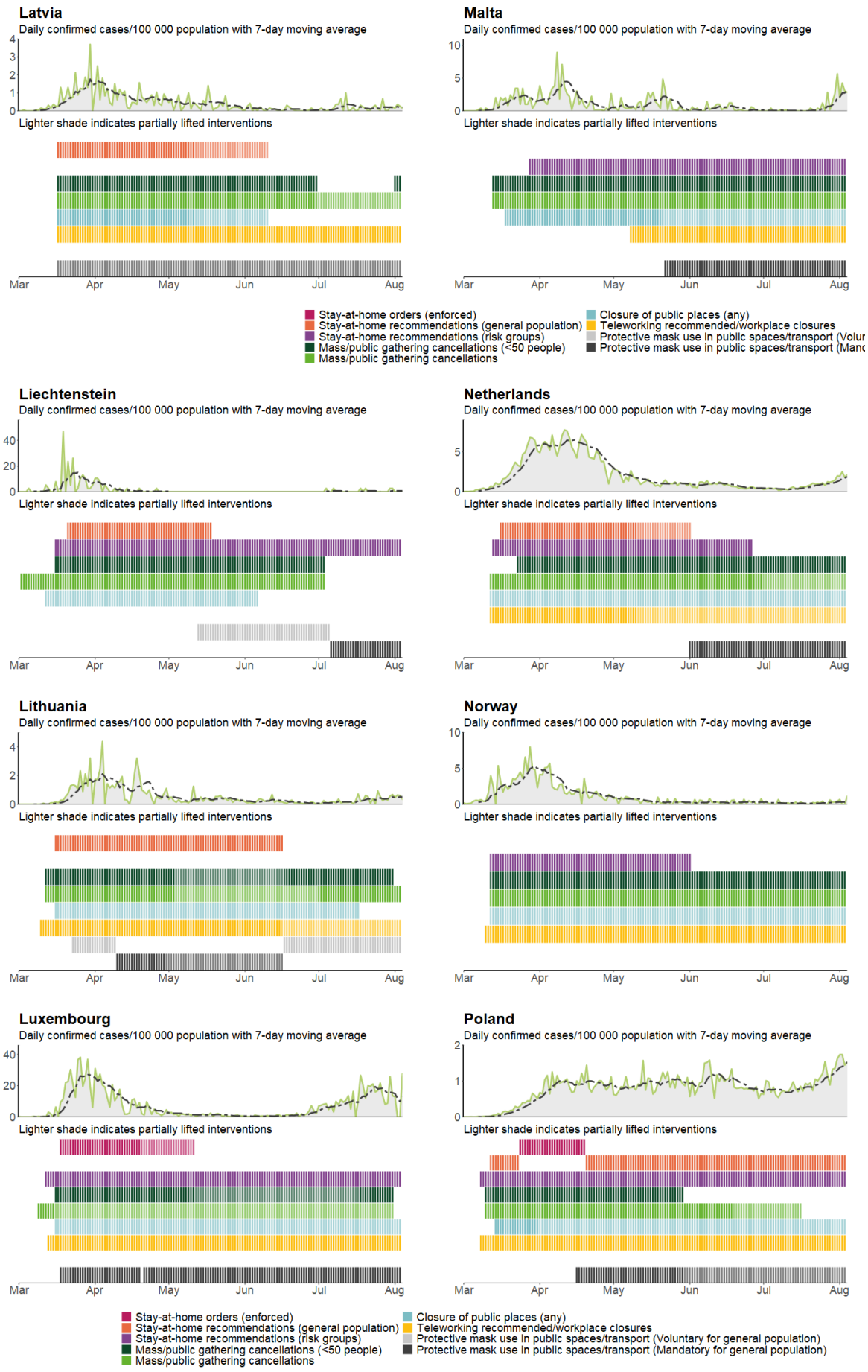
**The data on non-pharmaceutical interventions in Annex 2 are based on information available from official public sources as of Tuesday 28 July at 18:00 and may not capture measures being taken by countries that are not reported on publicly available websites. The situation is evolving rapidly and this represents a snapshot of the measures that were active in countries in the EU/EEA and the UK on 1 June and 1 July 2020. The response measures displayed are national measures, reported on official public websites.*

