

COVID-19 Pandemic: Variants of Concern and children

24 January 2021

WHO EURO COVID-19 Incident Management Support Team

www.euro.who.int

SARS-CoV-2 Variants of Concern – Unusual public health events?

- August 2020: mink-associated SARS-CoV-2 variant (“Cluster 5”) in Denmark
- Dec 2020: SARS-CoV-2 VOC (SARS-CoV-2 VOC 202012/01 or 20I/501Y.V1) reported by UK authorities
- Dec 2020: SARS-CoV-2 20H/501Y.V2 reported by South African authorities
- Jan 2021: SARS-CoV-2 20J/501Y.V3 reported from Brazil

Figure: Nextstrain SARS-CoV-2 clade distribution



<https://nextstrain.org/blog/2021-01-06-updated-SARS-CoV-2-clade-naming>

Summary of VOCs as of 24 January 2021

	VOC 202012/01	501Y.V2	P.1
Date first reported to WHO	14 December 2020	18 December 2020	9 January 2021
First reported by	United Kingdom	South Africa	Japan (ex Brazil)
# of countries reporting cases*	61	29	7
# of WHO regions affected	6	4	3

*includes some countries undergoing verification

Countries, territories, areas reporting VOC 202012/01 and/or 501Y.V2 variants (situation as of 24 January 2021)



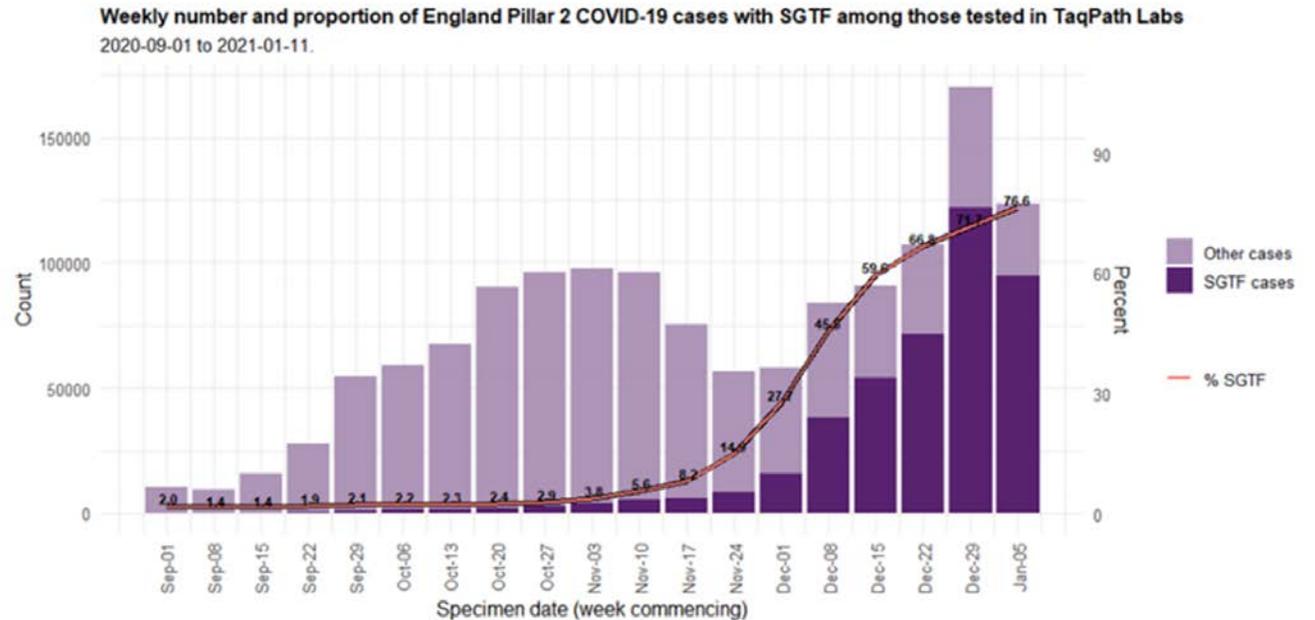
-  VOC 202012/01 and 501Y.V2 variants (21)
-  VOC 202012/01 variant (40)
-  501Y.V2 variant (8)

*The map includes 1 unverified report for the VOC 202012/01 variant and 6 unverified reports for the 501Y.V2 variant.

United Kingdom - VOC 202012/01 or 501Y.V1

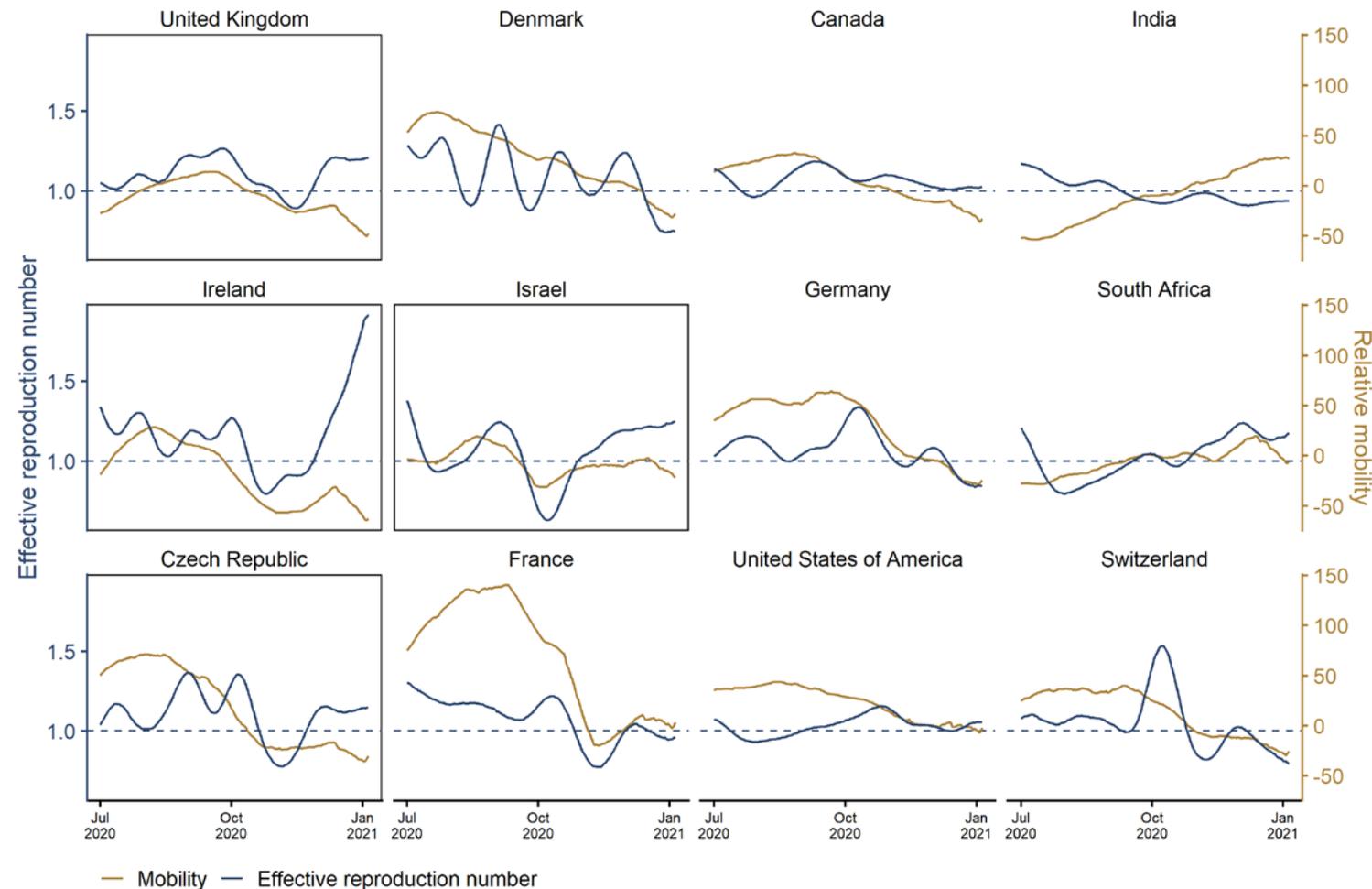
- Since late Nov 2020, UK faced rapid increase in COVID-19 incidence in South and East
- 14 December 2020: reported new SARS-CoV-2 Variant of Concern (VOC) 202012/01 to WHO
- Unusually large number of mutations, particularly in gene encoding spike protein resulting in deletion 69-70, deletion 144, N501Y, A570D, D614G, P681H, T716I, S982A, D1118H

Figure 5. Weekly number (bars) and proportion (red lines) of Pillar 2 cases tested by TaqPath labs, by S-gene detection (1 September 2020 to 11 January 2021)



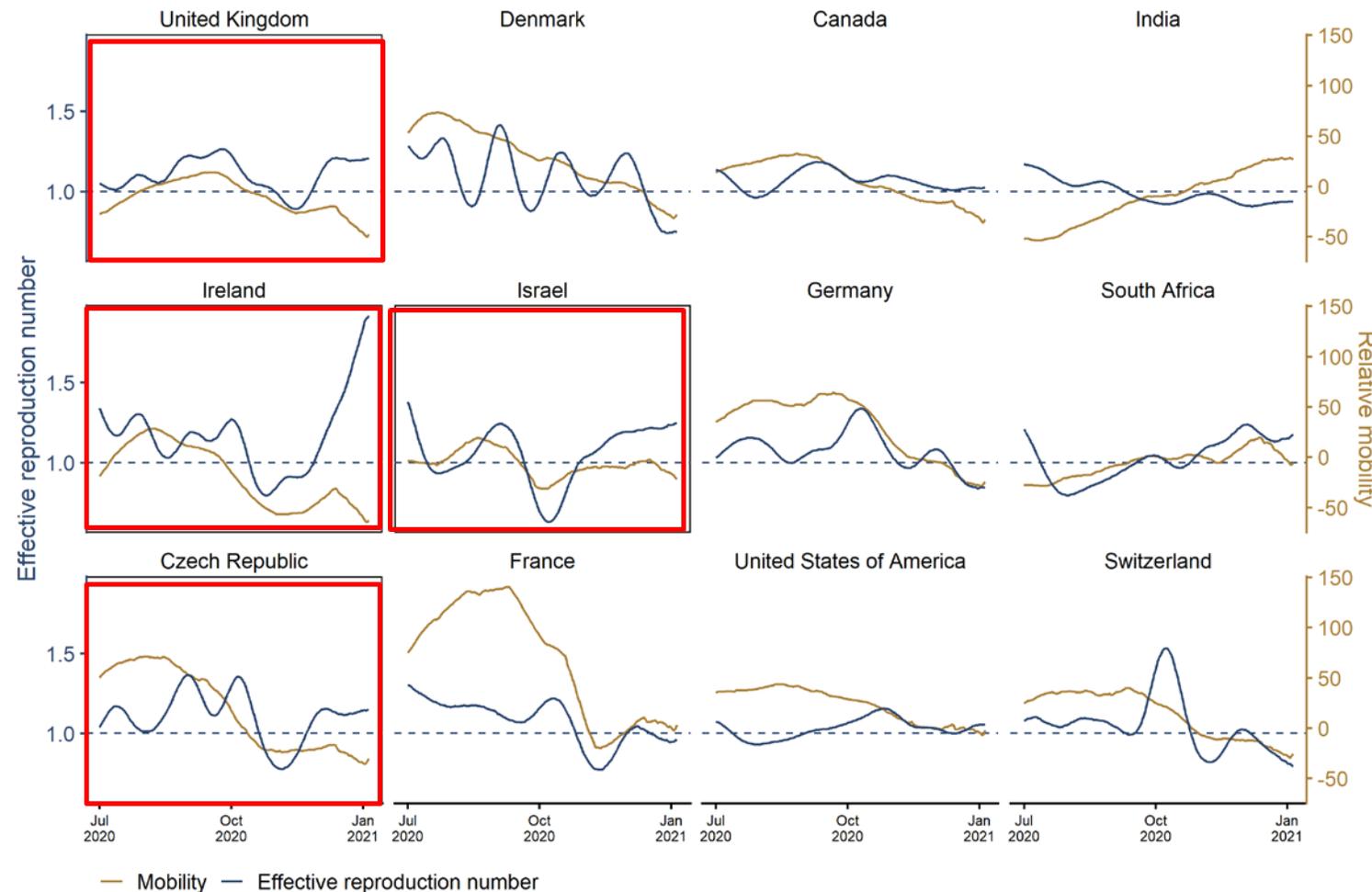
Where is transmission higher than expected?