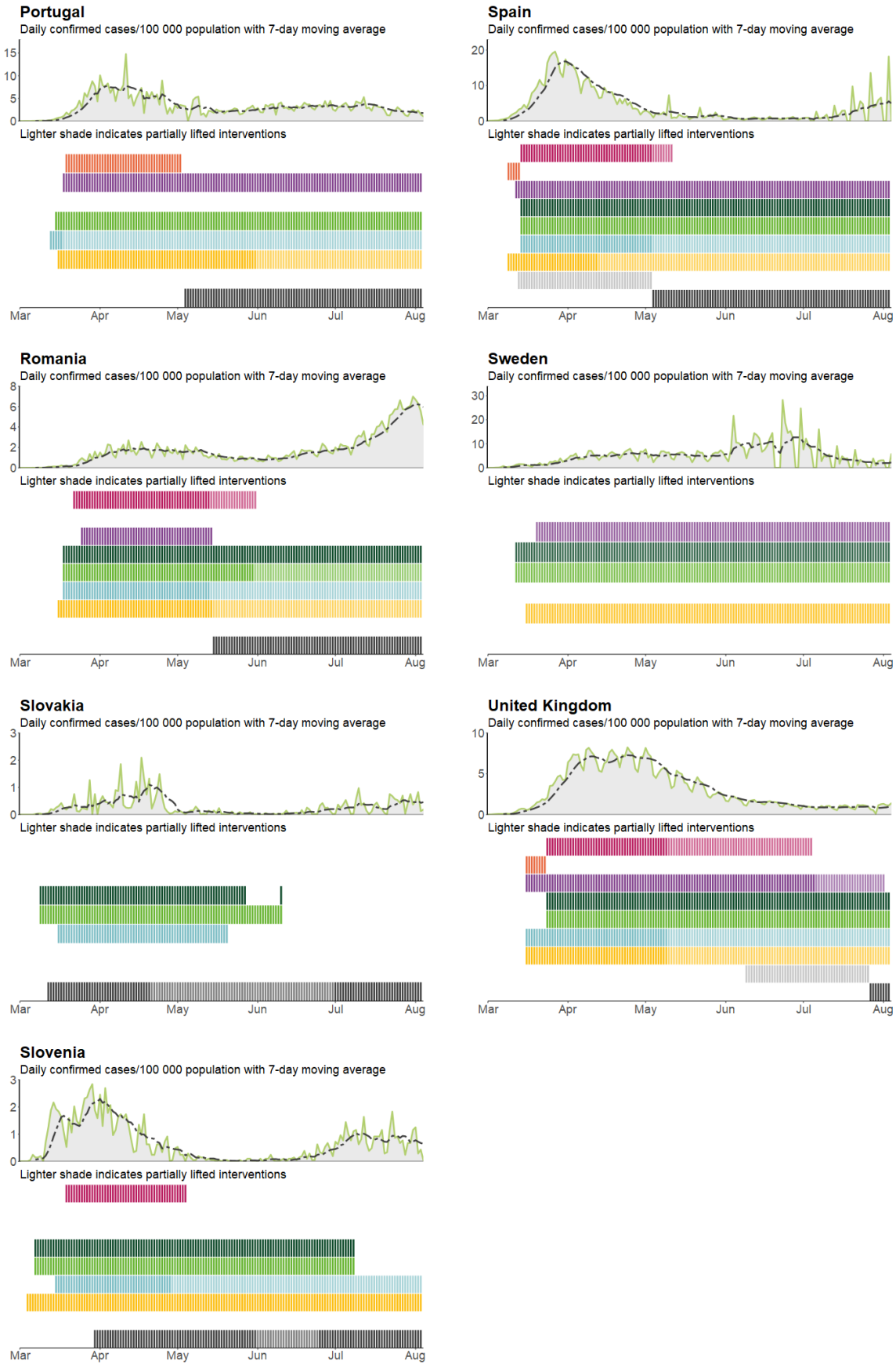
Non-pharmaceutical interventions displayed include: 'stay-at-home' orders for the general population (these are enforced and also referred to as 'lockdown'); 'stay-at-home' recommendations for the general population (which are voluntary or not enforced); 'stay-at-home' recommendations for risk groups or vulnerable populations (such as the elderly, people with underlying health conditions, physically disabled people etc.); mass/ public gathering cancellations (with the limit of 50 participants or less, and all mass gathering cancellations with defined limit up to 1000 participants); closure of public spaces (including restaurants, entertainment venues, non-essential shops, closure of public transport etc.); teleworking recommendations/closure of workplaces; use of protective masks in public spaces/on public transport (mutually exclusive voluntary recommendations and mandatory obligations shown separately).

This data has several limitations. Firstly, there is substantial heterogeneity in physical distancing policies and their implementation between countries. For instance, the level of enforcement of measures may vary between countries and there may be specific rules and exceptions to the measures, making interpretation of the data challenging. The measures displayed in these figures are measures reported at national level and it should be noted that due to the evolution of the outbreak in certain regions, regional or local measures often preceded national ones. The exact dates of introduction were often available from official sources but delays in their implementation may have occurred. Additionally, availability of public data from official government sources varies among countries. For some countries, data are no longer available on official websites concerning measures that are no longer in force, which may result in the data for more recent measures being more complete.