- Some countries have recently experienced **increases in transmission that cannot be explained by increases in mobility**
 - United Kingdom, Ireland, Czech Republic, Israel
 - Mobility has remained constant or even decreased as R_t has increased
- Plausible explanations for these trends:
 - Poorer adherence to micro-distancing measures, hygiene practices, self-isolation
 - Reduction in contact tracing performance
 - **A more virulent SARS-CoV-2 variant?**



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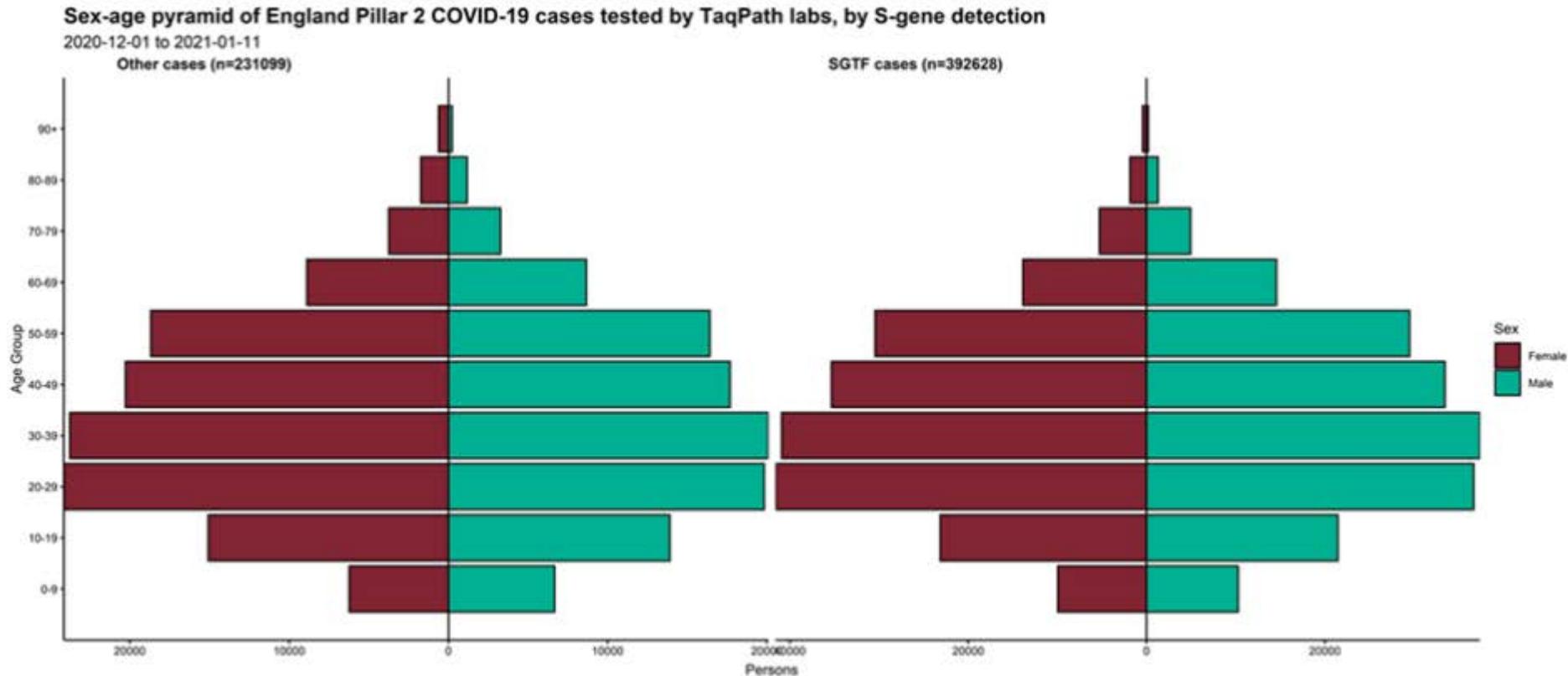
Definition and assessment of a Variant of Concern

- **Need set of laboratory and epidemiological criteria to define and assess level of risk based on (potential) impact on public health:**
 - Transmissibility
 - Infection-severity
 - Risk of reinfection (immune evasion)
 - New population at risk (age, comorbidities...)
 - Diagnostic failure
 - Vaccine failure/effectiveness
 - Treatment failure

Definition and assessment of a Variant of Concern

- **Need set of laboratory and epidemiological criteria to define and assess level of risk based on (potential) impact on public health:**
 - **Transmissibility** **Impact** (hospitalisations, deaths)
 - **Infection-severity**
 - Risk of reinfection (immune evasion)
 - New population at risk (age, comorbidities...)
 - Diagnostic failure
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 - Treatment failure

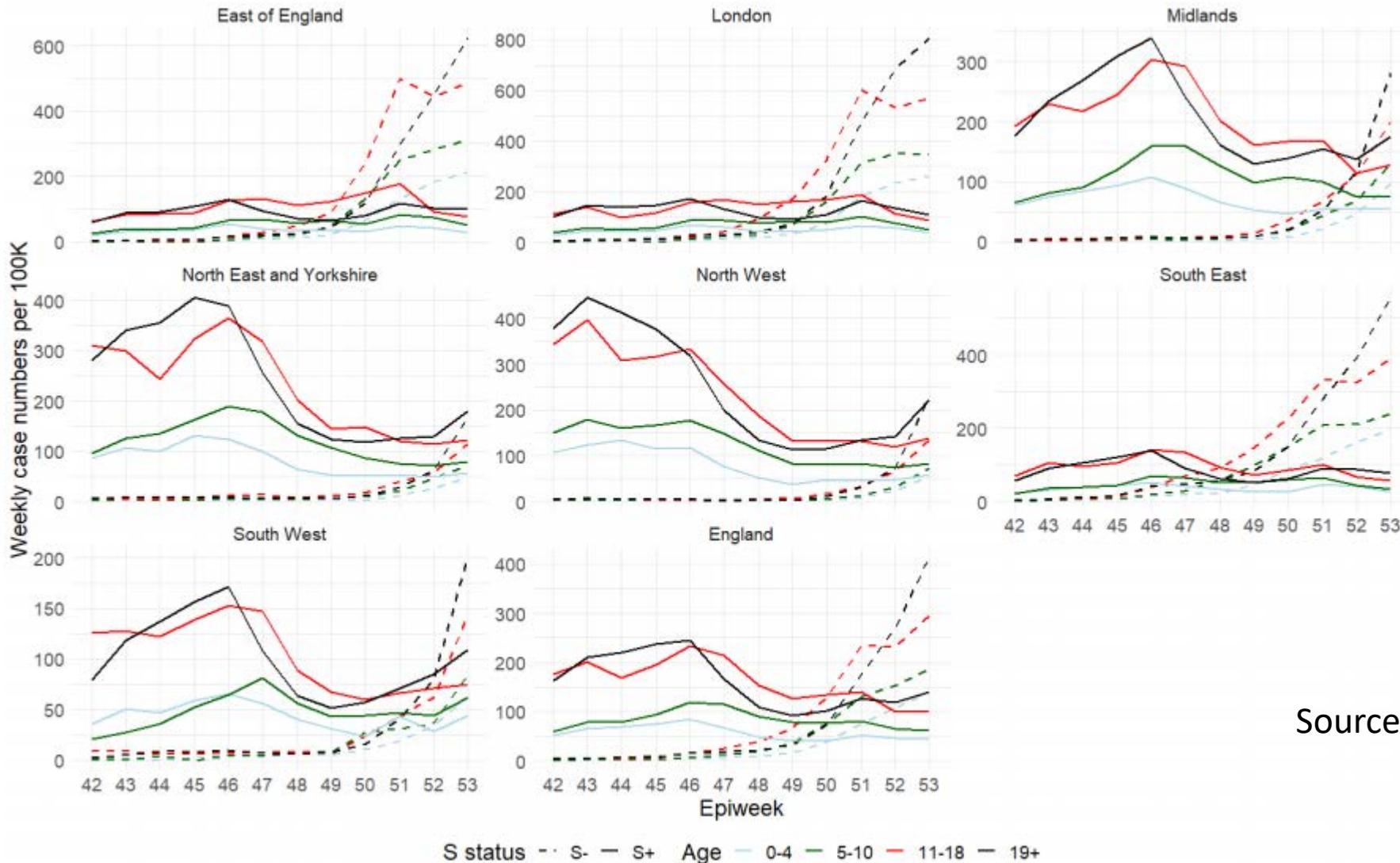
Age-sex distribution of VOC vs non-VOC viruses in England



SGTF is a surveillance proxy for VOC-202012/01 and may include other variants.
SGTF = Positive test with non-detectable S gene and ≤ 30 CT values for N and ORF1ab genes respectively.
TaqPath labs = Alderley Park, Milton Keynes and Glasgow Lighthouse Labs, which use TaqPath COVID-19 RT-PCR.
Cases deduplicated to one positive test per person per week, prioritising SGTF tests.
Data source: SGSS. 49 persons with missing age/sex excluded.