Austria
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Cyprus
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Belgium
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Czechia
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Bulgaria
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Denmark
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Croatia
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Estonia
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Stay-at-home orders (enforced)
Stay-at-home recommendations (general population)
Stay-at-home recommendations (risk groups)
Mass/public gathering cancellations (<50 people)
Mass/public gathering cancellations
Closure of public places (any)
Teleworking recommended/workplace closures
Protective mask use in public spaces/transport (Voluntary for general population)
Protective mask use in public spaces/transport (Mandatory for general population)

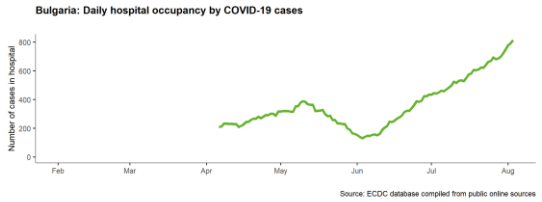

Finland
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Hungary
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
France
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Iceland
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Germany
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Ireland
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Greece
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Italy
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Stay-at-home orders (enforced)
Stay-at-home recommendations (general population)
Stay-at-home recommendations (risk groups)
Mass/public gathering cancellations (<50 people)
Mass/public gathering cancellations
Closure of public places (any)
Teleworking recommended/workplace closures
Protective mask use in public spaces/transport (Voluntary for general population)
Protective mask use in public spaces/transport (Mandatory for general population)

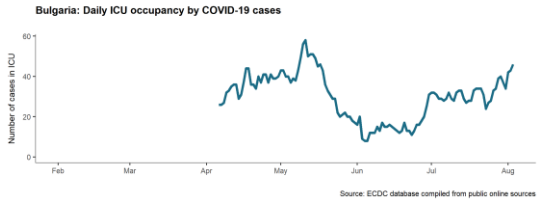

Latvia
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Malta
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Stay-at-home orders (enforced)
Stay-at-home recommendations (general population)
Stay-at-home recommendations (risk groups)
Mass/public gathering cancellations (<50 people)
Mass/public gathering cancellations
Closure of public places (any)
Teleworking recommended/workplace closures
Protective mask use in public spaces/transport (Volur
Protective mask use in public spaces/transport (Manc
Liechtenstein
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Netherlands
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Lithuania
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Norway
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Luxembourg
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Poland
Daily confirmed cases/100 000 population with 7-day moving average
Lighter shade indicates partially lifted interventions
Stay-at-home orders (enforced)
Stay-at-home recommendations (general population)
Stay-at-home recommendations (risk groups)
Mass/public gathering cancellations (<50 people)
Mass/public gathering cancellations
Closure of public places (any)
Teleworking recommended/workplace closures
Protective mask use in public spaces/transport (Voluntary for general population)
Protective mask use in public spaces/transport (Mandatory for general population)

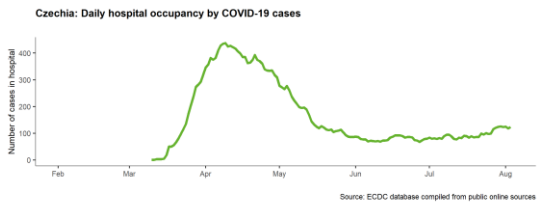

Portugal
Daily confirmed cases/100 000 population with 7-day moving average
15
10
5
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Spain
Daily confirmed cases/100 000 population with 7-day moving average
20
10
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Romania
Daily confirmed cases/100 000 population with 7-day moving average
8
6
4
2
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Sweden
Daily confirmed cases/100 000 population with 7-day moving average
30
20
10
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Slovakia
Daily confirmed cases/100 000 population with 7-day moving average
3
2
1
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
United Kingdom
Daily confirmed cases/100 000 population with 7-day moving average
10
5
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Slovenia
Daily confirmed cases/100 000 population with 7-day moving average
3
2
1
0
Lighter shade indicates partially lifted interventions
Mar
Apr
May
Jun
Jul
Aug
Stay-at-home orders (enforced)
Stay-at-home recommendations (general population)
Stay-at-home recommendations (risk groups)
Mass/public gathering cancellations (<50 people)
Mass/public gathering cancellations
Closure of public places (any)
Teleworking recommended/workplace closures
Protective mask use in public spaces/transport (Voluntary for general population)
Protective mask use in public spaces/transport (Mandatory for general population)

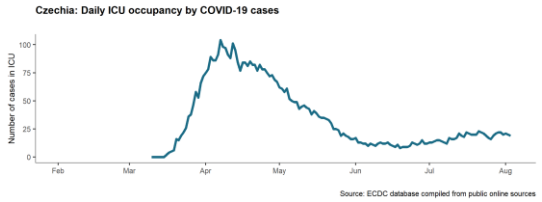
Annex 3

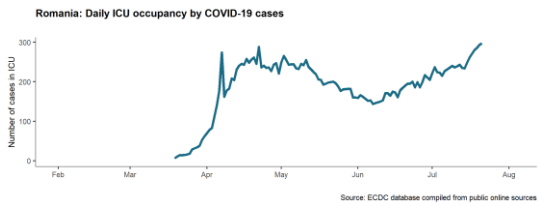
Figure A. Daily hospital and/or ICU occupancy or admissions for COVID-19 cases for Bulgaria, Croatia, Czechia, Luxembourg, Romania, Slovakia and Slovenia.