England age distribution over time of 501Y.V1 by region

As of 7 Jan 020



In every region, 501Y.V1 took off in 11-18 year olds first, likely because lockdown in November was reducing contacts in adults. Then after the lockdown, growth accelerated in adults

Source: Neil Ferguson, Imperial College

Secondary attack rate of VOC and non-VOC by region, age, England

Breakdown by contact characteristics using genomic sequencing data

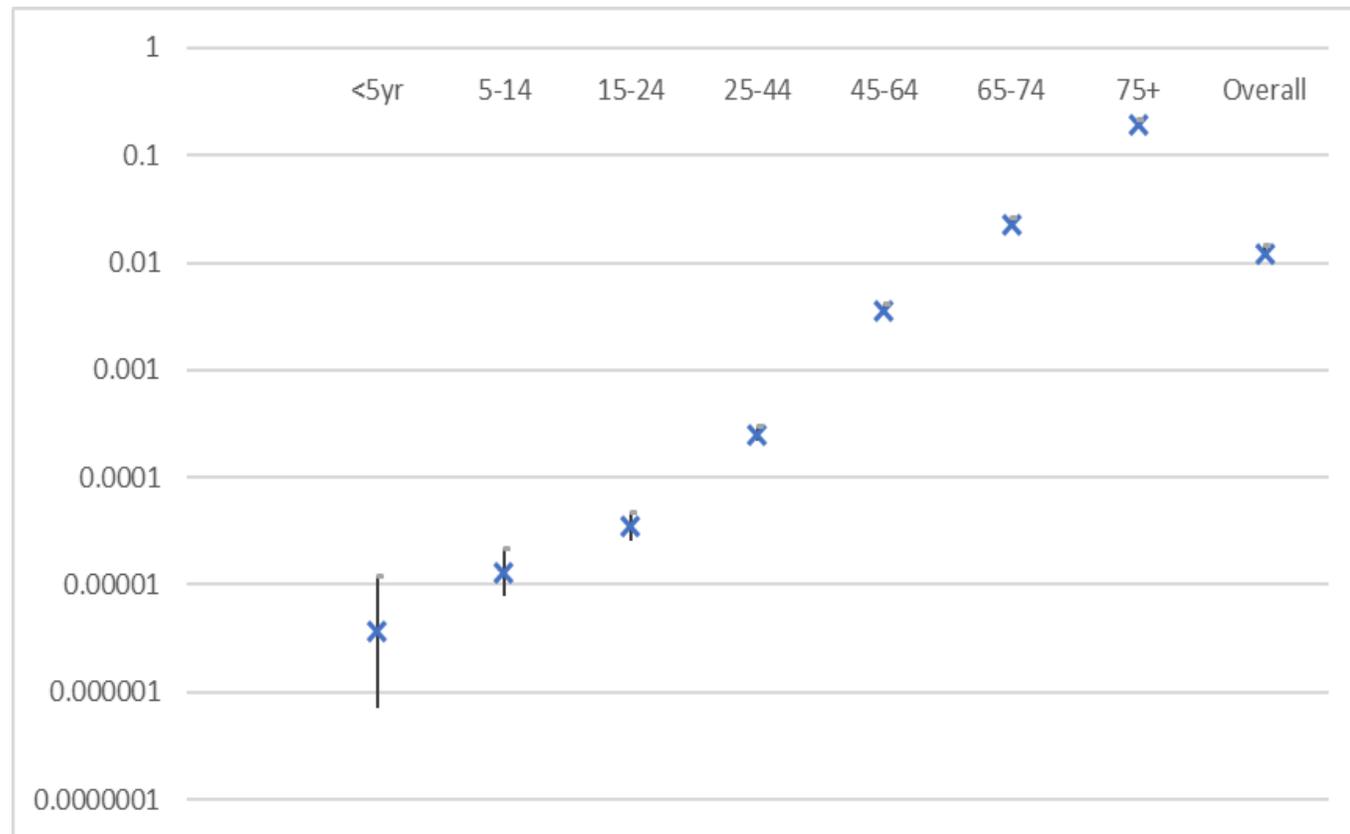
- Estimated AR for 501Y.V1 are 10%-70% higher than estimated AR for wild type virus in most regions and **age groups**
 - Children still lower clinical ARs than adults
- Source: PHE

Characteristic of contact		All contacts	Contacts of people with VOC 202012/01			Contacts of people with wild type (not VOC 202012/01)			Contacts of people without sequencing	
			All contacts	Contacts that became cases	%	All contacts	Contacts that became cases	%		%
	Total contacts									
	All	956,519	9,228	1,361	14.7	11,269	1,244	11.0		12.7
Region of residence	East Midlands	60,153	150	15	10.0	1,008	117	11.6		11.2
	East of England	154,144	1,869	263	14.1	1,199	153	12.8		13.5
	London	281,461	3,507	505	14.4	1,844	197	10.7		13.1
	North East	28,450	235	29	12.3	738	79	10.7		11.8
	North West	71,002	400	65	16.2	2,182	223	10.2		11.7
	South East	186,311	2,419	377	15.6	1,155	107	9.3		13.5
	South West	41,465	230	43	18.7	380	50	13.2		11.8
	West Midlands	78,112	299	47	15.7	1,388	155	11.2		11.6
	Yorkshire and Humber	53,192	109	16	14.7	1,339	158	11.8		10.6
	Level of contact*	Direct	875,237	8,399	1,299	15.5	10,088	1,193	11.8	
Close		79,867	829	62	7.5	863	45	5.2		6.9
Age group	0 – 9	135,998	1,345	121	9.0	1,536	93	6.1		7.2
	10 – 19	172,506	1,659	196	11.8	1,943	186	9.6		10.4
	20 – 29	111,391	1,020	167	16.4	1,352	192	14.2		15.1
	30 – 39	111,712	1,145	229	20.0	1,361	175	12.9		16.7
	40 – 49	126,005	1,241	263	21.2	1,448	199	13.7		16.8
	50 – 59	101,501	953	190	19.9	1,236	181	14.6		17.1
	60 – 69	44,985	366	74	20.2	610	92	15.1		17.7
	70 – 79	17,817	142	34	23.9	198	38	19.2		18.1
	80+	7,429	53	11	20.8	93	14	15.1		17.7
	Not known	127,175	1,304	76	5.8	1,492	74	5.0		5.3

SARS-CoV-2 infection severity and children

- Overall infection-severity 1.1% (95% CI 1-1.2%)
- Highest age-specific IFR in 75+ (17%)
- Extremely low risk of severe outcome in children (0.0015% in 5-14 year olds)

Figure: Age-specific infection-severity ratios, England



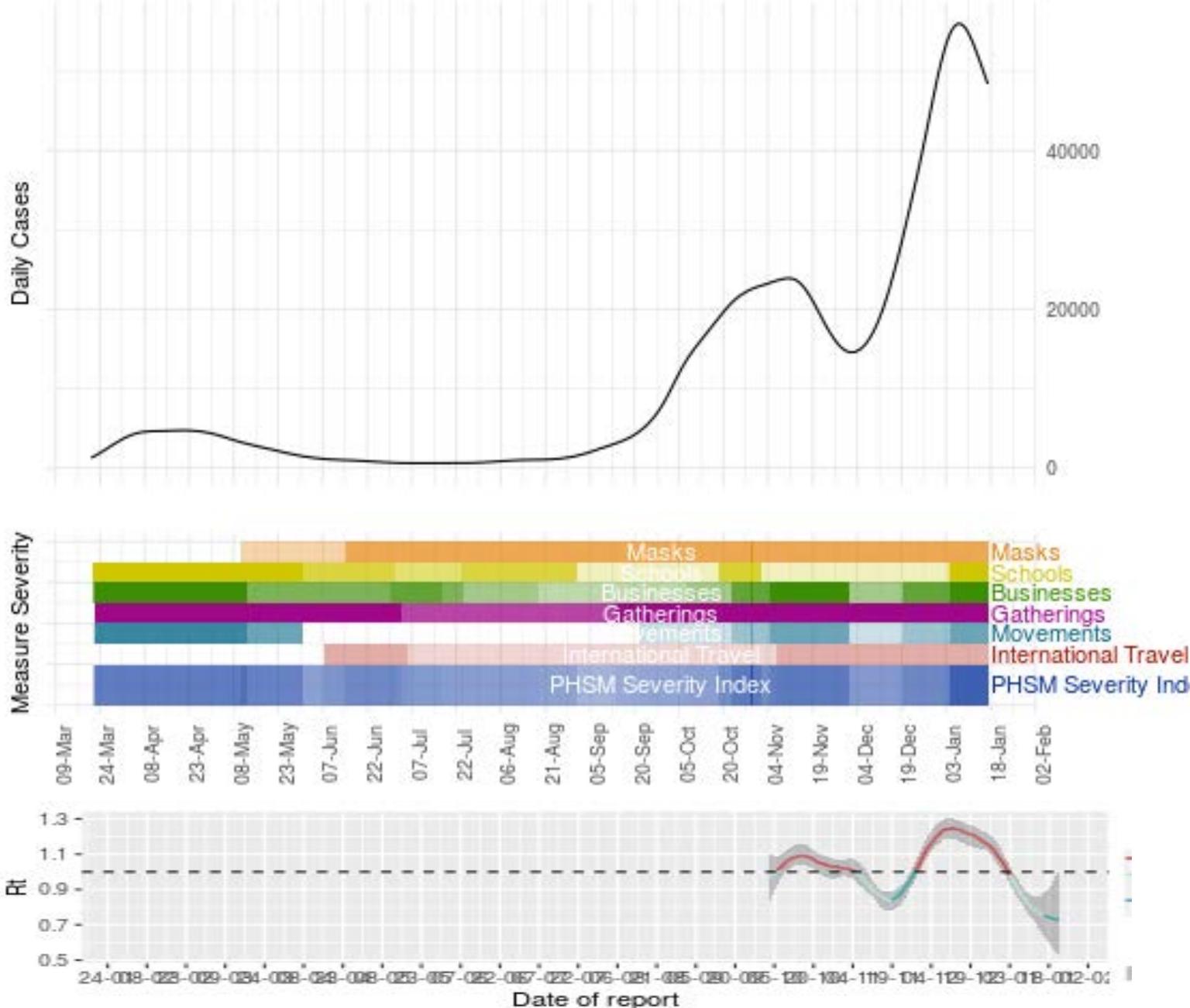
SARS-CoV-2 infection-severity and VOC

- *"Realistic possibility that 501Y.V1 is associated with an increased risk of death compared to non-VOC viruses"*