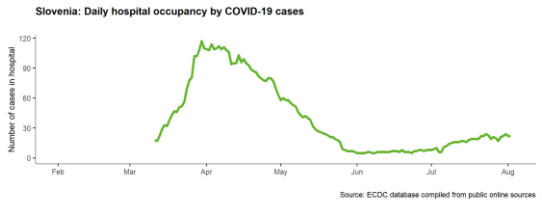


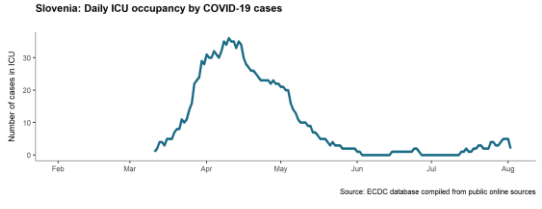


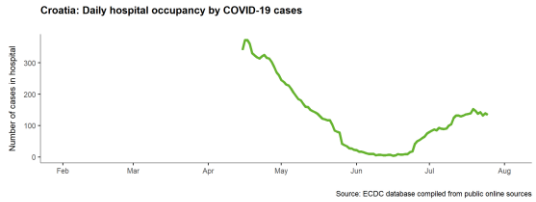


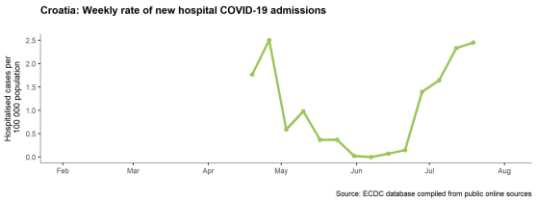


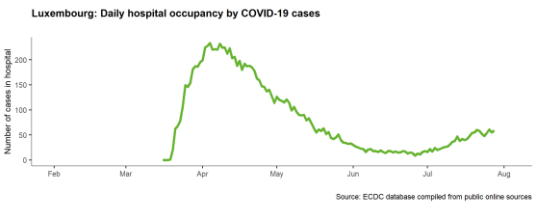


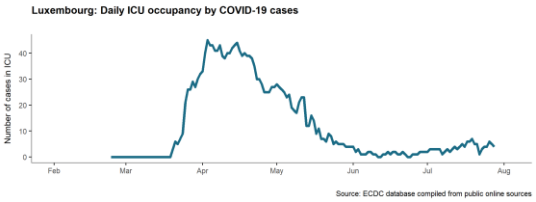


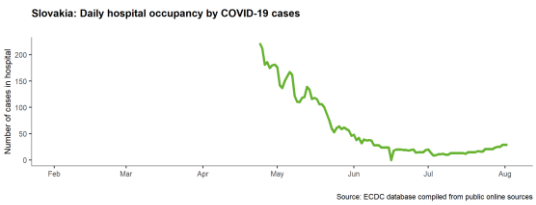


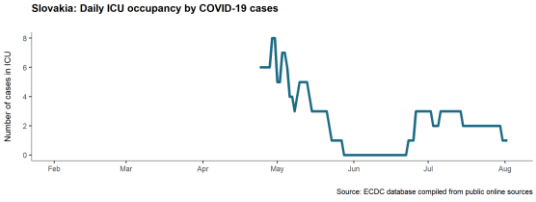












Annex 4

Table A. Proportion of imported cases between January and May (a) and June and July (b), EU/EEA countries.

A: January to May 2020

Country	Imported	Total
Cyprus	139 (14.7%)	943
Czechia	733 (8.2%)	8 964
Estonia	115 (6.1%)	1 870
Finland	728 (12.4%)	5 861
Croatia	301 (12.8%)	2 343
Hungary	85 (2.2%)	3 888
Ireland	392 (1.8%)	22 067
Lithuania	305 (18.6%)	1 641
Latvia	288 (27.0%)	1 066
Malta	12 (1.9%)	630
Netherlands	1591 (3.5%)	44 961
Norway	1737 (23.4%)	7 420
Portugal	0 (0%)	34 542
Slovakia	654 (43.6%)	1 501
Total	**7 080 (5.1%)**	**137 697**

B: June to July 2020

Country	Imported	Total
Cyprus	59 (75.6%)	78
Czechia	290 (5.5%)	5 298
Estonia	24 (14.8%)	162
Finland	60 (20.5%)	293
Croatia	125 (5.0%)	2 488
Hungary	NA	NA
Ireland	40 (5.3%)	748
Lithuania	64 (19.9%)	322
Latvia	46 (30.1%)	153
Malta	0 (0%)	206
Netherlands	0 (0%)	4 511
Norway	122 (21.7%)	562
Portugal	0 (0%)	16 723
Slovakia	191 (43.7%)	437
Total	**1 021 (3.2%)**	**31 981**

Notes: Includes countries reporting more than 80% of cases in TESSy and place of infection for more than 80% of cases. Hungary did not report cases in TESSy during June and July.