Study team	Method	Risk of VOC vs non-VOC	Age effects
LSHTM	Cox PH	1.35 (95% CI 1.08 – 1.68)	Similar relative increase in CFR across age groups
Imperial	Non-parametric method	1.36 (95% CI 1.18 – 1.56)	
		1.29 (95% CI 1.07 – 1.54)	
PHE	Retrospective cohort	1.65 (95% CI 1.21 – 2.25)	

- No evidence of a significant increase in hospital CFR at this point

United Kingdom – PHSM and VOCs

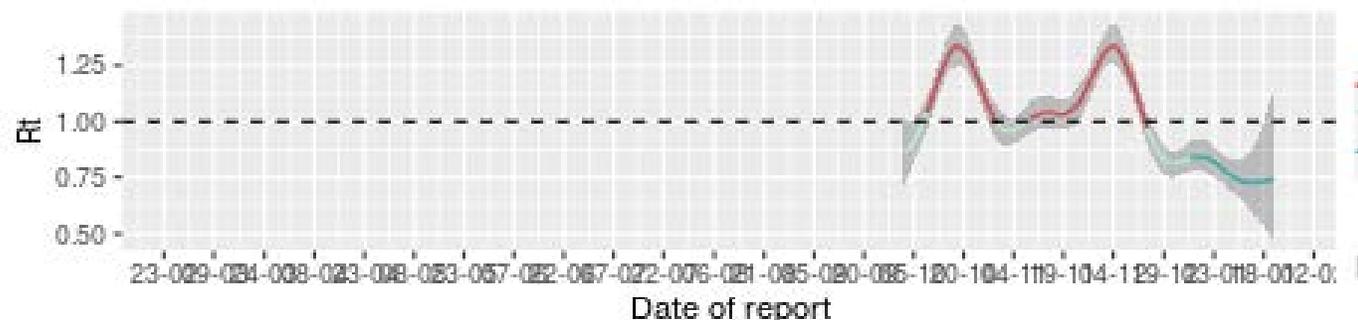
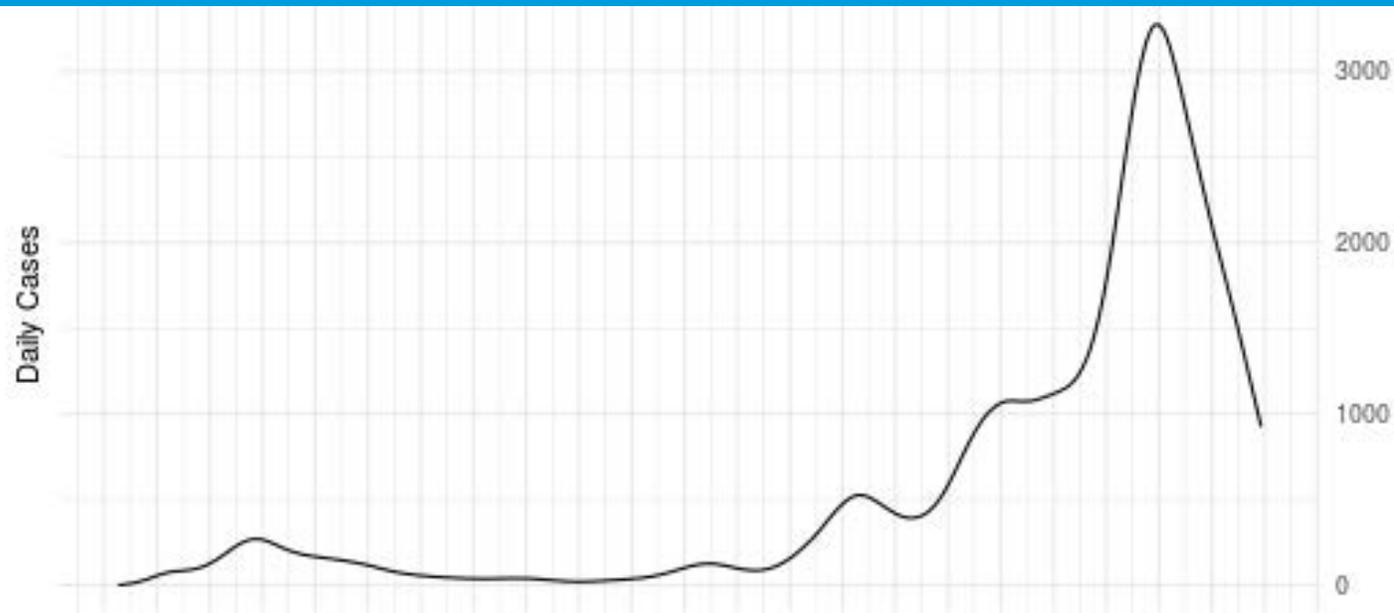


Public health measures

- A nationwide lockdown was reimposed from 05-Jan in response to increased activity related to 501Y.V1. The lockdown will probably last until mid-February at least.

Schools

- From 06-Jan, all primary schools, secondary schools and colleges in England moved to remote learning.
- Early signs of sustained reduction in transmission



Public health measures

- Evidence of community spread of 501Y.V1 found in 5% of sequenced samples
- Lockdown extended to 7 February, alongside the introduction of a number of stricter nationwide measures based on modelling work.