References

1. European Centre for Disease Prevention and Control (ECDC). COVID-19. Stockholm: ECDC; 2020 [5 June 2020]. Available from: https://www.ecdc.europa.eu/en/novel-coronavirus-china.
2. European commission (EC). Coronavirus response. Brussels: EC; 2020 [7 June 2020]. Available from: https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response_en.
3. World Health Organization (WHO). Coronavirus disease (COVID-19) outbreak. Geneva: WHO; [5 June 2020]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.
4. EuroMOMO. EuroMOMO [Internet]. [5 August 2020]. Available from: https://www.euromomo.eu/.
5. OurWorldData. [Internet]. Our World Data; [6 August 2020]. Available from: https://ourworldindata.org/grapher/covid-19-testing-policy?region=Europe.
6. European Centre for Disease Prevention and Control (ECDC). Surveillance of COVID-19 at long-term care facilities in the EU/EEA [Internet]. [updated 19 May 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/surveillance-COVID-19-long-term-care-facilities-EU-EEA.
7. European Centre for Disease Prevention and Control (ECDC). Infection prevention and control and surveillance for coronavirus disease (COVID-19) in prisons in EU/EEA countries and the UK [Internet]. Stockholm [updated 3 July 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/infection-prevention-and-control-and-surveillance-covid-19-prisons.
8. European Centre for Disease Prevention and Control (ECDC). Guidance on infection prevention and control of COVID-19 in migrant and refugee reception and detention centres in the EU/EEA and the UK [Internet]. Stockholm [updated 15 June 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/covid-19-guidance-prevention-control-migrant-refugee-centres.
9. Leclerc QJ, Fuller NM, Knight LE, Group CC-W, Funk S, Knight GM. What settings have been linked to SARS-CoV-2 transmission clusters? [version 2; peer review: 2 approved]. Wellcome Open Res. 2020;5:83.
10. Beek Vt. UPDATED: French, Dutch abattoir staff test positive for Covid-19 [Internet]. Pig Progress; [updated 25 May 2020]. Available from: https://www.pigprogress.net/Health/Articles/2020/5/Covid-19-French-and-Dutch-slaughterhouse-staff-test-positive-588262E/.
11. Tidey A. Coal mine workers make up a tenth of Poland's COVID-19 cases: Euronews; [updated 8 June 2020]. Available from: https://www.euronews.com/2020/06/08/coal-mine-workers-make-up-a-tenth-of-poland-s-covid-19-cases.
12. Nilsen T. "Uncontrolled outbreak" says city in northern Sweden and imposes lockdown [Internet]. The Brents Observer; [updated 17 June 2020]. Available from: https://thebarentsobserver.com/en/life-and-public/2020/06/uncontrolled-outbreak-says-city-northern-swedish-and-imposes-lockdown.
13. European Centre for Disease Prevention and Control (ECDC). COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK. ECDC [In press]. 2020.
14. Català Sabaté M, Cardona Iglesias PJ, Prats Soler C, Alonso Muñoz S, Álvarez Lacalle E, Marchena Angos M, et al. Situation report 108. Analysis and prediction of COVID-19 for EU-EFTA-UK and other countries [Internet]. [updated 29 July 2020]. Available from: https://upcommons.upc.edu/handle/2117/328129.
15. Sajadi MM, Habibzadeh P, Vintzileos A, Shokouhi S, Miralles-Wilhelm F, Amoroso A. Temperature, Humidity, and Latitude Analysis to Estimate Potential Spread and Seasonality of Coronavirus Disease 2019 (COVID-19). JAMA Netw Open. 2020 Jun 1;3(6):e2011834.
16. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. Science. 2020 May 22;368(6493):860-8.
17. Comission E. Mobile applications to support contact tracing in the EU's fight against COVID-19. Progress reporting June 2020 [Internet]. European Comission

[updated June 2020]. Available from: https://ec.europa.eu/health/sites/health/files/ehealth/docs/mobileapps_202006progressreport_en.pdf.
18. Dellanna A. Coronavirus: Cyprus launches voluntary tracking app to halt spread [Internet]. Euronews; [updated 2 May 2020]. Available from: https://www.euronews.com/2020/05/02/coronavirus-cyprus-launches-voluntary-tracking-app-to-halt-spread.
19. Johnson B. Nearly 40% of Icelanders are using a covid app—and it hasn't helped much [Internet]. MIT Technology Review; [updated 11 May 2020]. Available from: https://www.technologyreview.com/2020/05/11/1001541/iceland-rakning-c19-covid-contact-tracing/.
20. News D. Developers to start testing Dutch Covid-19 tracing app in June [Internet]. Dutch News; [updated 30 May 2020]. Available from: https://www.dutchnews.nl/news/2020/05/developers-to-start-testing-dutch-covid-19-tracing-app-in-june/.
21. Sabbagh D, Hern A. UK abandons contact-tracing app for Apple and Google model [Internet]. The Guardian; [updated 18 June 2020]. Available from: https://www.theguardian.com/world/2020/jun/18/uk-poised-to-abandon-coronavirus-app-in-favour-of-apple-and-google-models.