Schools

- All primary, secondary schools and colleges moved to remote learning mid December.
- Sustained reduction in transmission

Summary: SARS-CoV-2 Variants

- Viruses constantly change through mutation, and so the emergence of new variants is not unexpected
 - Many mutations have no impact on the virus;
 - some may be detrimental;
 - few may result in an advantage to the virus.
- 501Y.V1:
 - Increase in transmissibility across all age-groups (including children)
 - Early evidence of increase in infection-mortality (including children who have very low risk of death)
 - Several European countries have detected community transmission temporally associated with increase in 510Y.V2 activity
 - Response has included tightening PHSM – including school closures (both reactive and pre-emptive)
- Early evidence of 501Y.V2 escape from neutralizing antibodies in COVID-19 convalescent plasma
 - Prospect of reinfection with antigenically distinct variants and reduced efficacy of current spike-based vaccines.

Recent guidance – WHO and ECDC

Considerations for implementing and adjusting public health and social measures in the context of COVID-19

Interim guidance
4 November 2020



- The decision to introduce, adapt or lift PHSM should be based primarily on situational assessment of intensity of transmission and capacity of health system, but also effects on general welfare
- Situational level 4: Consider all options for continuity of in-person learning. If not possible, limit in-person contact. This may include in person teaching, blended or remote learning strategies strictly limit number of people physically on site (exceptions would include children of essential workers and their teachers).
- **Closure of educational facilities only when there are no other alternatives.**

The screenshot shows the ECDC website header with the logo and the text "European Centre for Disease Prevention and Control, An agency of the European Union". Below the header is a navigation bar with "All topics: A to Z" and links for "News & events", "Publications & data", "Tools", and "About us". A breadcrumb trail reads: "Home > All topics: A to Z > Coronavirus > Threats and outbreaks > COVID-19 > Risk to the EU". On the left is a sidebar menu with "COVID-19" selected, containing links for "Situation updates on COVID-19", "Risk to the EU", "Prevention and control", "Latest evidence", and "All resources". The main content area features a green header for "Risk assessment on COVID-19, 21 January 2021" with a "Risk assessment" tag and social media icons for Twitter, Facebook, LinkedIn, and Email. Below this is a sub-header: "Risk related to the spread of new SARS-CoV-2 variants of concern in the EU/EEA – first update".

- “Incidence of COVID-19 in school settings appears to be mainly affected by levels of community transmission. Widespread transmission of more highly transmissible variants increase likelihood that COVID-19 cases appear in schools, even if not more transmissible among the young.
- Recommended school closures are measure of last resort, implemented as additional, time limited layer where other NPIs have not been able to control local transmission and where school closure will lead to further reductions in the effective reproductive number”

Key questions

- What is the implication of the emergence of VOC for children in terms of:
 - Role of school closures
 - Other health protection measures for children

Background slides

Current WHO recommendations: WER Jan 2021

- Adolescents appear to transmit the virus as often as adults, whereas children under 10 years seem to be less susceptible and less infectious
- This is supported by higher frequency of outbreaks in secondary compared to primary schools
- Large-scale community-based studies in the UK have showed higher levels of acute infection among adolescents and young adults compared to other ages.
- A study in Norway from August to November 2020 found low levels of child-to-child and child-to-adult transmission in primary schools (children aged 5-13 years) that had infection prevention and control measures in place.
- National surveillance data from UK found school staff are at lower risk of infection compared to general adult population. Another study among caregivers at childcare facilities in the USA, found no increased risk of infection for caregivers.
- Several studies and reviews have shown that school re-openings have not been associated with significant increases in community transmission. The return to school of many children in mid-August, following periods of lower community transmission does not appear to have contributed toward the rises seen in October.

Current WHO recommendations: WER Jan 2021

- Transmission occurring in communities can be reflected in school settings: when community transmission is low and when appropriate mitigation measures are applied, schools are unlikely to be the main drivers of COVID-19 transmission. However, where there is community transmission and/or the number of new cases is rising, schools, and particularly secondary schools, may play a substantial role in community transmission. As such, WHO continues to advise a comprehensive approach to reduce transmission, including early detection and isolation of cases as well as contact tracing and supported quarantine, along with other risk mitigation public health measures to reduce exposure and spread.
- WHO and partners have issued guidance on the safe operation of schools during the COVID-19 pandemic (see key resources below). Schools should have outbreak prevention and management plans ready, including control measures to protect staff and individuals at high risk. Measures include the need for adequate ventilation, hygiene practices (such as hand cleaning, cleaning of surfaces and items), mask use (12 years and older should wear a mask under the same conditions as adults and teacher and support staff should wear masks when they cannot guarantee at least a 1-metre distance from others where there is widespread transmission in the area), physical distancing (such as by limiting the number of students per class, alternating shifts, limiting mixing of classes), and frequent communication with parents, students, teachers and staff (such as asking parents to report any cases of COVID-19 in the household, posting signs in visible locations).
- Strong infection prevention and control measures are necessary in all schools and may need to be applied differently based on the age of the students (e.g. secondary and older students compared to primary and younger students).
- School teachers and staff need to remain vigilant to prevent exposure outside the school, where they can be infected.
- Where a student or staff tests positive for SARS-CoV-2, appropriate actions must be taken, including notifying health officials, staff and families, cooperating closely with local health authorities, quarantine, identifying and notifying close contacts and advising them to stay home for 14 days, and disinfecting school areas.
- Considerations to decide to close, partially close or reopen schools should be guided by a risk-based approach to maximize the educational and health benefit for students, teachers, staff, and the wider community, and help prevent transmission of SARS-CoV-2 in the community. School closure should be implemented as a last resort, be temporary and only at a local level in areas with intense transmission.
- Where schools are fully or partially closed, opportunities for remote learning should be instituted, school-based health services, immunization, meals and support services should be maintained, and opportunities for psychosocial and mental health support enhanced.