22. European Centre for Disease Prevention and Control (ECDC). Operational tool on rapid risk assessment methodology. Stockholm: ECDC; 2019 [6 April, 2020]. Available from: https://www.ecdc.europa.eu/sites/default/files/documents/operational-tool-rapid-risk-assessment-methodolgy-ecdc-2019.pdf.
23. European Centre for Disease Prevention and Control (ECDC). Rapid Risk Assessment: Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – tenth update [Internet]. Stockholm [updated 11 June 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-coronavirus-disease-2019-covid-19-pandemic-tenth-update.
24. European Centre for Disease Prevention and Control (ECDC). Rapid Risk Assessment: Resurgence of reported cases of COVID 19 in the EU/EEA, the UK and EU candidate and potential candidate countries [Internet]. European Centre for Disease Prevention and Control (ECDC),; [updated 2 July 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-resurgence-reported-cases-covid-19.
25. European Centre for Disease Prevention and Control (ECDC). Rapid risk assessment: Outbreak of novel coronavirus disease 2019 (COVID-19): increased transmission globally – fifth update [Internet]. Stockholm [updated 2 March 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-outbreak-novel-coronavirus-disease-2019-covid-19-increased.
26. European Centre for Disease Prevention and Control (ECDC). Monitoring and evaluation framework for COVID-19 response activities in the EU/EEA and the UK [Internet]. [updated 17 June 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/covid-19-monitoring-and-evaluation-framework-response-activities.
27. World Health Organization (WHO). Monitoring and evaluation framework [Internet]. WHO; [updated 5 June 2020]. Available from: https://www.who.int/publications/i/item/monitoring-and-evaluation-framework.
28. European Centre for Disease Prevention and Control (ECDC). Testing strategies [Internet]. European Centre for Disease Prevention and Control (ECDC),; [updated 29 May 2020]. Available from: https://www.ecdc.europa.eu/en/covid-19/surveillance/testing-strategies.
29. European Centre for Disease Prevention and Control (ECDC). Contact tracing: Public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union - second update [Internet]. [updated 9 April 2020]. Available from: https://www.ecdc.europa.eu/en/covid-19-contact-tracing-public-health-management.
30. European Centre for Disease Prevention and Control (ECDC). Considerations for travel-related measures to reduce spread of COVID-19 in the EU/EEA [Internet]. European Centre for Disease Prevention and Control (ECDC),; [updated 26 May 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/considerations-travel-related-measures-reduce-spread-covid-19-eueea.
31. European Centre for Disease Prevention and Control (ECDC). Transmission of COVID-19 [Internet]. [updated 16 July 2020]. Available from: https://www.ecdc.europa.eu/en/covid-19/latest-evidence/transmission.
32. European Centre for Disease Prevention and Control (ECDC). Contact tracing for COVID-19: current evidence, options for scale-up and an assessment of resources needed [Internet]. [updated 5 May 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/contact-tracing-covid-19-evidence-scale-up-assessment-resources.
33. Grassly NC, Pons-Salort M, Parker EP, White PJ, M FN. Role of molecular testing in COVID-19 control: a mathematical modelling study. Lancet Infectious Diseases [Accepted]. 2020.
34. Bilinski A, Mostashari F, Salomon JA. Contact tracing strategies for COVID-19 containment with attenuated physical distancing. medRxiv. 2020:2020.05.05.20091280.
35. Kretzschmar ME, Rozhnova G, Bootsma MCJ, van Boven M, van de Wijgert J, Bonten MJM. Impact of delays on effectiveness of contact tracing strategies for COVID-19: a modelling study. Lancet Public Health. 2020 Jul 16.
36. European Centre for Disease Prevention and Control (ECDC). Case definition for coronavirus disease 2019 (COVID-19), as of 29 May 2020 [Internet]. [updated 29 May 2020]. Available from: https://www.ecdc.europa.eu/en/covid-19/surveillance/case-definition.
37. Japan MoFAo. Handout (3) Japa's COVID-19 Response [Internet]. Japan [updated 1 June 2020]. Available from: https://www.mofa.go.jp/p_pd/pds/page22e_000910.html.
38. UK Parliament, House of Lords, Technology SCoSa. COVID-19 Rapid Summary: Contact Tracing and Data Ethics [Internet]. [updated 13 July 2020]. Available from: https://committees.parliament.uk/committee/193/science-and-technology-committee-lords/news/147375/covid19-rapid-summary-contact-tracing-and-data-ethics/.
39. PHE PHE. Research and analysis. COVID-19: exceedances in Leicester [Internet]. Public Health England (PHE); [updated 1 July 2020]. Available from: https://www.gov.uk/government/publications/covid-19-exceedances-in-leicester.
40. Bradshaw WJ, Alley EC, Huggins JH, Lloyd AL, Esvelt KM. Bidirectional contact tracing dramatically improves COVID-19 control. medRxiv. 2020:2020.05.06.20093369.
41. Sun K, Viboud C. Impact of contact tracing on SARS-CoV-2 transmission. Lancet Infect Dis. 2020 Aug;20(8):876-7.
42. Braithwaite I, Callender T, Bullock M, Aldridge RW. Automated and partially-automated contact tracing: a rapid systematic review to inform the control of COVID-19. medRxiv. 2020:2020.05.27.20114447.

43. European Centre for Disease Prevention and Control (ECDC). Mobile applications in support of contact tracing for COVID-19 - A guidance for EU EEA Member States [Internet]. European Centre for Disease Prevention and Control (ECDC),; [updated 10 June 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/covid-19-mobile-applications-support-contact-tracing.
44. Comission E. Guidance on Apps supporting the fight against COVID 19 pandemic in relation to data protection [Internet]. Official Journal of the European Union [updated 17 April 2020]. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020XC0417%2808%29.
45. Network e. Mobile applications to support contact tracing in the EU's fight against COVID-19 [Internet]. [updated 15 April 2020]. Available from: https://ec.europa.eu/health/sites/health/files/ehealth/docs/covid-19_apps_en.pdf.
46. Morawska L, Milton DK. It is Time to Address Airborne Transmission of COVID-19. Clin Infect Dis. 2020 Jul 6.
47. Yusef D, Hayajneh W, Awad S, Momany S, Khassawneh B, Samrah S, et al. Large Outbreak of Coronavirus Disease among Wedding Attendees, Jordan. Emerg Infect Dis. 2020 May 20;26(9).
48. Aschwanden C. How 'Superspreading' Events Drive Most COVID-19 Spread [Internet]. Scientific American; [updated 23 June 2020]. Available from: https://www.scientificamerican.com/article/how-superspreading-events-drive-most-covid-19-spread1/.
49. Martarelli CS, Wolff W. Too bored to bother? Boredom as a potential threat to the efficacy of pandemic containment measures. Humanities and Social Sciences Communications. 2020 2020/07/09;7(1):28.
50. Streeck H, Schulte B, Kuemmerer B, Richter E, Hoeller T, Fuhrmann C, et al. Infection fatality rate of SARS-CoV-2 infection in a German community with a super-spreading event. medRxiv. 2020:2020.05.04.20090076.
51. Kassam A. Parties and raves across Europe spark fears of Covid-19 surge [Internet]. The Guardian; [updated 26 June 2020]. Available from: https://www.theguardian.com/world/2020/jun/26/parties-and-raves-across-europe-spark-fears-of-covid-19-surge.
52. Burdeau C. Europe Frets Over Virus Spreading at Parties, Beaches: Court House News Service; [updated 26 June 2020]. Available from: https://www.courthousenews.com/europe-frets-over-virus-spreading-at-parties-beaches/.
53. McMurtry A. Spain: Parties seen behind new surge in COVID-19 [Internet]. Anadolu Agency; [updated 20 July 2020]. Available from: https://www.aa.com.tr/en/europe/spain-parties-seen-behind-new-surge-in-covid-19/1916740.
54. F. DBaK. Les sources de contaminations à Anvers selon la gouverneure : "Les fêtes entre jeunes" et les réunions de famille "intergénérationnelles" [Internet]. RTBF; [updated 28 July 2020]. Available from: https://www.rtbf.be/info/societe/detail_les-sources-de-contaminations-a-anvers-selon-la-gouverneure-les-fetes-entre-jeunes-et-les-reunions-de-famille-intergenerationnelles?id=10550605.
55. Liu J, Huang J, Xiang D. Large SARS-CoV-2 Outbreak Caused by Asymptomatic Traveler, China. Emerg Infect Dis. 2020 Jun 30;29(9).
56. Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schunemann HJ, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet. 2020 Jun 27;395(10242):1973-87.
57. World Health Organization (WHO). Key planning recommendations for mass gatherings in the context of the current COVID-19 outbreak [Internet]. WHO; [updated 29 May 2020]. Available from: https://www.who.int/publications/i/item/10665-332235.
58. Brauner JM, Mindermann S, Sharma M, Stephenson AB, Gavenčiak T, Johnston D, et al. The effectiveness of eight nonpharmaceutical interventions against COVID-19 in 41 countries. medRxiv. 2020:2020.05.28.20116129.
59. Block P, Hoffman M, Raabe IJ, Dowd JB, Rahal C, Kashyap R, et al. Social network-based distancing strategies to flatten the COVID-19 curve in a post-lockdown world. Nat Hum Behav. 2020 Jun;4(6):588-96.
60. Leng T, White C, Hilton J, Kucharski AJ, Pellis L, Stage H, et al. The effectiveness of social bubbles as part of a Covid-19 lockdown exit strategy, a modelling study. medRxiv. 2020:2020.06.05.20123448.
61. Doung-ngern P, Suphanchaimat R, Panjagampatthana A, Janekrongtham C, Ruampoom D, Daochaeng N, et al. Associations between wearing masks, washing hands, and social distancing practices, and risk of COVID-19 infection in public: a cohort-based case-control study in Thailand. medRxiv. 2020:2020.06.11.20128900.
62. Payne DC, Smith-Jeffcoat SE, Nowak G, Chukwuma U, Geibe JR, Hawkins RJ, et al. SARS-CoV-2 Infections and Serologic Responses from a Sample of U.S. Navy Service Members - USS Theodore Roosevelt, April 2020. MMWR Morb Mortal Wkly Rep. 2020 Jun 12;69(23):714-21.
63. Hendrix MJ, Walde C, Findley K, Trotman R. Absence of Apparent Transmission of SARS-CoV-2 from Two Stylists After Exposure at a Hair Salon with a Universal Face Covering Policy - Springfield, Missouri, May 2020. MMWR Morb Mortal Wkly Rep. 2020 Jul 17;69(28):930-2.
64. Mitze T, Kosfeld R, Rode J, Wälde K. IZA DP No. 13319: Face Masks Considerably Reduce COVID-19 Cases in Germany: A Synthetic Control Method Approach [Internet]. IZA Institute of Labor Economics; [updated June 2020]. Available from: https://www.iza.org/publications/dp/13319/face-masks-considerably-reduce-covid-19-cases-in-germany-a-synthetic-control-method-approach.

65. Cheng VC, Wong SC, Chuang VW, So SY, Chen JH, Sridhar S, et al. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. J Infect. 2020 Jul;81(1):107-14.
66. Stutt ROJH, Retkute R, Bradley M, Gilligan CA, Colvin J. A modelling framework to assess the likely effectiveness of facemasks in combination with ‘lock-down’ in managing the COVID-19 pandemic. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences. 2020;476(2238):20200376.
67. Mantzari E, Rubin GJ, Marteau TM. Is risk compensation threatening public health in the covid-19 pandemic? BMJ. 2020;370:m2913.
68. Seres G, Balleyer A, Cerutti N, Friedrichsen J, Müge S. Face Mask Use and Physical Distancing before and after Mandatory Masking: Evidence from Public Waiting Lines (July 9, 2020). Available at SSRN: https://ssrn.com/abstract=3641367. SSRN [pre-print]. 2020.
69. https://chp-dashboard.geodata.gov.hk/covid-19/en.html. Latest Situation of Coronavirus Disease (COVID-19) in Hong Kong [Internet]. [10 August 2020]. Available from: https://chp-dashboard.geodata.gov.hk/covid-19/en.html.
70. Wu P, Tsang TK, Wong JY, Ng TWY, Ho F, Gao H, et al. Suppressing COVID-19 transmission in Hong Kong: an observational study of the first four months. Research Square [pre-print]. 2020.
71. World Health Organization (WHO). Clinical management of COVID-19 [Internet]. WHO; [updated 24 May 2020]. Available from: https://www.who.int/publications/i/item/clinical-management-of-covid-19.
72. European Centre for Disease Prevention and Control (ECDC). Considerations relating to passenger locator data, entry and exit screening and health declarations in the context of COVID-19 in the EU/EEA and the UK [Internet]. European Centre for Disease Prevention and Control (ECDC),; [updated 12 June 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/passenger-locator-data-entry-exit-screening-health-declaration.
73. European Centre for Disease Prevention and Control (ECDC). Infection prevention and control and preparedness for COVID-19 in healthcare settings: Second update - 31 March 2020. ECDC: Stockholm; 2020. [7 April, 2020]. Available from: https://www.ecdc.europa.eu/en/publications-data/infection-prevention-and-control-and-preparedness-covid-19-healthcare-settings.
74. (EU-OSHA) EAfSaHaW. COVID-19: Back to the workplace - Adapting workplaces and protecting workers: EU-OSHA; [6 August 2020]. Available from: https://oshwiki.eu/wiki/COVID-19:_Back_to_the_workplace_-_Adapting_workplaces_and_protecting_workers.